Report

Baseline Ecological Risk Assessment Remedial Investigation Halaco Superfund Site Oxnard, California

EPA Contract No. EP-S9-08-04

Task Order No. 015-RIRI-09X6

CH2M HILL Project No. 385135

Prepared for

U.S. Environmental Protection Agency

Region 9

September 2015

CH2MHILL®

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Acronyms and Abbreviations

µg/L	micrograms per liter
1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin
1,2,3,4,6,7,8-HpCDF	1,2,3,4,6,7,8-heptachlorodibenzofuran
1,2,3,4,7,8-HxCDD	1,2,3,4,7,8-hexachlorodibenzo-p-dioxin
1,2,3,4,7,8-HxCDF	1,2,3,4,7,8-hexachlorodibenzofuran
1,2,3,4,7,8,9-HpCDF	1,2,3,4,7,8,9-heptachlorodibenzofuran
1,2,3,6,7,8-HxCDD	1,2,3,6,7,8-hexachlorodibenzo-p-dioxin
1,2,3,6,7,8-HxCDF	1,2,3,6,7,8-hexachlorodibenzofuran
1,2,3,7,8-PeCDD	1,2,3,7,8-pentachlorodibenzo-p-dioxin
1,2,3,7,8-PeCDF	1,2,3,7,8-pentachlorodibenzofuran
1,2,3,7,8,9-HxCDD	1,2,3,7,8,9-hexachlorodibenzo-p-dioxin
1,2,3,7,8,9-HxCDF	1,2,3,7,8,9-hexachlorodibenzofuran
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzodioxin
2,3,7,8-TCDF	2,3,7,8-tetrachlorodibenzofuran
2,3,4,6,7,8-HxCDF	2,3,4,6,7,8-hexachlorodibenzofuran
2,3,4,7,8-PeCDF	2,3,4,7,8-pentachlorodibenzofuran
95% UTL	95 percent upper tolerance limit
Ag	silver
Al	aluminum
AMEC	AMEC Earth & Environmental, Inc.
ANOVA	analysis of variance
As	arsenic
Ba	barium
BAF	bioaccumulation factor
Be	beryllium
BERA	baseline ecological risk assessment
bgs	below ground surface
Ca	calcium
CCC	criterion continuous concentration
Cd	cadmium
CDFG	California Department of Fish and Game
City	City of Oxnard
Cl	chloride

CMC	criterion maximum concentration
Co	cobalt
CO_3	carbonate
COPEC	constituent of potential ecological concern
Cr	chromium
CSM	conceptual site model
CTR	California Toxics Rule
Cu	copper
DDE	dichlorodiphenyldichloroethene
EcoSSL	Ecological Soil Screening Level
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ERA	ecological risk assessment
FCGMA	Fox Canyon Groundwater Management Agency
FIR	food ingestion rate
FSP	Field Sampling Plan
Halaco	Halaco Engineering Co.
HCO_3	bicarbonate
Hg	mercury
HpCDD	heptachlorodibenzo-p-dioxin
HpCDF	heptachlorodibenzofuran
HQ	hazard quotient
HxCDD	hexachlorodibenzo-p-dioxin
HxCDF	hexachlorodibenzofuran
Jones & Stokes	Jones & Stokes Associates, Inc.
K	potassium
kg	kilogram(s)
LAS	Lower Aquifer System
LC_{50}	lethal concentration with 50 percent mortality
LOAEL	lowest observed adverse effect level
LOEC	lowest observed effect concentration
Mg	magnesium
mg/kg	milligrams per kilogram
mg/kg/day	milligrams per kilogram per day
mg/L	milligrams per liter

Mn	manganese
Na	sodium
NCL	Nature Conservancy Land
ND	nondetect
ng/kg	nanograms per kilogram
Ni	nickel
NO_2	nitrogen dioxide
NO_3	nitrate
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NPL	National Priorities List
NRWQC	National Recommended Water Quality Criteria
OCDD	octachlorodibenzo-p-dioxin
OCDF	octachlorodibenzofuran
OID	Oxnard Industrial Drain
ORNL	Oak Ridge National Laboratory
PAH	polycyclic aromatic hydrocarbon
Pb	lead
PCB	polychlorinated biphenyl
PEC	probable effects concentration
PeCDD	pentachlorodibenzo-p-dioxin
PeCDF	pentachlorodibenzofuran
PWA	Philip Williams & Associates, Ltd.
QAPP	Quality Assurance Project Plan
Ra 226	radium 226
Ra 228	radium 228
RBC	risk-based concentration
RI	Remedial Investigation
RWQCB	Regional Water Quality Control Board
SAV	secondary acute value
Sb	antimony
SCV	secondary chronic value
Se	selenium
Site	Halaco Engineering Co. Superfund Site
SLERA	screening-level ecological risk assessment

SO_4	sulfate
SVOC	semivolatile organic compound
TCDD	tetrachlorodibenzodioxin
TCDF	tetrachlorodibenzofuran
TDS	total dissolved solids
TEC	threshold effects concentration
TEF	toxic equivalency factor
TEQ	toxic equivalency quotient
Th 228	thorium 228
Th 230	thorium 230
Th 232	thorium 232
TKN	total Kjeldahl nitrogen
Tl	thallium
TNC	The Nature Conservancy
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TRV	toxicity reference value
TRV_{SL}	screening-level toxicity reference value
UAS	Upper Aquifer System
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTL	upper tolerance limit
UWCD	United Water Conservation District
V	vanadium
VOC	volatile organic compound
WDA	waste disposal area
Weston	Weston Solutions, Inc.
WMU	waste management unit
WRA	WRA Environmental Consultants
Zn	zinc

SECTION 1

Introduction

CH2M HILL prepared this baseline ecological risk assessment (BERA) on behalf of the U.S. Environmental Protection Agency (EPA) Region 9 for the former Halaco Engineering Co. (Halaco) Superfund Site located in Oxnard, California (Halaco Site, or Site). This report was prepared under Contract No. EP-S9-08-04, Task Order No. 015-RIRI-09X6 with EPA Region 9.

1.1 Objectives

The BERA provides information intended to support risk management decisions at the Site. Specific objectives are to determine:

1. Whether site-related chemical and radiologic contamination could cause adverse effects on birds, mammals, fish, and other living organisms
2. The likelihood of adverse effects
3. The concentrations of contaminants that could serve as action or cleanup levels for soils, sediments, and other contaminated media at the Site

1.2 Background

The Site is located in eastern Ventura County at and near 6200 Perkins Road in Oxnard, California. Halaco operated a secondary metal smelter at the Site from 1965 to 2004, recovering aluminum and magnesium for reuse. The location and area surrounding the Halaco Site are shown in Figure 1-1. The Site includes an 11-acre parcel containing the former smelter, a 26-acre Waste Management Area where wastes were deposited and managed, and adjacent areas affected by Halaco's wastes. The 11-acre parcel and 26-acre Waste Management Area are referred to as the "Halaco Properties." The 26-acre Waste Management Area includes the Waste Management Unit (WMU), which contained Halaco's former waste settling ponds, and the Waste Disposal Area (WDA) to the north, which received waste from the WMU.

The adjacent areas affected by Halaco's wastes include portions of:

- Land owned by The Nature Conservancy (TNC) east and north of the Waste Management Area, referred to as Nature Conservancy Land (NCL)-East and NCL-North
- Wetland and beach areas south of the Smelter Parcel and WMU
- The Oxnard Industrial Drain (OID), which bisects the Halaco Properties, and an associated lagoon (OID Lagoon)

During its 40 years of operation, Halaco acquired scrap metal from more than 400 suppliers in a variety of forms and in varying levels of purity. Halaco processed dross, sludge, castings, sheets, pellets, granules, cans, car parts, and other scrap. Halaco reports that it processed one type of scrap, a low-level radioactive magnesium-thorium alloy, until about 1977. Other metals found in aluminum and magnesium alloys include copper, silver, zinc, lead, chromium, titanium, tin, manganese, and nickel.

Halaco produced large quantities of solid and liquid waste. Most of the waste was "process waste" generated during the smelting process. Other waste was generated by the air pollution control equipment and from used oil and spent solvent. From 1965 to about 1970, Halaco discharged much or all of its process waste to a former channel of the OID and a settling pond adjacent to the OID, and used waste solids as fill in the smelter area. In about 1970, Halaco began pumping its wastewater across the OID into unlined earthen settling ponds in the area later named the WMU. Beginning in or before 1980, Halaco moved waste solids from the WMU to the WDA.

Halaco's waste at the Smelter Parcel is underlain by a historical burn dump. The dump underlies approximately 9 acres of the 11-acre area. The burn dump appears active in aerial photos from the 1940s through the 1960s.

Halaco reports that all operations ceased in September 2004. In 2007, EPA estimated that more than 700,000 cubic yards of waste solids remained onsite. Most of the solids are in the WMU, which covers about 15 acres and rises up to 35 feet above grade. Previous testing at the Site showed that elevated levels of several metals are present in the waste, and that soils, sediments, and groundwater have been contaminated by Halaco's wastes. Constituents found at elevated levels included aluminum, barium, beryllium, cadmium, chromium, copper, lead, magnesium, manganese, nickel, and zinc. Elevated levels of radioactive thorium (and decay products) were found in some areas. In past sampling, elevated levels of ammonia and petroleum hydrocarbons also were detected at the Site. The ammonia is believed to be a byproduct of the smelting process.

1.3 EPA Actions from 2006 through 2010

In 2006, EPA completed a testing effort at the Site called the Integrated Assessment to (1) determine the eligibility of the Site for placement on the Superfund National Priorities List (NPL), and (2) evaluate the need for immediate actions to stabilize the Site (Weston Solutions, Inc. [Weston], 2007). In September 2007, EPA added the former Halaco facility and adjacent areas of contamination to the NPL. Shortly thereafter, EPA began the RI to determine the nature and extent of contamination at the Site, identify human health and ecological risks posed by the contamination, and identify areas needing remediation.

In 2006 and 2007, two removal actions were completed to address immediate site risks while EPA evaluated the Site for placement on the NPL. The first removal action, completed by the property owners between August 2006 and February 2007, included the removal of drums and other hazardous substances from the Site. A second, EPA-funded removal action was completed in 2007 to stabilize and secure the Site and limit offsite migration of contaminated wastes. It included regrading the waste pile to reduce the steepness of the slopes; placing matting on the slopes to reduce erosion; stabilizing the banks along the lower portion of the OID; removing an estimated 9,000 cubic yards of waste from the smelter area; removing an estimated 7,600 cubic yards of material from a wetland area adjacent to the Halaco Properties; and installing more than 6,000 feet of fencing around the perimeter of the Waste Management Area. See the summary report (Team 9, 2008) for additional details. The aerial photo in Figure 1-1 was taken after the second removal action was completed.

In 2007, EPA completed additional site characterization activities. These included a radiation assessment of surface and subsurface conditions throughout the Smelter Parcel (Team 9, 2008).

In 2008, EPA completed the *Screening-Level Ecological and Human Health Risk Assessment, Halaco Site* to support remedial investigation (RI) activities for the Site (CH2M HILL, 2008a). This screening-level risk assessment identified contaminants of potential concern and environmental exposure pathways for ecological and human receptors. This assessment used conservative estimates of exposure and potential ecological and human health effects to identify areas of the Site that may pose unacceptable risks to human health and/or the environment and may warrant remediation.

Also in 2008, EPA completed the *Preliminary Evaluation of the Sources, Nature, Extent, and Movement of Contamination in Surface Water and Groundwater, Halaco Site* (CH2M HILL, 2008b). This preliminary evaluation compiled and evaluated information on surface water and groundwater contamination at the Site, and the physical processes that affect the movement of the contamination.

In 2009, using the results of the Integrated Assessment (Weston, 2007), radiation assessment (Team 9, 2008), screening-level risk assessment (CH2M HILL, 2008a), and preliminary groundwater evaluation (CH2M HILL, 2009b), EPA identified data gaps and prepared a plan for additional sampling and analysis activities needed before remediation could occur (EPA Region 9, 2009). Based on this testing plan, CH2M HILL then prepared

the data quality objectives, Quality Assurance Project Plan (QAPP), and Field Sampling Plan (FSP) for the RI activities (CH2M HILL, 2009a, 2009b) conducted by EPA from 2009 through 2011.

In 2010, EPA demolished two abandoned industrial buildings at the Site. The two buildings were in poor condition and at risk of collapse.

1.4 EPA Investigation Activities from 2009 through 2011

EPA performed RI sampling and analysis activities for the Halaco Site from 2009 through 2011. The primary objectives were to provide data needed to:

- More fully determine the nature and extent of (1) wastes and soil contamination at the Halaco Properties, (2) soil and sediment contamination in the areas surrounding the Halaco Properties, and (3) surface water and groundwater contamination.
- Characterize the human health and environmental risks posed by the wastes and contaminated soil, sediment, surface water, and groundwater.
- Evaluate remedial options for wastes and contaminated soil, sediment, surface water, and groundwater that pose an unacceptable risk.

This testing was completed in accordance with the EPA-approved QAPP (CH2M HILL, 2009a), FSP (CH2M HILL, 2009b), and an Addendum to the QAPP and FSP (EPA, 2011). The results of this testing are documented in the following reports:

- *Solid Matrix Sampling and Analysis Results for the NCL-East and NCL-North Areas, Halaco Superfund Site Remedial Investigation, Oxnard, California* (CH2M HILL, 2011a)
- *Solid Matrix Sampling and Analysis Results for the Wetlands and Beach Areas, Halaco Superfund Site Remedial Investigation, Oxnard, California* (CH2M HILL, 2011b)
- *Solid Matrix Sampling and Analysis Results for the Oxnard Industrial Drain and Lagoon Areas, Halaco Superfund Site Remedial Investigation, Oxnard, California* (CH2M HILL, 2011c)
- *Solid Matrix and Soil Gas Sampling and Analysis Results for the Smelter Parcel and Waste Management Areas, Halaco Superfund Site Remedial Investigation, Oxnard, California* (CH2M HILL, 2011d)
- *Surface Water and Groundwater Sampling and Analysis Results, Halaco Superfund Site Remedial Investigation, Oxnard, California* (CH2M HILL, 2012)
- *Step-out Solid Matrix Sampling and Analysis Results and Sediment Chromium Speciation, Halaco Superfund Site Remedial Investigation, Oxnard, California* (CH2M HILL, 2013)

The RI activities performed from 2009 through 2011 supplemented the earlier data collected by EPA from 2006 through 2008 for the Halaco Site, historical environmental data collected by others, and data collected as part of regional investigations, including studies to assess regional groundwater conditions in support of Ormond Beach restoration efforts. These data are described in the above six reports.

EPA performed additional Tier 2 biological sampling and analysis activities for the Halaco Site in 2011 to further evaluate ecological risks and support the preparation of this BERA. The testing and laboratory results are documented in Appendix A of this report. In summary, samples were collected to perform the following analyses:

- Bioaccumulation modeling that compares contaminant concentrations in soil invertebrate, aquatic benthic invertebrate, and fish tissues (“tissue residues”) with contaminant concentrations in collocated soil or sediment
- Toxicity tests with contaminated sediments and laboratory test species (“bioassays”)

The following types of samples were collected:

- Terrestrial invertebrate, aquatic benthic invertebrate, and fish tissue samples for laboratory analysis of metals and polychlorinated dibenzodioxins and dibenzofurans (dioxins and furans)
- Soil and sediment samples (collocated with the tissue samples) for laboratory analysis of metals, dioxins and furans, and other parameters
- Sediment samples (collocated with the tissue samples) for laboratory bioassays ("toxicity tests") in which a test organism is exposed to the sediments

Field-collected benthic invertebrate, terrestrial invertebrate, and fish tissue samples were analyzed together with the collocated soil and sediment samples for the constituents of ecological concern, which are metals and dioxins and furans. Sediment samples collected for bioassays were also analyzed for other constituents that may affect and help explain the response of the laboratory bioassay test organisms. These analytes are polycyclic aromatic hydrocarbons (PAHs), semivolatile organic compounds (SVOCs), chlorinated pesticides, polychlorinated biphenyls (PCBs), pH, total organic carbon (TOC), and grain size. The samples were collected at locations expected to have low, intermediate, and high contaminant concentrations based on past sampling results. The laboratory analytical results for some of these other constituents (PAHs, SVOCs, pesticides, PCBs) were subsequently determined to be not valid by EPA and therefore, the results are not used in this BERA. The collected Tier 2 samples are outlined in Table A-1 of Appendix A.

1.5 Technical Approach

The BERA was conducted in accordance with EPA guidance for ecological risk assessments (ERAs) within the Superfund Program (EPA, 1997). As recommended in this guidance, ERAs are prepared in phases (sometimes referred to as tiers or levels). This approach entails increasingly sophisticated levels of data collection and analysis, wherein the conservative assumptions of the initial evaluations are replaced by more site-specific data and more ecologically realistic assumptions. Using a phased approach may reduce the amount of field work, serves to reduce conservatism and uncertainties in the risk assessment, and focuses effort on issues most likely to drive remedial actions. The ERA process for Superfund is composed of the following eight steps:

- Step 1: Screening Level – Problem Formulation and Ecological Effects Evaluation
- Step 2: Screening Level – Preliminary Exposure Estimate and Risk Calculations
- Step 3: Problem Formulation
- Step 4: Study Design and Data Quality Objective Process
- Step 5: Verification of Field Sampling Design
- Step 6: Site Investigation and Data Analysis
- Step 7: Risk Characterization
- Step 8: Risk Management

The first phase of risk assessment is the screening-level ecological risk assessment (SLERA), which is limited to steps 1 and 2 of the eight-step process. This phase employs existing data and conservative assumptions to develop a screening-level problem formulation, ecological conceptual model, exposure evaluation, toxicity evaluation, and risk calculations. The SLERA integrates conservative measures of exposure with conservative measures of effects to differentiate between analytes, receptors, and locations for which there are clearly no risks and those for which further evaluation is necessary.

EPA completed a SLERA for the Halaco Site in 2008 using available data (CH2M HILL, 2008a). The Halaco Site SLERA developed a preliminary conceptual site model (CSM) of the primary contaminant sources, release mechanisms, pathways (exposure media), exposure routes, and potential terrestrial and aquatic receptors. The SLERA then identified metals and radionuclides as the primary constituents of potential ecological concern (COPECs) and concluded that numerous metals exceeded ecological risk screening values for Halaco's process wastes and affected media including soil, sediment, surface water, and groundwater.

The second phase of an ERA consists of a BERA that follows steps 3 through 8 of the eight-step process. In this phase, the collection and interpretation of biological data are completed to refine and update the conclusions of the SLERA. This phase makes use of results of the RI sampling and analysis activities conducted from 2009 through 2011.

The procedures followed for conducting the BERA are consistent with those described in the primary guidance (EPA, 1997), as well as additional guidance provided by EPA:

- ECO Updates, Volume 1, Numbers 1 through 5 (EPA, 1991a, 1991b, 1992b, 1992c, 1992d)
- ECO Updates, Volume 2, Numbers 1 through 4 (EPA, 1994a, 1994b, 1994c, 1994d)
- ECO Updates, Volume 3, Numbers 1 and 2 (EPA, 1996a, 1996b)
- *Final Guidelines for Ecological Risk Assessment* (EPA, 1998)
- *Ecological Risk Assessment and Risk Management Principles for Superfund Sites* (EPA, 1999b)
- *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments* (EPA, 2001)

1.6 BERA Organization

This report is organized following the ecological risk assessment framework established by EPA (EPA, 1992a) and includes the following sections:

- Section 1: Introduction
- Section 2: Baseline Problem Formulation
- Section 3: Aquatic Biota – Exposure, Effects, and Risk Characterization
- Section 4: Benthic Invertebrates – Exposure, Effects, and Risk Characterization
- Section 5: Terrestrial Plants and Soil Invertebrates – Exposure, Effects, and Risk Characterization
- Section 6: Birds and Mammals – Exposure, Effects, and Risk Characterization
- Section 7: Uncertainties
- Section 8: Risk Results by Medium
- Section 9: Summary of Risk by Area
- Section 10: References
- Tables
- Figures

The following appendixes also are included:

- Appendix A: Tier 2 Biological Sampling and Analysis Results
- Appendix B: Consolidated Data Tables and Lead Concentration Figures
- Appendix C: Summary and Analysis of Sediment Bioassays
- Appendix D: Summary and Analysis of Bioaccumulation Data
- Appendix E: Summary of Literature-Derived Fish Tissue Toxicity Data
- Appendix F: Summary of Literature-Derived Invertebrate Tissue Toxicity Data
- Appendix G: Evaluation of Pyrethroid and Organophosphate Pesticides in Sediment
- Appendix H: Calculation of Risk-Based Concentrations for Wildlife
- Appendix I: Sample-by-Sample Comparison of Soil and Sediment Concentrations to Risk-Based Concentrations for Ecological Receptors

SECTION 2

Baseline Problem Formulation

This section provides the baseline problem formulation, Step 3 of the BERA process. Problem formulation is one of the most critical components of any risk assessment. Problem formulation includes a description of the site setting (demographics and land uses, physical setting, and ecological setting); identification of the COPECs; development of the baseline CSM; identification of assessment endpoints and measures of exposure and effects; and a summary of the available data. The baseline problem formulation provides direction and focus to the assessment process and ensures that relevant data are evaluated.

2.1 Site Setting

The site setting for the Halaco Site, including land use, physical setting, and ecological setting is described below.

2.1.1 Land Use

Industrial and open space land uses surround the Halaco Site, which is located in the southern part of the City of Oxnard (City) (Figure 1-1). Industrial land uses occur to the northeast, north, and northwest of the Site. The City's wastewater treatment plant is located to the northwest and an industrial paper recycling plant is located to the north of the Smelter Parcel. Open space land uses predominate to the west, south, and east. The City's 2030 General Plan (City of Oxnard, 2011), which provides the city's vision for future land uses, designates the Site as Resource Protection. This designation is intended to protect, preserve, and restore environmentally sensitive habitat, including coastal wetlands, sand dunes, riparian habitats, and endangered species habitats.

The Halaco Site is located within the Ormond Beach area, which was once a large region of tidal marsh lands extending from Point Mugu (to the south) northward to Port Hueneme, before being drained many years ago in response to agricultural, urban, and industrial activities. TNC is collaborating with the California Coastal Conservancy (a state agency), Ormond Beach Task Force, and other local partners in an effort to restore large areas of what were once tidal marsh lands. A significant level of characterization of the ecological and physical characteristics has been conducted to support these planned wetland restoration activities, as documented by Jones & Stokes Associates, Inc. (Jones & Stokes, 1998), AMEC Earth & Environmental, Inc. (AMEC, 2006), WRA Environmental Consultants (WRA, 2007), and Philip Williams & Associates, Ltd. (PWA, 2007).

2.1.2 Physical Setting

The physical setting for the Halaco Site and vicinity has been well characterized by EPA's RI activities and from ongoing efforts by various agencies to restore wetland habitat in the Ormond Beach area. Six RI reports prepared by CH2M HILL summarize the surface, subsurface, surface water, and groundwater conditions (CH2M HILL; 2011a, 2011b, 2011c, 2011d, 2012, and 2013). A report by PWA (2007) summarizes hydrologic and geomorphic conditions at and near the Halaco Site to help identify wetland restoration opportunities and constraints based on physical processes. The report documents the topography, geology and soils, surface water hydrology, groundwater, wave climate, longshore current/sediment transport, and beach conditions in the Ormond Beach area. Additionally, significant hydrogeologic studies have been performed to help manage the groundwater resources on the Oxnard Plain. These include studies by the U.S. Geological Survey (USGS, 2003), United Water Conservation District (UWCD, 2004), and Fox Canyon Groundwater Management Agency (FCGMA, 2007). This information has been updated by EPA's detailed studies to assess surface water and groundwater flow conditions at the Halaco Site (CH2M HILL, 2008b, 2012).

2.1.2.1 Surface Conditions

The Site is located on the Pacific Ocean shoreline, at the southern extent of the City. The Site is bisected by the OID, a surface water channel that drains upstream agricultural, commercial, and residential areas of the Oxnard Plain (Figure 1-1). Immediately to the north and east of the Halaco Properties is a wetland area owned by TNC. To the south are a wetland area, a lagoon, and the Pacific Ocean. The wetlands are part of the larger Ormond Beach wetland area, which extends from Port Hueneme (to the northwest) southward to the Mugu lagoon (to the southeast). The Ormond Beach wetlands are home to several endangered or threatened species and are the focus of federal and state restoration efforts.

2.1.2.2 Surface Water Conditions

The OID, J Street Drain, and Hueneme Drain discharge into the wetlands (lagoon) area between the Halaco Properties and the ocean (Figure 1-1). These channels drain urbanized runoff from the Port Hueneme and Oxnard areas. The OID and J Street Drain discharge into the lagoon by gravity. Water from the Hueneme Drain requires pumping over a dam structure at the terminus of the J Street Drain before discharge into the J Street Drain and lagoon. This dam structure is in place to prevent reverse flow and inundation of the upstream, urbanized area.

Much of the year, the lagoon is maintained several feet higher than the Pacific Ocean by a naturally occurring beach berm. During the summer dry season, surface water slowly seeps through the coastal sand berm into the ocean (CH2M HILL, 2012). This berm breaches during winter rainfall events, allowing the lagoon level to drop and equalize with the ocean level. When the berm is breached, seawater moves in and out of the lagoon and OID (CH2M HILL, 2012). Ocean longshore sedimentation processes act to reestablish this berm, reestablishing higher water levels. The longshore ocean current and sediment transport direction is from the northwest to southeast, roughly parallel to the coastline (Figure 3 in PWA, 2007).

NCL-East and NCL-North become partially inundated by surface water during high-water-level stages in the OID and lagoon. These high water-level stages occur during the nonrainy months when surface water rises to an elevation of approximately 8 feet. Water flows into these two areas at this elevation when:

- Surface water from the lagoon flows eastward along the ditch south of the WMU and spills across a high point at the south tip of the WMU into the NCL-East area, filling the southwestern part of NCL-East that is below this elevation of 8 feet.
- Surface water from the OID flows into the NCL-North pond that occurs immediately to the north of the WDA and eastward along the ditch north of the WDA. At very high surface water elevations, the water also flows out of the ditch at the northeast corner of the WDA and into NCL-East.

The water in the NCL lands dissipates in response to evaporation and percolation when the water levels in the OID/lagoon drop during the rainy months when the berm breaches.

2.1.2.3 Groundwater Conditions

The Halaco Site overlies the Oxnard Plain Groundwater Basin, which is one of several groundwater sub-basins located within the coastal valleys and plains of the Santa Clara-Calleguas basin. The aquifer system underlying this basin is extensively used for water supply for agricultural, municipal, and industrial uses. Groundwater is present in three primary aquifer systems (from shallowest to deepest): the Semi-perched aquifer, Upper Aquifer System (UAS), and Lower Aquifer System (LAS). These aquifer systems are separated by silts and clays of low permeability and generally consist of the following:

- **Semi-perched Aquifer.** The Semi-perched aquifer consists of localized units of low- to moderate-permeability materials (silts and sands), generally to a depth of between 50 to 100 feet below ground surface (bgs). The Semi-perched aquifer is regionally of low yield and poor water quality across the Oxnard Plain. Consequently, the Semi-perched aquifer generally is not used as a water supply for drinking or irrigation. The Semi-perched aquifer is underlain by an extensive clay deposit that separates it from the underlying regional aquifer system consisting of the UAS and LAS.

- **Regional Aquifer System.** The UAS and LAS each consist of aquifer units of high-permeability materials (sands and gravels), generally to a depth of more than 1,000 feet bgs. From shallowest to deepest, the UAS consists of the Oxnard and Mugu aquifers; and the LAS consists of the Hueneme, Fox Canyon, and Grimes Canyon aquifers. These regional aquifers yield significant amounts of water and contain good quality water across the Oxnard Plain, except in coastal areas that are affected by saline water intrusion caused by overdraft conditions. Saline intrusion occurs in the vicinity of the Halaco Site in both the UAS and LAS.

The Semi-perched aquifer, UAS, and LAS have each been assigned beneficial uses by the California Regional Water Quality Control Board (RWQCB) for municipal and domestic water supply. However, Finding No. 145 of RWQCB Order 980-58 states, "Because of its very poor mineral quality, waters from the semi-perched aquifer are not used for domestic, agricultural, or industrial water supply in any significant quantity."

The RI data (CH2M HILL, 2012) confirm that groundwater occurs beneath the Halaco Properties in two distinct layers. The shallower layer is the Semi-perched aquifer, which extends to a depth of about 90 feet bgs. The deeper layer is the Oxnard aquifer, which is separated from the Semi-perched aquifer by a 30-foot-thick layer of clay and silt (an "aquitard") that limits movement of groundwater between the two aquifers. Although Halaco operations have affected the shallower Semi-perched aquifer, they have had little or no effect on the deeper Oxnard aquifer due to the presence of the aquitard. Additionally, water in the Semi-perched aquifer has, on average, been at lower pressure than water in the Oxnard aquifer since the 1990s. This pressure difference reduces the risk that groundwater in the Semi-perched aquifer has moved or will move downward into the Oxnard aquifer.

The RI data also show that groundwater in the Semi-perched aquifer generally moves northward across the Site. Its movement is affected by surface water levels in the OID, Ormond Beach lagoon, and the TNC properties, and a groundwater "sink" that has been identified to the north of the Halaco Properties (CH2M HILL, 2012).

2.1.3 Ecological Setting

The ecological setting for the Halaco Site and vicinity has been well characterized as part of the Ormond Beach Wetland Restoration project, as documented by Jones & Stokes (1998) and WRA (2007).

2.1.3.1 Habitat Types

Sensitive habitats in the Site vicinity include coastal salt marsh, coastal freshwater/brackish wetlands, and the southern foredune. An extensive beach-dune complex runs along the southern boundary of the Site. The wetlands adjacent to the Site historically were part of a salt marsh and brackish water lagoon and dune system. These lagoons were located behind a narrow sandy barrier beach of low dunes; they were fed by water from creeks and surface flow over the plain, and inundated by saltwater during high tides or storms. Periodically, the barrier beach was breached by discharge of meandering river flows or the action of winter storm waves. Some of the lagoons likely remained open to the ocean for a period of time after the breaching event.

TNC Land. The wetland areas owned by TNC to the east and north of the Site represent the greatest expanse of historical salt marsh habitat remaining within the Ormond Beach area. The northeastern portion of NCL-East is impacted by numerous dirt roads and miscellaneous vehicular activity and is not designated as a wetland by the Oxnard Local Coastal Program. Additionally, the region directly to the south of the McWane Boulevard terminus contains a remnant concrete building pad and a large amount of debris (WRA, 2007). The remaining habitat to the south is dominated by perennial pickleweed (*Salicornia virginica*), jaumea (*Jaumea carnosa*), fat-hen spearscale (*Atriplex triangularis*), and numerous areas of seasonally flooded mineral (sand) flats. The special-status plant species, Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*) also has been documented in this region (Jones & Stokes, 1998; California Department of Fish and Game [CDFG], 2007).

NCL-North is much less disturbed than the eastern TNC parcel and retains most of the original physical characteristics (topography) visible in an 1855 U.S. Coastal Survey. The vegetation communities are a mix of perennial emergent freshwater wetlands in a band immediately adjacent to the OID, and ruderal (weed-dominated) non-native grassland as distance from the OID increases.

Wetland Area—West. The wetland area located in the Hueneme Drain property (herein referred to as the Hueneme Parcel), west of the Smelter Parcel, was not accessed by WRA biologists during the July 2004 Site visits. However, images and descriptions provided by Dr. Spencer MacNeil (formerly of Aspen Environmental Group) indicate that this area is primarily dominated by perennial pickleweed and saltgrass. The area is situated in a closed depression that does not receive tidal influence; however, the current plant composition and review of the 1855 coast survey indicate that this area was historically subject to tidal inundation (WRA, 2007).

Wetland Area—South. The wetland area located near the mouth of the OID and south of the WMU receives freshwater flows into the lagoon area from three drains: Hueneme Drain, J Street Drain, and OID. The water in the wetland area infiltrates into and through the beach sands, or flows directly into the ocean through occasional breaches in the sand barrier. The lagoon receives ocean water through tidal influence during the winter months when the sand barrier is breached, and potentially at other times of the year over and through the sand berm during very high tides. Generally, low-salinity and high-water conditions occur during the summer when freshwater builds up in the lagoon behind the sand berm. Higher salinity and lower water levels are more characteristic during the winter months when the berm has been breached. Salts tend to accumulate in adjacent soils during saline conditions and then flush from the soils during freshwater conditions (Impact Sciences, 1996). This region contains a mix of habitat types including open water, southern foredunes, degraded dunes, and mixed transitional habitat. The wetland habitat occupies the central region of the lagoon and is dominated primarily by California tule (*Schoenoplectus californicus*), bulrush (*Bolboschoenus maritimus*), common cattail (*Typha latifolia*), and saltgrass. Transitional marsh-upland habitats are located along portions of the wetland perimeter. These areas contain a mix of wetland and upland species such as saltgrass, curly dock (*Rumex crispus*), western ragweed (*Ambrosia psilostachya*), iceplant (*Carpobrotus* sp.), and coyote bush (*Baccharis pilularis*). According to the 1855 coast survey, this area appears to have been an estuarine lagoon, associated wetlands, coastal grasslands, and dunes (WRA, 2007).

Dune Habitat. Most of the dune habitat within or adjacent to the Site has been developed or is severely degraded by perturbations caused by humans. This habitat is characteristic of the sand verbena-beach bursage series (Sawyer and Keeler-Wolf, 1995). Most of the beach dune complex is a sparse combination of perennial forbs and low shrubs that form a ground cover. Native plant species that are dominant in this habitat type include beach evening primrose (*Camissonia cheiranthifolia*), beach bur (*Ambrosia chamissonis*), and beach morning-glory (*Calystegia soldanella*). Sand verbena also was a dominant species and may have included the naturalized yellow sand verbena (*Abronia latifolia*) from northern California and the native *A. maritima* and *A. umbellata*, as well as hybrids of these species. Patches of invasive iceplant dominate regions of the southern foredune habitat. Other non-native plants that have invaded this habitat (but do not appear to be problematic) include sea rocket (*Cakile maritima*) and kikuyu grass (*Pennisetum clandestinum*) (WRA, 2007).

Agricultural Land. Agricultural land is located to the east and north of NCL. This habitat comprises inactive and active agricultural land used to cultivate sod and various crops.

2.1.3.2 Special-Status Species

Based on a review of literature and database searches for known occurrences of special-status species in the general vicinity of the Site, 50 special-status plant species have been documented (Appendix A in WRA, 2007). Wildlife and plant species observed during the July 2004 site assessment are provided in Appendix B in WRA (2007). Additional information concerning special-status species potentially resident at the Site were provided by Phillips (2007). In 2009, the U.S. Fish and Wildlife Service (USFWS) provided EPA

a table of federally listed species that may occur near the Halaco Site (USFWS, 2009). These species are shown in Table 2-1.

Plants

During the WRA surveys, two special-status plant species were observed within the vicinity of the Halaco Site: salt marsh bird's-beak (*Cordylanthus maritimus* ssp. *maritimus*) and woolly seablite (*Suaeda taxifolia*). Salt marsh bird's beak was also identified as a special-status species for the Site in the list provided by USFWS (Table 2-1). Follow-up observations by a CH2M HILL wildlife biologist during RI sampling did not find the salt marsh bird's beak to occur either onsite or at the NCL and wetland areas surrounding the Site. Woolly seablite is not mapped because it was not clearly differentiated from other *Suaeda* species during the time of the field surveys (Figure 6 in WRA, 2007). Additionally, red sand verbena (*Abronia maritima*) and Coulter's goldfields were documented in the vicinity of the Halaco Site (Jones & Stokes, 1998; CDFG, 2007; Impact Sciences, 1996).

Of the remaining 25 plant species that have potential to occur within the vicinity of the Site, aphanisma (*Aphanisma blitoides*), San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*), and white rabbit-tobacco (*Pseudognaphalium leucocephalum*) are the only special-status plant species with a low potential to occur. Thirteen of the special-status plant species have a moderate potential for occurrence on the Site: Braunton's milk-vetch (*Astragalus brauntonii*), Ventura marsh milk-vetch (*A. pycnostachyus* var. *lanosissimus*), South Coast saltscale (*Atriplex pacifica*), Davidson's saltscale (*A. serenana* var. *davidsonii*), Brewer's calandrinia (*Calandrinia breweri*), seaside calandrinia (*C. maritima*), Catalina mariposa lily (*Calochortus catalinae*), Santa Barbara morning-glory (*Calystegia sepium* ssp. *binghamiae*), dunedelion (*Malacothrix incana*), cliff malacothrix (*M. saxatilis* var. *saxatilis*), Mexican malacothrix (*M. similis*), rayless ragwort (*Senecio aphanactis*), and salt spring checkerbloom (*Sidalcea neomexicana*). Nine special-status plant species have a high potential for occurrence: southern tarplant (*Centromadia parryi* ssp. *australis*), Orcutt's pincushion (*Chaenactis glabriuscula* var. *orcuttiana*), dune larkspur (*Delphinium parryi* ssp. *blochmaniae*), beach spectaclepod (*Dithyrea maritima*), small spikerush (*Eleocharis parvula*), suffrutescent wallflower (*Erysimum insulare* ssp. *suffrutescens*), vernal barley (*Hordeum intercedens*), California spineflower (*Mucronea californica*), and estuary seablite (*Suaeda esteroa*) (WRA, 2007).

Animals and Birds

WRA (2007) documented six state and federally listed endangered and threatened animal species as being present or as having a high potential to occur, in addition to the 23 other special-status species known to occur or having a high potential to occur in the vicinity of the Site (Appendix A in WRA, 2007). Additionally, more than 200 migratory bird species have been documented within the Ormond Beach and adjacent Mugu Lagoon wetland complex. More shorebird species are known from this area than any other site in Ventura County (Coastal Conservancy, 2003).

These six state and federally listed animal species documented by WRA (2007) included the California brown pelican (*Pelecanus occidentalis californicus*), American peregrine falcon (*Falco peregrinus anatum*), western snowy plover (*Charadrius alexandrinus nivosus*), California least tern (*Sterna antillarum browni*), Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), and tidewater goby (*Eucyclogovius newberryi*). The American peregrine falcon was federally delisted in 1999 and the CDFG voted to remove this species from the state's list in 2009, though it is still a state-protected species. In addition to the five remaining state and federally listed species, USFWS (2009) also identified the light-footed clapper rail (*Rallus longirostris levipes*) and the southern sea otter (*Enhydra lutris nereis*) as having a potential to occur near the Site (Table 2-1).

Appendix C in WRA (2007) presents aerial photographs delineating potential breeding and foraging habitats for California least tern, Belding's savannah sparrow, white-tailed kite (*Elanus leucurus*), western snowy plover, south coast garter snake (*Thamnophis sirtalis*), and wandering (saltmarsh) skipper (*Panoquina errans*), which are known to occur within the areas surrounding the Halaco Properties. The skipper is included because of its extreme rarity in California and dependence on coastal saltmarsh habitats such as

those present at the Site. This species is considered globally imperiled by the World Conservation Union (WRA, 2007). The remaining federal and state species of concern and fully protected species are Southern California saltmarsh shrew (*Sorex ornatus salicornicus*), San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), double-crested cormorant (*Phalacrocorax auritus*), American bittern (*Botaurus lentiginosus*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), black-crowned night-heron (*Nycticorax nycticorax*), white-faced ibis (*Plegadis chihi*), white-tailed kite, northern harrier (*Circus cyaneus*), merlin (*Falco columbarius*), mountain plover (*Charadrius montanus*), long-billed curlew (*Numenius americanus*), western burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), California horned lark (*Eremophila alpestris actia*), tri-colored blackbird (*Agelaius tricolor*), south coast garter snake, sandy beach tiger beetle (*Cicindela hirticollis gravida*), tiger beetle (*C. sensilis frosti*), and globose dune beetle (*Coelus globosus*) (Appendix A in WRA, 2007).

2.2 Site Areas for Ecological Risk Assessment

As outlined in Section 1.2, Halaco operated a secondary metal smelter at the Site for about 40 years (1965 to 2004). It has been estimated that more than 700,000 cubic yards of waste solids from smelter-related activities remain onsite. The Halaco Site includes the Halaco Properties, which consist of the 11-acre former Smelter Parcel and the 26-acre Waste Management Area, and the areas adjacent to the Site that have been affected by Halaco's wastes. The former smelter and Waste Management Area parcels are bisected by the OID. The adjacent areas include NCL-East and NCL-North located to the east and north of the Waste Management Area, wetland and beach areas to the south, the OID, and OID Lagoon (see Section 1.2 and Figure 1-1).

For the purposes of this BERA, the areas adjacent to the Halaco Properties were divided into the following subareas (Figure 2-1):

- NCL-East: This area is salt marsh wetland bounded by the terminus of McWane Boulevard to the north, the Waste Management Area to the west, cultivated fields to the east, and dunes to the south.
  - NCL-East (less than 8 feet elevation) – This subarea contains land that is less than 8 feet in elevation and can become inundated with water when the coastal sand berm is intact, and lagoon and OID water levels are high. Because this subarea, or portions thereof, is sometimes dry, the solid matrix samples collected in this subarea were considered to be both soil and sediment and accordingly were evaluated for both terrestrial and aquatic receptors.
  - NCL-East (more than 8 feet elevation) – This subarea consists of land that is at an elevation greater than 8 feet and was considered to be terrestrial because the higher area remains dry when NCL-East becomes inundated.
- NCL-North: This area is bounded by open space to the north, the WDA and NCL-East to the south, and industrial areas to the west and east.
  - NCL-Ditch – The NCL-Ditch is located immediately north of the WDA.
  - NCL-Pond – The NCL-Pond is a small pond located near the northwest corner of the WDA in a small copse of trees east of the OID and just north of the fence line.
- OID Lagoon: The Hueneme Drain (also known as Bubbling Springs Drain), J Street Drain, and the OID all discharge to the OID Lagoon located to the south/southwest of the Halaco Properties.
  - OID-North
  - OID-Site
  - Lagoon Finger-Footbridge
  - Lagoon-Main
  - Lagoon Finger-West
  - Lagoon Finger-East

- Wetlands Beach
  - Hueneme Parcel – The Hueneme Parcel is the triangular piece of land immediately west of the Smelter Parcel, south of the Oxnard wastewater treatment plant, and north of the wetlands area.
  - WMU Ditch – The WMU Ditch runs along the southern border of the WMU and carries surface water from the lagoon to NCL-East when water levels are high.
  - WMU Ditch-5 feet South – This subarea represents samples collected 5 feet south of the WMU Ditch.
  - WMU Ditch-15 feet South – This subarea represents samples collected 15 feet south of the WMU Ditch.
  - WMU Ditch-30 feet South – This subarea represents samples collected 30 feet south of the WMU Ditch.
  - WMU Ditch-50 feet South – This subarea represents samples collected 50 feet south of the WMU Ditch.
  - Wetland-West – This area is south and west of the Smelter Parcel and west of the OID.
  - Wetland-East – This area is south of the WMU and east of the OID.
  - Beach-Breach – This area includes a portion of the beach where the OID historically breached the coastal sand berm.

2.3 Constituents of Potential Ecological Concern

COPECs are those constituents present at the Site at concentrations that may exceed toxicity thresholds for ecological receptors. These chemicals are identified by an evaluation of past Site operations and analytical results from samples collected from the Site. In a BERA, a key component of the problem formulation is refinement of the COPECs identified in the SLERA. Additional RI data that were collected after completion of the SLERA were used to update the COPECs for this BERA.

2.3.1 SLERA COPECs

The SLERA used data from the following site-specific and regional investigations:

- **Site-specific Investigations**—The site-specific investigations consisted of EPA's Integrated Assessment of the Site (Weston, 2007) and EPA's follow-up investigation of the southeast corner of the smelter area (Team 9, 2008).
- **Regional Investigation**—The regional investigation consisted of the soil and surface water investigation conducted to support the ongoing efforts to restore wetland habitat in the Ormond Beach area (AMEC, 2006).

Although other historical data existed, those data were not considered to represent current conditions at the time the SLERA was performed.

Results of the SLERA indicated that concentrations of multiple metals in surface water, groundwater, sediment, or soil were sufficiently high to potentially present risks to ecological receptors. Additionally, three radioactive COPECs were found to be potential risk drivers (K-40 in surface water, and radium 228 [Ra-228] and thorium 228 [Th-228] in soil). As would be expected, the potential risks to ecological receptors were greatest at the Halaco Properties, and lower in adjacent areas. However, the Halaco Properties provide little or no suitable habitat for ecological receptors.

2.3.2 BERA COPECs

Given the lack of suitable habitat, the Halaco Properties were not carried forward for evaluation in the BERA. Subsequent to the SLERA, EPA performed additional RI sampling and analysis from 2009 through

2011. This included additional sampling of surface water, sediment, and soil in areas adjacent to the Halaco Properties (see Sections 1.4 and 2.7.2). These media were tested for the following analytes:

- **Surface water** — Metals, radioactive thorium and radium, general chemistry parameters, and TOC (CH2M HILL, 2012)
- **Soil/Sediment from OID and Lagoon Areas** — Metals in all samples, and volatile organic compounds (VOCs), SVOCs, PCBs, total petroleum hydrocarbons (TPH), and dioxins and furans in approximately 50 percent of samples (CH2M HILL, 2011c)
- **Soil/Sediment from Wetlands and Beach Areas** — Metals and radioactive thorium and radium (CH2M HILL, 2011b, 2013)
- **Soil/Sediment from NCL-East and NCL-North** — Metals and radioactive thorium and radium (CH2M HILL, 2011a, 2013)

It should be noted that additional sampling was conducted at the Halaco Properties (CH2M HILL, 2012), but as previously indicated, this area was not included in the BERA.

In addition to the media sampling, Tier 2 biological sampling for the BERA was conducted in 2011. As described in Section 1.4, field-collected tissue samples and collocated soil and sediment samples were analyzed for the constituents of ecological concern, which are metals and dioxins and furans. Sediment samples collected for bioassays were also analyzed for other constituents that may affect and help explain the response of the laboratory bioassay test organisms. These analytes are PAHs, SVOCs, chlorinated pesticides, PCBs, pH, TOC, and grain size. The laboratory analytical results for some of these other constituents (PAHs, SVOCs, pesticides, PCBs) were subsequently determined to be not valid by EPA and therefore, the results are not used in this BERA. Finally, a subset of the bioassay samples collected from the OID Lagoon and WMU Ditch (five samples total) were analyzed for pyrethroid and organophosphate pesticides.

The following COPECs were identified for the BERA based on the RI data collected from 2009 through 2011:

- Metals were carried forward from the SLERA as COPECs. They were detected at elevated concentrations above background during the RI, exceeded screening levels for one or more receptors in at least one area at the Site, and warrant evaluation in the BERA. Metals occur in both Halaco's process waste and the burn dump waste.
- Polychlorinated dibenzo-dioxins and furans (also referred to as dioxins and furans) are identified as COPECs. They were detected during the 2009 to 2011 RI and warrant evaluation in the BERA. Data for dioxins/furans did not exist for the SLERA. Dioxins/furans occur in both Halaco's process waste and the burn dump waste.

Exceedances of radionuclides above background were limited to the Halaco Properties and deeper sediments within the lagoon finger immediately south of the Smelter Parcel; therefore, these analytes were not considered COPECs in the BERA.

Groundwater was not evaluated in the BERA because local groundwater does not discharge to land (for example, seeps) and rarely discharges to surface water; therefore, ecological exposures via groundwater are largely restricted to uptake by plants. Groundwater can temporarily discharge to surface water when the beach berm breaches and the OID and lagoon levels drop to equilibrate with the ocean. Uptake by plants from groundwater was not evaluated in this BERA because risks from this pathway are expected to be negligible compared to other exposure pathways (for example, uptake from soil or sediment).

Based on the SLERA and 2009 to 2011 RI sampling results, metals were the primary COPECs selected for evaluation in the BERA. Dioxins and furans in soil and sediment also were considered to be COPECs. Although VOCs, SVOCs, and TPH were measured in sediment samples from the OID and lagoon, these analytes were detected infrequently at low concentrations and do not appear to be attributable to Halaco

wastes (CH2M HILL, 2011c). PCBs were detected in some of the Lagoon Finger-Footbridge sediment samples; however, these detections were in the subsurface soils and are likely not available to ecological receptors. VOCs, SVOCs, and PCBs were considered in the interpretation of the bioassay results and the development of site-specific toxicity data.

Pyrethroids were not considered a site-related COPEC; however, these analytes were analyzed for a subset of sediment samples during the 2009 to 2011 RI. The sampling and analysis of pyrethroids is summarized in Appendix A; an evaluation is provided in Appendix G.

2.4 Conceptual Site Model

A CSM is a written and visual presentation of predicted relationships among stressors, exposure pathways, and assessment endpoints. It includes a description of the complete exposure pathways and outlines the potential routes of exposure for each assessment endpoint. A CSM diagram for ecological exposures was developed for the Site and is presented in Figure 2-1.

The primary contaminant sources at the Site are the historical smelter and waste disposal activities at the Smelter Parcel and Waste Management Area. In addition, the historical burn dump practices and buried burn dump wastes underlying the Smelter Parcel may be primary sources. Primary release mechanisms from Halaco's smelter operations include air emissions from the smelter stack and other process locations, as well as solid wastes and wastewater associated with the processing of the scrap materials. Primary release mechanisms from the burn dump include air emissions during burning and remaining solid wastes associated with the burn dump. Secondary sources of potential contaminants are air and surface soils (including smelter wastes located onsite, in the WDA, and in the WMU, and burn dump wastes). Release mechanisms include aerial deposition of stack emissions, discharge/runoff from the waste piles and other areas containing waste to surrounding surface water/soil areas (OID, adjacent wetland, and adjacent soils), wind erosion, leaching to groundwater, and surface discharge from groundwater.

Complete exposure pathways from contaminated surface soil, sediment, surface water, biota, and groundwater to ecological receptors exist at the Site. Contaminants in soil may be directly bioaccumulated by terrestrial plants or soil invertebrates resident in Site soils. Additionally, terrestrial plants may be exposed by uptake from contaminated groundwater or surface water sources or by aerial deposition onto foliage. Aquatic plants are primarily exposed via contaminated sediment. Although benthic invertebrates, fish, and amphibians may be exposed to contaminants via surface water or sediment, benthic invertebrates are primarily exposed through sediment, and fish and amphibians are primarily exposed through surface water. Terrestrial and aquatic wildlife (herbivores, omnivores, invertivores, and carnivores), including reptiles, may be exposed directly to contaminants in surface water through ingestion, and to contaminants in soil or sediment by incidental soil or sediment ingestion, dermal contact, or inhalation of wind-borne particles. Terrestrial and aquatic invertebrates, fish, and wildlife (amphibians, reptiles, birds, and mammals) also may receive contaminant exposure through food-web transfer of chemicals from lower trophic levels (such as plants to herbivores, and plants and prey animals to omnivores).

As discussed above in Section 2.3.2, groundwater was not evaluated in the BERA because local groundwater infrequently discharges to surface water and risks to plants, and fish and wildlife that may feed on plants, are considered to be less than that from other exposure pathways (for example, uptake from soil or sediment, direct ingestion, etc.).

2.5 Assessment Endpoints

Assessment endpoints are an expression of the important ecological values that should be protected at a site (Suter, 1990, 1993; EPA, 1998; Suter et al., 2000). Assessment endpoints are developed based on known information concerning the contaminants present, the study area, the ecological CSM, and risk hypotheses. There are three components to each assessment endpoint: an *entity* (for example, migratory birds), an *attribute* of that entity (for example, individual survival), and a *measure* (for example, a measurable value,

such as an effect level). Measures are described following the general description of assessment endpoints (EPA, 1998; Suter et al., 2000).

The assessment endpoint entities for the Site were selected based on the following principal criteria:

- Ecological relevance
- Societal relevance
- Susceptibility (or high exposure) to known or potential stressors at the Site

The attributes selected for each entity consisted of growth, reproduction, or survival. Maximum acceptable adverse effect levels generally selected for all receptors at the screening level are no observed effect concentrations (NOECs) or no observed adverse effect levels (NOAELs). Higher levels of effect are considered suitable for the BERA. These include the lowest observed effect concentrations (LOECs) and lowest observed adverse effect levels (LOAELs). However, any effect to special-status species is considered unacceptable. Therefore, NOECs and NOAELs are used in the BERA to assess special-status species.

Assessment endpoints for the Site include:

- Aquatic plants, water-column invertebrates, amphibians, fish, benthic invertebrates, and aquatic birds in the aquatic habitats
- Terrestrial plants, soil invertebrates, reptiles, and terrestrial birds and mammals in the terrestrial habitats

Four state or federally listed species known to occur at or near the Site are included as representative receptors for their respective ecological groups. These species include the tidewater goby, western snowy plover, and California least tern (all federally listed as endangered), and the Belding's Savannah sparrow (state-listed as endangered).

Where appropriate, representative ecological receptors (specific species) were selected from aquatic and terrestrial communities to fulfill as many of the following criteria as possible:

- Species that are known to occur or are likely to occur at the Site
- Species that relate to the assessment endpoints selected
- Species that are likely to be maximally exposed to the site-related COPECs
- Sedentary species or species with a small home range
- Species with high reproductive rates
- Species that are known to play an integral role in the ecological community structure at the Site
- Species that are known or likely to be especially sensitive to the site-related COPECs, and thus are an indication of ecological change
- Species that are representative of the foraging guild (that is, a group of species with similar ecological resource requirements and foraging strategies and, therefore, similar roles in the ecosystem) or that serve as food items for higher trophic levels

Bird and mammal receptors include species representative of trophic levels and foraging guilds (herbivores, omnivores, invertivores, and carnivores), as well as special-status species known to occur at the Site. The representative receptors, in addition to the special-status species listed previously, include the California vole (*Microtus califonicus*) and ornate shrew (*Sorex ornatus*). The assessment endpoints are outlined in Table 2-2.

2.6 Measures of Exposure and Effects

Measures (formerly referred to as measurement endpoints) are measurable attributes used to evaluate the risk hypotheses and are predictive of effects on the assessment endpoints (EPA, 1998). The three categories of measures include the following.

- Measures of exposure—used to evaluate levels at which exposures may be occurring
- Measures of effect—used to evaluate the response of the assessment endpoints when exposed to the stressors
- Measures of ecosystem and receptor characteristics—used to evaluate the ecosystem characteristics that influence the assessment endpoints, the distribution of stressors, and the characteristics of the assessment endpoints that may affect exposure or response to the stressor

For this assessment, measures of exposure and effects were the primary measures used for most receptors. Measures of ecosystem and receptor characteristics were available for the special-status avian receptors.

2.6.1 Measures of Exposure

Measures of exposure can be an exposure point concentration (EPC) of a chemical in an environmental medium, food item, or tissue, or a related dose estimate. In the initial screening assessment, maximum detected concentrations were used as the EPC for all receptors. For analytes that failed the initial screening, the arithmetic mean was used as the EPC for the baseline evaluation.

2.6.2 Measures of Effect

Measures of effect include media-specific, ecotoxicity-based benchmarks and toxicity reference values (TRVs) as well as results of site-specific bioassays. As previously indicated, benchmarks and TRVs in the initial screen were represented by literature-based screening benchmarks, NOECs, or NOAELs. In the baseline evaluation, NOECs and NOAELs, as well as LOECs and LOAELs were used. The exception is receptors assessed at the individual level (that is, special-status species); for these receptors, exceedance of the NOAEL is considered unacceptable.

Literature-based, single-chemical toxicity data and LOECs developed from the site-specific bioassays were used. Ecological Soil Screening Levels (EcoSSLs) developed by EPA (EPA, 2007a) were used as available, as were other published screening data for plants and soil invertebrates (Efroymson et al., 1997a, 1997b). For the aquatic environment, published screening levels for surface water (EPA, 2000a, 2012; Suter and Tsao, 1996) and sediment (MacDonald et al., 2000) and site-specific LOECs for sediment were also used. Literature sources (for example, Jarvinen and Ankley, 1999) were used to develop NOECs and LOECs for evaluation of whole-body fish and invertebrate tissue. Avian and mammalian toxicity values were extracted from EPA's EcoSSL documents, Sample et al. (1996), and published primary literature, as appropriate.

2.6.3 Measures of Ecosystem and Receptor Characteristics

Measures of ecosystem and receptor characteristics include site-specific studies of the diversity and abundance of receptors and/or quantitative or qualitative evaluations of the habitat quality and functioning at the Site. Populations of many special-status species in California are regularly surveyed to support population recovery efforts. These data have been collected at Ormond Beach, immediately adjacent to the Halaco Site, as well as at multiple locations within California where these species occur. Population metrics for Belding's Savannah sparrows, western snowy plovers, and California least terns were used as measures of ecosystem and receptor characteristics in the evaluation of risks to these species. An analysis of these data is provided in Section 2.6.4.

The measures are provided, along with the assessment endpoints, in Table 2-2.

2.7 Approach for Risk Characterization

In the risk characterization, exposure and effects data are integrated to draw conclusions concerning the presence, nature, and magnitude of effects that may occur at the Site. The following three main components comprise the risk characterization:

- Risk Estimation
- Risk Description
- Uncertainty Analysis

These three components are used together to identify the final chemicals of ecological concern for the Halaco Site. This section outlines the process by which exposure and effects data were integrated to estimate risk in the risk characterization. The exposure, effects, and risk characterization for aquatic biota (as used in the BERA, "aquatic biota" includes aquatic plants, water-column invertebrates, amphibians, and fish), benthic invertebrates, terrestrial plants and soil invertebrates, and birds and mammals are presented separately in Sections 3 through 6, respectively.

For this BERA, the evidence evaluated consisted of comparisons between measured chemical concentrations in surface water, soil, sediment, and tissue (fish, benthic invertebrate, and terrestrial invertebrate), as well as literature-derived effects data. In addition, results from the site-specific bioassays for benthic invertebrates and site-specific field studies of populations of special-status species were evaluated.

Risks at the Site were estimated using a weight-of-evidence approach. First, each individual line of evidence was evaluated as part of the Risk Estimation step. These individual conclusions were then integrated and weighed in the Risk Description step. Finally, uncertainties associated with each component were described.

Risks potentially associated with measured chemical concentrations in abiotic media and biota were evaluated based on the ratio of exposure concentrations or doses to literature-derived TRVs, resulting in hazard quotients (HQs), according to the following equations:

$$HQ = C/TRV_{SL}$$

$$TC/TRV_{NOEC\ or\ LOEC}$$

$$ED/TRV_{NOAEL\ or\ LOAEL}$$

Where:

HQ = Ecological hazard quotient (unitless)
C = Media concentration (micrograms per liter [µg/L] for water; milligrams per kilogram [mg/kg] or nanograms per kilogram [ng/kg] for sediment and soil)
TC = Tissue concentration (mg/kg)
ED = Estimated chemical intake (dose) by wildlife receptor (milligrams per kilogram per day [mg/kg/day])
TRV_{SL} = Screening-level toxicity reference value (µg/L, mg/kg, ng/kg)
TRV_{NOEC} = NOEC-based toxicity reference value (mg/kg)
TRV_{LOEC} = LOEC-based toxicity reference value (mg/kg)
TRV_{NOAEL} = NOAEL-based toxicity reference value (mg/kg/day)
TRV_{LOAEL} = LOAEL-based toxicity reference value (mg/kg/day)

In the initial screening[1], surface water was screened by area using maximum detected concentrations and screening values adjusted for site-specific water hardness, as applicable. Soil and sediment were screened

[1] The Halaco Site SLERA was completed in 2008 using available data. Subsequent to the completion of the SLERA, additional data were collected from 2009 to 2011 to support the RI investigation. Because these recent data are considered most representative of current conditions, only data collected from 2009 to 2011 were used in the BERA. Therefore, this BERA includes an initial and baseline screening evaluation for each receptor.

using the maximum detected concentration by area to determine if any areas of the Site or any receptors could be eliminated from evaluation. Initial screens for birds and mammals used mean site-specific (when available) or literature-based (when site-specific data were not available) bioaccumulation models. Sitewide maximum detected tissue concentrations of biota were also screened. These maximum exposure estimates were compared to the TRV_{SL}, NOEC, or NOAEL.

Screening-level-, NOEC-, or NOAEL-based HQ values less than 1.0 indicate that adverse effects associated with exposure to a given analyte are unlikely (EPA, 1997). These analytes are not considered to present unacceptable risk, and thus can be excluded from further evaluation. When the estimated exposure for any COPEC exceeds the TRV_{SL}, TRV_{NOEC}, TRV_{NOAEL}, an HQ greater than 1.0 is obtained. An HQ equal to or greater than 1.0 indicates data are insufficient to exclude the potential for risk, but does not indicate that risks are actually present. COPECs with HQs equal to or greater than 1.0 were evaluated further in a baseline evaluation using mean concentrations by area or subarea, as appropriate. COPECs for which appropriate toxicity data were unavailable or for which detection limits were insufficient were not evaluated further, but were retained as uncertainties.

The baseline evaluation included comparison to the TRV_{SL} for aquatic biota, terrestrial plants, and soil invertebrates; site-specific LOECs for benthic invertebrates; NOECs and LOECs for tissue; and NOAELs and LOAELs for birds and mammals. Screening-level-based HQs less than 1.0 indicate that adverse effects are unlikely, resulting in a conclusion of no risk to aquatic biota, terrestrial plant, or soil invertebrate communities. An HQ equal to or greater than 1.0 indicates potentially unacceptable risk to these communities. Conclusions based on these TRVs fall within three broad categories:

- NOEC-based or NOAEL-based HQs < 1 = no risk to populations or individuals.
- NOEC-based or NOAEL-based HQs $\geq$ 1 and LOEC-based or LOAEL-based HQs < 1 = acceptable risk to population-level receptors, but potentially unacceptable risk to individual-level receptors.
- LOAEC-based or LOAEL-based HQs $\geq$ 1 = potentially unacceptable risk to populations and individual-level receptors.

In addition to the baseline risk calculations, site-specific sediment bioassays were used as an estimate of risk for benthic invertebrates, and field studies of population metrics were used as an estimate of risk for western snowy plover, California least tern, and Belding's savannah sparrow. Because multiple types of information (that is, lines of evidence) were available, baseline risks to ecological receptors at the Site were evaluated using a weight-of-evidence approach (Sample and Suter, 1999; Suter et al., 2000). In a weight-of-evidence approach, each available line of evidence for each assessment endpoint and receptor is evaluated individually to provide a conclusion concerning the presence or absence of risk based on that line of evidence. Once all lines of evidence have been evaluated, they are considered jointly to determine whether the combined weight-of-evidence supports a conclusion of risk.

The weight-of-evidence analysis was conducted as outlined in Suter et al. (2000). Data were considered to be of unequal value. Greater weight was given to data displaying either responses of test biota exposed in the laboratory to site-specific field-collected media or site-specific field surveys of responses of resident biota. Comparison of literature-based toxicity data to site-specific exposure estimates received the lowest weight. Strength-of-risk conclusions were considered high if multiple lines of evidence, including site-specific field surveys or toxicity tests, were available for a given receptor and all lines of evidence were in agreement. Risk conclusions were considered to be of moderate strength if data consisted of literature-based toxicity and one site-specific line of evidence. If only literature-based toxicity data were available to evaluate risks, the strength of risk conclusions was considered to be low.

2.8 Summary of Available Data

Several sources or types of data were available for use in the BERA. These include historical and SLERA media data, 2009 to 2011 RI sampling media data, site-specific ecological studies (bioaccumulation study

and sediment toxicity testing), background soil and sediment data, special-status species field data (avian population surveys), and non-site-specific literature data. These six sources or types of data are discussed below.

2.8.1 Historical and SLERA Media Data

The Halaco Site SLERA used data from site-specific (Weston, 2007; Team 9, 2008) and regional investigations (AMEC, 2006). Although other historical data exist, those data were not considered to represent current conditions at the time the SLERA was performed. Because new media data were collected from 2009 through 2011 as part of the RI, these data were not used in the BERA.

2.8.2 2009 to 2011 RI Sampling Media Data

The 2009 to 2011 RI sampling included collection and analysis of surface water, groundwater, sediment, soil, and tissue within the Halaco Properties as well as in adjacent areas. Note that although groundwater data were collected to support the RI, this medium is not evaluated as part of this BERA for the reason described in Section 2.3.2. All other BERA data are described by medium below.

2.8.2.1 Surface Water

Two rounds of surface water samples were collected from 19 locations during the 2009 to 2011 RI sampling. One round was collected during non-breach conditions when the OID was at a high-water stage, when surface water slowly seeps from the lagoon through the berm toward the ocean. The second round was collected during breach conditions when ocean water moves inland with the rising tide and then drains to the ocean with the falling tide.

Surface water samples were collected from the following locations (shown in Figure 2-3): OID adjacent to the Halaco Properties (OID-1 through OID-4), OID north of the Halaco Properties (OID-5 through OID-8), lagoon (LAG-1 and LAG-2), ocean (OCE-1 and OCE-2), J Street and Hueneme drains (JSD-1 and HUD-1), ditch south of the WMU (WMU-1 and WMU-2), and NCL-East (NCE-1 through NCE-3). Except for the WMU Ditch and NCL-East, samples were collected from each location at two different times, once during “high” water level conditions when the berm was not breached (November 2009) and once during “low” water level conditions when the berm was breached (February 2010). In general, surface water was more saline (higher total dissolved solids [TDS] at >4,000 milligrams per liter [mg/L]) during the breach conditions because of the influence of ocean water. Surface water was fresher (lower TDS at <4,000 mg/L) during non-breach conditions. Surface water from the WMU Ditch was only sampled during the high water conditions because it was dry during the low conditions. Surface water from NCL-East was only sampled once (June 2010) and this water represents surface water that spilled from the OID and Lagoon during the high water conditions.

Surface water samples were analyzed for:

- Metals (unfiltered and field filtered)
- Radionuclides (thorium 232 [Th 232], thorium 230 [Th 230], thorium 228 [Th 228], Radium 228 [Ra 228], and Radium 226 [Ra 226])
- General chemistry (ammonia, TDS, major cations [Na, K, Ca, Mg], major anions [Cl, SO_4, CO_3, HCO_3], nitrogen species [NO_3, NO_2, total Kjeldahl nitrogen (TKN)], and other anions [F, Br, hardness, and alkalinity])
- TOC for approximately 50 percent of surface water samples
- Field parameters (electrical conductivity, pH, T, Eh, dissolved oxygen, turbidity)

The results of these analyses are presented and described in CH2M HILL (2012). Data tables from the 2012 report are provided in Appendix B. Summary statistics for inorganic analytes in surface water are presented by area in Table 2-3. The number of detections, sample size, and the minimum, median, maximum, mean, and standard deviation for both dissolved and total surface water concentrations are shown. One-half the

detection limit was used to calculate the summary statistics and all samples (primary and duplicate) are included.

2.8.2.2 Soil/Sediment

Soil and/or sediment samples were collected from the OID and Lagoon areas, Wetlands and Beach areas, and TNC lands. These samples are described below; locations are shown in Figure 2-4.

OID and Lagoon Areas — Surface and shallow subsurface sediment samples were collected in June 2010. These samples were collected from the following locations: the portion of OID between the Halaco Properties (OID-1 through OID-7; 0, 2, and 4 feet bgs), OID north of the Halaco Properties (OID-8 through OID-14; 0 and 2 feet bgs), Lagoon-Main (LGM-1 through LGM-10; 0, 2, 4 feet bgs), Lagoon Finger-Footbridge (LGF-1 through LGF-4; 0 and 2 feet bgs), Lagoon Finger-West (LGF-5 through LGF-9; 0 and 2 feet bgs), and Lagoon Finger-East (LGF-10 through LGF-12; 0 and 2 feet bgs).

All of these sediment samples were analyzed for metals and radionuclides (Th 232, Th 230, Th 228, Ra 228, and Ra 226). In addition, 50 percent of the samples were analyzed for VOCs, SVOCs, PCBs, TPH, and dioxins and furans. Results of these analyses are presented and described in CH2M HILL (2011c).

Wetlands and Beach Areas—Soil samples were collected from wetland areas, beach areas, and the Hueneme Parcel in June 2010. These samples were collected from the following locations:

- Wetland Areas – WMU Ditch (DSA-1 through DSA-8; 0, 2, and 4 feet bgs), WMU Ditch-5 feet South (DSB-1 through DSB-8; 0, 2, and 5 feet bgs), WMU Ditch-15 feet South (DSC-1 through DSC-8), WMU Ditch-30 feet South (DSD-1 through DSD-8; 0 and 2 feet bgs; these were additional stepout samples collected in June 2011), WMU Ditch-50 feet South (DSE-1 through DSE-8; 0 and 2 feet bgs; these were additional stepout samples collected in June 2011), Wetland-East (WLE-1 through WLE-8; 0 and 2 feet bgs), Wetland-West (WLW-1 through WLW-12; 0 and 2 feet bgs), and Beach-Background (WLB-1 through WLB-6; 0 and 2 feet bgs).
- Beach Areas – Beach Breach (BBR-1 through BBR-6; 4.5, 6.5, 8.5, and 10.5 feet bgs) and Breach-Background (BBG-1 through BBG-6; 0 feet bgs).
- Hueneme Parcel – Hueneme Parcel (HUP-1 through HUP-4; 0.0 to 0.1 foot, 0.1 to 0.5 foot, and 2 feet bgs).

Except for the June 2011 stepout samples, all of the samples were analyzed for metals and radionuclides (Th 232, Th 230, Th 228, Ra 228, and Ra 226). Results of these analyses are presented and described in CH2M HILL (2011b). The June 2011 stepout samples were only analyzed for metals to assess the extent of elevated metals above background concentrations. Results of these analyses are presented and described in the stepout report (CH2M HILL, 2013).

Nature Conservancy Land—Soil samples were collected from NCL-East and NCL-North in June 2010. These samples included the following locations:

- NCL-East – Surface and subsurface soil samples (NEL-1 through NEL-65) were collected in a grid of six north-to-south transects. The 40 samples closest to the WMU were collected from 0 and 2 feet bgs. Twenty-one samples in the two transects east of these 40 samples were collected at 0 feet bgs. Samples were also collected at four locations at the eastern edge of NCL-East at 0.0 to 0.1 foot, 0.1 to 0.5 foot, and 2.0 to 2.5 feet bgs.
- NCL-North – NCL-Pond (NNP-1 and NNP-2 at 0 feet bgs, and NNP-3 through NNP-19 at 0 and 2 feet bgs; these were additional stepout samples collected in June 2011), NCL-Ditch (NND-1 through NND-4; 0 feet bgs), NCL-North (NNL-1 through NNL-4; 0.0 to 0.1 foot, 0.1 to 0.5 foot, and 2 feet bgs), and NCL-Background (NNB-1 through NNB-6; 0 feet bgs).

Except for the June 2011 stepout samples, all of the samples were analyzed for metals and radionuclides (Th 232, Th 230, Th 228, Ra 228, and Ra 226).Two NCL-East samples (NEL-17 and NEL-56) and one NCL-North sample (NNL-2) were also analyzed for TOC and pH. Results of these analyses are presented and described in

CH2M HILL (2011a). The June 2011 stepout samples were only analyzed for metals to assess the extent of elevated metals above background concentrations. Results of these analyses are presented and described in CH2M HILL (2013).

Results of the metals and dioxin and furan analyses are provided in Appendix B. These are the primary COPECs and are used in the risk assessment calculations in this BERA. Also provided in Appendix B are solid matrix lead concentration summary figures that depict lead as a representative contaminant to illustrate the nature and relative levels of contamination. Its use in the figures does not imply that lead poses more or less risk to human health or the environment than the other metals and radionuclides. These figures use the following lead concentration ranges:

- < 14 mg/kg (white) – lead levels in silt/clay soil unaffected by Halaco wastes
- 14 to 100 mg/kg (blue) – up to seven times higher than background
- 100 to 400 mg/kg (yellow) – up to four times higher than blue
- 400 to 800 mg/kg (orange) – up to two times higher than yellow
- > 800 mg/kg (red)

Summary statistics for sediment samples were calculated by area and depth for inorganics (Table 2-4) and dioxin/furans (Table 2-5). Summary statistics for soil samples also were calculated by area and depth for inorganics (Table 2-6). The number of detections, sample size, and the minimum, median, maximum, mean, and standard deviations are shown in these summary statistic tables. One-half the detection limit was used to calculate the summary statistics and all samples (primary and duplicate) were included. It should be noted that some of the wetland areas and portions of NCL-East (less than 8 feet elevation) are inundated with water during portions of the year; therefore, these locations may provide aquatic and/or terrestrial habitat and are included in the datasets for both sediment and soil.

2.8.2.3 Tissue

Fish (bottom and water-column) and benthic invertebrate tissues were collected, as available, from 15 sediment locations (5 each from locations identified as having low, medium, and high COPEC concentrations). Additionally, terrestrial invertebrates were collected, as available, from 15 soil locations (5 each from locations identified as having low, medium, and high COPEC concentrations). These samples were analyzed for metals and dioxins and furans. Biological sampling and analysis results are provided in Appendix A. Table A-1 summarizes the analyses completed for each sample.

Sitewide summary statistics for detected inorganic analytes and dioxins and furans in tissue are presented by taxa, biota type, and common names in Table 2-7. The number of detections, sample size, and the minimum, median, maximum, mean, and standard deviations are shown. Only detected concentrations were used to calculate mean tissue concentrations and all samples (primary and duplicate) were included in the summary statistics. It should be noted that dioxins and furans were not detected in fish and were infrequently detected in the invertebrate tissues (see Appendix A for results).

2.8.3 Site-Specific Ecological Studies

The results of the site-specific ecological studies (sediment bioassays and the bioaccumulation study) are summarized in the following subsections.

2.8.3.1 Site-Specific Sediment Bioassays

Results of the SLERA suggested that concentrations of metals in sediment from the Halaco Superfund Site were sufficiently elevated to be toxic to resident benthic invertebrates. To provide more refined data on the potential toxicity of sediment, sediment samples were collected and site-specific bioassays were conducted. The sediment bioassay sampling and results are summarized below; details are provided in Appendix C.

Sediment samples were collected from 15 locations on June 23, 2011. Chronic, 42-day sediment bioassays using the freshwater amphipod *Hyalella azteca* were conducted by Nautilus Environmental. The tests measured survival, growth and reproduction endpoints and were conducted following methods in EPA

(2000). Sediment bioassay samples were analyzed for metals, dioxins and furans, and other constituents that may affect and help explain the response of the laboratory bioassay test organisms. These analytes are PAHs, SVOCs, chlorinated pesticides, PCBs, pH, TOC, and grain size. The laboratory analytical results for some of these other constituents (PAHs, SVOCs, pesticides, PCBs) were subsequently determined to be not valid by EPA and therefore, the results are not used in this BERA.

A subset of the bioassay samples collected from the OID Lagoon and WMU Ditch (five samples in total) were analyzed for pyrethroid and organophosphate pesticides (Note: the pyrethroid and organophosphate pesticides were not used in the statistical analysis of the bioassay data; however, a qualitative evaluation is provided below. In addition, an evaluation of the sediment concentrations of these analytes compared to literature-derived benchmarks is provided in Appendix G and discussed in Section 4).

Summary statistics, including the rank analysis of variance (ANOVA) results, for 42-day survival, growth, and reproduction for *Hyalella azteca* exposed to sediments from the Halaco Site are summarized in Table 2-8. Statistically significant reduced survival relative to laboratory controls was observed in 8 of 15 samples, including all samples from OID Lagoon Finger-West, OID Lagoon Finger-East, both samples from the OID Lagoon-Main, and one of the NCL-East samples. Growth was not affected in any sample. Reproduction was reduced in only two samples, one from the OID Lagoon Finger-West (LGF-009) and one from NCL-East (NEL-007).

Evaluation of scatterplots and regression analyses of these data suggests that bioassay responses in most samples are driven by sediment characteristics (larger grain size and lower percentage of silt and clay). Only in the single NCL-East sample (NEL-007) do elevated COPEC concentrations appear to be associated with effects. Maximum concentrations exceeded published effect levels in this sample for a number of COPECs. Pyrethroid and organophosphate data were only available for 5 of 16 sediment samples, of which only 2 (LGF-007 and LGM-003) displayed effects relative to controls. Although one of these samples (LGM-003) had four pyrethroids that exceeded median lethal concentration (LC_{50}) (see Appendix G), the other sample (LGF-007) did not. Only one organophosphate was detected in these two samples and these concentrations did not exceed the LC_{50}. Because of the limited number of samples with pyrethroid data and the lack of a consistent finding of pyrethroid exceedances of LC_{50} in samples with effects, definitive conclusions concerning effects of pyrethroids and organophosphates cannot be made.

Site-specific sediment LOECs were developed based on the NEL-007 bioassay sample results (Table 2-9). These LOECs represent concentrations of inorganics in sample NEL-007 that displayed significantly reduced survival and reproduction relative to controls. The concentration of each metal in the NEL-007 sample was the highest concentration measured in the bioassay samples. Many of these concentrations also exceeded the probable effects concentration (PEC) values developed for sediment (MacDonald et al., 2000).

2.8.3.2 Bioaccumulation Study

Biota were collected from the Halaco Site to quantify bioaccumulation and food-web transfer of site-associated contaminants. Biota samples consisted of whole-body fish, plus whole-body terrestrial and aquatic invertebrates. Biota samples were collocated with soil or sediment samples, as appropriate, so that bioaccumulation rates could be estimated. Tissue samples and collocated soil and sediment samples were analyzed for metals and dioxins and furans. The numbers of collocated soil/sediment and biota samples collected for the study are shown in Table 2-10. Results of the bioaccumulation study are detailed in Appendix D and briefly described here.

Regression analyses were conducted to determine if statistically significant linear associations existed. Additionally, bioaccumulation factors (BAFs; ratio of collocated biota and soil/sediment concentrations) were calculated. Only detected data were used for the evaluation. Of the 18 metals measured in tissue, 11 (aluminum, barium, calcium, copper, iron, magnesium, manganese, mercury, potassium, sodium, and zinc) were above detection limits in at least one sample in each of the taxa collected. Few dioxin and furan congeners were detected in biota, with no detections observed in fish, and only limited detections in terrestrial and benthic invertebrates.

Scatterplots of tissue COPEC concentrations versus concentrations in soil or sediment generally indicated poor associations between media and tissue, which was supported by the results of the regression analyses (only one statistically significant regression [zinc and waterboatmen] was identified). In addition, due to the limited number of detections for dioxins and furans, regression analyses could not be performed for these analytes.

Due to the lack of statistically significant linear regressions, BAFs were calculated for all metals in soil and sediment (Table 2-11). BAFs were also calculated for the few dioxin and furan congeners detected in both sediment or soil and biota (Table 2-12). An evaluation of the median BAFs for metals indicates that over half (170 of 309) are less than 1, and over 66 percent (212 of 309) are less than 2 (Table 4-6). Mean BAFs for dioxins and furans were all less than 1.2.

Overall, the analysis of the site-specific bioaccumulation data for the Halaco Site suggests that metals and dioxins and furans in sediment and soil are not highly bioavailable and not readily accumulated by biota. Poor associations between concentrations in soil or sediment and those in biota negate the application of site-specific regression models. Therefore, measured concentrations were used to estimate exposure at locations where these samples were collected. Exposure estimation at other locations were based on the median analyte-specific BAF.

2.8.4 Background Soil and Sediment Data

Soil/sediment samples collected in the following areas were used to develop preliminary background levels for the Halaco Site (CH2M HILL, 2011c):

- Beach Dunes and Wetlands (BBG-1A through -6A and WLE-1B through -8B)
- NCL-North (NNB-1A through -6A, NNL-1A through -3A, and NNL-1B through -3B, NNL-1C through -4C)
- NCL-East (NEL-53C through -54C and NEL-60C through -61C)

A statistical parameter often used to establish background levels is known as the 95 percent upper tolerance limit (95% UTL, also referred to as the background UTL). The 95% UTL is a calculated value that only the highest 5 percent of background concentrations is expected to exceed. The 95% UTL also can be described as a confidence limit on the 95th percentile of the data.

The 95% UTLs developed for soil (silt and clay) that are presented in Table 9 of CH2M HILL (2011c) were used as preliminary background values for this BERA. These background values were compared to maximum concentrations of inorganics in sediment (Table 2-13) and soil (Table 2-14) to determine if any analytes or areas could be removed from evaluation. Because maximum concentrations of all inorganics exceeded background 95% UTLs at one or more areas across the Site, no analytes or areas were excluded from evaluation in the BERA. However, the 95% UTLs are used in Sections 4 through 6 to exclude risks for cases where concentrations in an area exceed the toxicity benchmark but are less than background.

2.8.5 Special-Status Species Field Data

Because of their limited numbers, populations of many special-status species in California are regularly surveyed to develop data to support population recovery efforts. Such data have been collected for three species resident at the Halaco Site: Belding's savannah sparrows, western snowy plovers, and California least terns. Data for these species have been collected by USFWS and CDFG at Ormond Beach (immediately adjacent to the Halaco Site) and at multiple locations within California where these special-status species occur. Population metrics measured for each species at Ormond Beach were compared to those from other nearby locations (for example, Point Mugu), and to totals for the state-wide population to determine whether population metrics at Halaco differed from those at other locations. If population metrics adjacent to the Halaco Site were reduced relative to those observed elsewhere, these field data can be interpreted as a line of evidence suggesting adverse effects. Summaries of the population survey data and analyses for each species are presented below.

California Least Terns. Breeding survey data for California least terns from 2011 (Marschalek, 2012), 2010 (Marschalek, 2011), 2009 (Marschalek, 2010), 2007 (Marschalek, 2008), and 2000 (Patton, 2002) for Ormond Beach and the State of California as a whole were combined (Table 2-15) and analyzed. Although median breeding success at Ormond Beach was consistently greater than that for the California statewide populations (Figure 2-6), the paired t-test indicated no statistically significant difference (p=0.13). Further, correlation analyses showed breeding success at Ormond Beach to be significantly positively correlated (r=0.9, p=0.04) with that seen in the statewide population. These field observations suggest that exposure to contaminants from the Halaco Site are not adversely affecting reproduction among California least terns.

Western Snowy Plovers. In an effort to quantify population health, abundance of western snowy plovers has been recorded at eight locations, including Ormond Beach, San Luis Obispo, Santa Barbara, and Ventura Counties, California (USFWS, 2007). Abundance of plovers was determined using breeding season window surveys. Year-to-year trends in abundance of snowy plovers at Ormond Beach generally track abundance in the larger three-county area (Figure 2-7A). In addition, although plover abundance at Ormond Beach was not correlated with total plover abundance when data from all years are considered (R=0.29, p=0.33; Figure 2-7B), when 3 years with the greatest abundance of plovers at Ormond Beach are excluded, abundance at Ormond Beach is correlated with total abundance (R=0.7, p=0.02; Figure 2-7B). These field observations suggest that exposure to contaminants from the Halaco Site are not adversely affecting abundance of western snowy plover.

Belding's Savannah Sparrow. In an effort to quantify population health, abundance of Belding's savannah sparrow has been recorded at 32 locations, including Ormond Beach, in five counties in Southern California (Zembal and Hoffman, 2010). The number of sparrow breeding territories was counted at each location in 8 separate years from 1973 through 2010. Year-to-year trends in number of sparrow breeding territories at Ormond Beach generally tracks abundance in the larger three-county area (Figure 2-8A). In addition, although the number of sparrow breeding territories at Ormond Beach was not correlated with the total number of sparrow territories in Southern California when data from all years are considered (R=0.71, p=0.07; Figure 2-8B), when the year with the greatest number of territories at Ormond Beach is excluded, the number at Ormond Beach is correlated with total abundance (R=0.89, p=0.02; Figure 2-8B). These field observations suggest that exposure to contaminants from the Halaco Site are not adversely affecting abundance of Belding's savannah sparrow.

2.8.6 Non-Site-Specific Literature-Derived Toxicity Data

Site-specific toxicity data and avian and mammalian life-history parameters required for calculation of exposure estimates (for example, body weight, food ingestion rates, and dietary components) were not available for each receptor. Therefore, life-history parameters for avian and mammalian receptors were derived from the literature. Toxicity data for each receptor group were obtained from many sources including published benchmarks from data compiled by the National Oceanic and Atmospheric Administration (Buchman, 2008), EPA (2007a, 2012), and the Oak Ridge National Laboratory (ORNL) (Suter and Tsao, 1996; Efroymson et al., 1997a; Efroymson et al., 1997b; Sample et al. 1996). Additional toxicity data were derived from published studies as needed, and are detailed for each receptor in Sections 3 through 6.

SECTION 3

Aquatic Biota

This section characterizes exposure, effects, and risk for aquatic biota exposed to contaminated surface water. Risks to benthic invertebrates from contaminated sediment are evaluated in Section 4; this section evaluates risks to aquatic plants, water-column invertebrates, amphibians, and fish. The risks identified in this section were not necessarily caused by Halaco's operations. Some risks appear to be the result of other sources of contamination in the watershed (CH2M HILL, 2012).

3.1 Exposure Characterization

Data were available to evaluate media-based and tissue-based chemical exposures to aquatic biota as described below.

3.1.1 Media-Based Chemical Exposures

Aquatic biota at the Site are exposed primarily through the medium in which they live. Although aquatic plants, water-column invertebrates, amphibians, and fish are exposed to COPECs in surface water and sediment, the primary exposure medium is surface water. For these receptors, exposure occurs as a consequence of living in a contaminated medium (that is, receptors are directly exposed to COPECs). Although other exposure pathways (such as direct exposure to sediment or dietary exposure for invertebrates or fish) may contribute to total exposure for these receptors, exposure through surface water predominates. Consequently, estimates of exposure for aquatic biota are represented as the concentrations of COPECs in surface water (in µg/L).

EPCs for the initial screening estimates included the maximum detected concentrations measured in surface water by area (Table 2-3). Note that water in all areas was assumed to be fresh, except for seawater samples. The maximum detected concentration was selected from one of the two RI sampling events, one during “high” water level conditions when the berm was not breached (November 2009) and the TDS was generally lower (<4,000 mg/L), and one during breach conditions (February 2010) when the TDS was generally higher (>4,000 mg/L). Surface water from the WMU Ditch was only sampled during the high water conditions because it was dry during the low conditions. Surface water from NCL-East was only sampled once (June 2010); this water represents surface water that spilled from the OID and Lagoon some months earlier during high water conditions.

The mean concentration for each area and each water level condition (high and low) was used as the EPC in the baseline evaluation of COPECs that failed the initial screening. In the calculation of the mean, one-half the detection limit was used for nondetected data. Either the total or dissolved concentration was used in the evaluation, depending on the applicability of the screening benchmarks (some benchmarks were developed for use with total metals concentrations and others for use with dissolved metals concentrations).

3.1.2 Tissue-Based Chemical Exposures

Concentrations of COPECs in tissues of receptor animals may exert adverse effects through various mechanisms, including toxicity to the target organ (for example, liver or kidneys where metabolism and excretion occur) or release from tissue reserves during episodic events (for example, mobilization of certain contaminants from fat during winter or spawning). Thus, body burden or tissue data provide a measure of exposure.

Fish were collected from the Lagoon, NCL-East, and WMU Ditch areas of the Site. Figure 2-5 shows sampling locations. These samples were analyzed for metals and dioxins and furans. Dioxins and furans were not detected in any of the fish tissue samples (Appendix A). EPCs in the initial screening estimate were represented by the maximum detected whole-body fish concentration by taxa and biota type (Table 2-7).

For COPECs that failed this screening, the mean concentration within each subarea was used as the baseline EPC.

3.2 Effects Characterization

Media- and tissue-based single-chemical toxicity data were available to evaluate effects to the aquatic biota community.

3.2.1 Media-Based Toxicity Values

Single-chemical toxicity values for aquatic biota were derived from the California Toxics Rule (CTR) (EPA, 2000), National Recommended Water Quality Criteria (NRWQC) (EPA, 2012), and ORNL freshwater aquatic organism benchmarks (Suter and Tsao, 1996) that complement the promulgated CTR values and NRWQC. CTR values and NRWQC are represented by criterion maximum concentrations (CMCs – acute exposure) and criterion continuous concentrations (CCCs – chronic exposure). The ORNL benchmarks include secondary acute values (SAVs) and secondary chronic values (SCVs) for aquatic organisms (fish, daphnids, non-daphnid invertebrates, aquatic plants, and all species). Although some surface water areas of the Site may temporarily drain during the rainy season when the beach berm is breached (for example, WMU Ditch), chronic benchmarks were used to evaluate potential risks to aquatic biota because all aquatic areas are inundated with water for several months of the year.

Benchmarks for both freshwater and marine aquatic biota are presented in Table 3-1. For some inorganics, toxicity varies as a function of hardness. These benchmarks were calculated using the mean site-specific hardness measurement of 1,484 mg/L. Additionally, some benchmarks were developed for use with total metals concentrations in surface water and others for use with dissolved metals concentrations.

3.2.2 Tissue-Based Toxicity Values

Benchmarks for whole-body fish tissue were developed from literature sources. Studies that reported fish tissue levels associated with no effects and observed adverse effects were extracted from several sources, including:

- Environmental Residue Effects Database (ERED) (USACE, 2003)
- ECOTOX Database (EPA, 2003a)
- A data compilation titled *Linkage of effects to tissue residues: development of a comprehensive database for aquatic organisms exposed to inorganic and organic chemicals (*Jarvinen and Ankley, 1999)
- Scientific literature searches through search engines such as BIOSIS and Science Direct

For each COPEC with available data, the lowest value among the LOECs was selected as the BERA LOEC. If possible, the NOEC from the same study was selected as the BERA NOEC. If a NOEC for the same study was not available, the highest NOEC below the lowest LOEC from another study that evaluated the same endpoint was selected as the BERA NOEC. Additional details are provided in Appendix E.

NOECs and LOECs selected for use in the BERA are provided in Table 3-2.

3.3 Risk Characterization

3.3.1 Initial Screening

The initial screening assessment for aquatic biota was conducted as outlined in Section 2.6. Maximum concentrations of inorganics in surface water for each area were compared to literature-based freshwater and marine surface water benchmarks, as appropriate, and HQs were calculated (Table 3-3). To evaluate COPEC concentrations measured in fish tissue, sitewide maximum fish tissue concentrations (by biota type and taxa) were compared to literature-derived whole-body NOECs and LOECs (Table 3-4).

If the maximum concentration of an analyte equaled or exceeded the chronic surface water benchmark or the tissue-based NOEC (HQ ≥ 1) during the initial screening, that analyte was retained for further evaluation in the baseline assessment. If the maximum concentration of the analyte was less than the chronic surface water benchmark or less than the tissue-based NOEC (HQ < 1), the analyte was considered to present no significant risk and was dropped from further evaluation. Analytes for which toxicity data were lacking were retained and are referred to as "uncertainties."

Results of the initial screening of maximum concentrations indicated exceedances of chronic benchmarks by 13 analytes (aluminum, arsenic, barium, beryllium, calcium, copper, iron, magnesium, manganese, potassium, selenium, silver, and sodium) across all surface water areas of the Site (Table 3-3). HQs based on maximum concentrations of antimony, cadmium, chromium, cobalt, copper, lead, mercury, nickel, thallium, vanadium, and zinc were less than 1 at all freshwater/brackish surface water areas of the Site. All of these COPECs, except copper[2], also passed the initial screening of the ocean surface water samples. Maximum concentrations of aluminum, copper, and selenium in whole-body fish tissue for all biota types and taxa exceeded the NOEC (Table 3-4). Analytes that failed the initial screening were retained for further evaluation in the baseline assessment.

3.3.2 Baseline Evaluation

The baseline evaluation included comparison of mean inorganic surface water concentrations by area and water level condition to literature-based surface water benchmarks (Table 3-5). For analytes with exceedances of fish tissue benchmarks, mean whole-body concentrations by subarea were compared to literature-based NOECs and LOECs (Table 3-6).

COPECs with a mean surface water concentration that is less than the freshwater or marine surface water benchmark were considered not to present a risk to aquatic biota. However, if mean surface water concentrations equaled or exceeded (HQ ≥ 1) the benchmark, risks to aquatic biota were considered possible. Analytes with mean whole-body fish tissue concentrations that are below the NOEC were considered not to present a risk to the fish community or to individual tidewater gobies. If the NOEC is exceeded but the LOEC is not, risks to the fish community are considered unlikely, though potentially unacceptable risks may exist for individual gobies. Exceedance of the LOEC indicates a potentially unacceptable risk to the fish community and an unacceptable risk to individual tidewater gobies.

All surface water areas of the Site had mean concentrations of one or more analytes that exceeded surface water benchmarks (Table 3-5). Only two analytes, beryllium and silver, passed in all areas and at both water level conditions. (Note: as previously discussed, water samples were not collected from NCL-East during the high water level condition and WMU Ditch during the low water level condition). Calcium, iron, magnesium, potassium, and sodium were considered macronutrients and are not expected to adversely affect ecological receptors. Accordingly, these COPECs were dropped from further consideration. However, it is notable that concentrations of potassium and sodium in the OID, Lagoon, and WMU Ditch areas are at levels that are below freshwater benchmarks during the high water level condition. This is indicative of the buildup of freshwater in these areas when the berm is intact. Aluminum also passed the baseline assessment at two areas, OID and Other Drains. Selenium was detected in 4 of 19 high water samples and 9 of 20 low water samples. All detected samples (13 samples) were lower than the surface water benchmark, but the detection limit for the remaining 26 samples exceeded the benchmark. In these samples, the detection limit (35 µg/L) for selenium was insufficient to determine risk.

Mean concentrations of mercury and zinc were less than fish tissue NOECs and LOECs at all subareas, whereas aluminum, copper, and selenium in fish tissue exceeded tissue-based NOECs and LOECs for all subareas with detected samples (Table 3-6).

[2] Cobalt and vanadium lacked marine benchmarks

3.3.3 Weight of Evidence

Two lines of evidence were available for aquatic biota, including the endangered tidewater goby. One line of evidence compares measured contaminant concentrations in surface water to literature-based surface water toxicity values; the other line of evidence compares measured tissue concentrations to literature-based tissue toxicity values (Table 3-7). In both cases, the toxicity values are chemical-specific.

Overall, surface water risks were similar during high water level and low water level conditions. The one exception was that potassium and sodium in the OID, Lagoon, and WMU Ditch were below surface water benchmarks during high water level conditions, though this does not affect risk conclusions. Calcium, magnesium, potassium, and sodium are essential nutrients and are not considered to be a risk at the Site.

Generally, aluminum is not considered to be a risk in surface water at the Site because of the high water hardness (that is, toxicity of aluminum likely decreases with increased water hardness [EPA, 2012]) and because aluminum bound to sediment likely contributes significantly to total aluminum. Although tissue concentrations of aluminum in fish collected from NCL-East, WMU Ditch, and the Lagoon areas are at levels that may result in an adverse effect to individual tidewater gobies or the fish community, risks are likely overestimated. Aluminum concentrations in the outfingers were clustered around 100 mg/kg compared to those in the two higher concentration areas, which were around 200 to 300 mg/kg. This suggests that aluminum concentrations are site-related. However, the pH at the Site (pH > 5.5) indicates that aluminum in sediment has low bioavailability. Given this low bioavailability, it is likely that the higher concentrations observed in NCL-East and WMU Ditch are a result of sediment present in the gut of the fish rather than aluminum incorporated into the fish tissues. For exposure to wildlife, this whole body measurement that includes sediment in the gut is appropriate (fish-eating birds eat the whole fish), but for determining risks to fish from tissue-based or “internal” exposures, aluminum associated with the sediment in the gut overestimates exposure and risk. Therefore, aluminum is not considered a risk to individual tidewater gobies or the fish community.

Risks from selenium are considered uncertain due to an insufficient detection limit in a majority of the samples; however, in detected surface water samples, concentrations are less than the surface water benchmark. Although risk cannot be excluded, this suggests that selenium concentrations in surface water are likely not a risk to aquatic biota. Tissue concentrations of selenium in fish collected from NCL-East, WMU Ditch, and the Lagoon areas exceeded NOECs and LOECs. The concentrations of selenium in fish collected in the Lagoon fingers were compared to those collected in NCL-East and WMU Ditch. These concentrations were similar across all locations, suggesting that risks, if present, are not site-related. Similarly, copper concentrations in fish tissue from these three areas were similar and suggest that risks, if present, are not site-related.

Barium and manganese exceeded water quality benchmarks in all freshwater/brackish onsite and background subareas, except for the ocean area. Additionally, HQs in the background subarea (Other Drains) were similar to or greater than those in the onsite areas. This suggests that onsite concentrations of these analytes are likely within the range of regional background concentrations, and that risks are not site-related. Arsenic at both water levels and copper at low water levels exceeded water quality criteria in the ocean samples. Arsenic and copper risks in ocean water are also not likely to be site-related because neither analyte exceeded water quality criteria at the other surface water areas. Risks that are not site-related are not considered further in this assessment.

Based on this evaluation, the weight-of-evidence is that there are no site-related risks to the aquatic biota community, fish populations, or individual tidewater goby.

Confidence in the risk conclusions for aquatic biota is generally low to moderate due to conflicting results for some lines of evidence. For example, copper concentrations at NCL-East, WMU Ditch, and Lagoon did not exceed water quality criteria, but fish tissue levels exceeded benchmarks. However, copper in fish tissue did not differ among areas of the Site, despite differing copper concentrations in sediment, which indicates that

risks are not likely site-related. Ultimately, it should be noted that contaminants found in surface water may originate elsewhere in the OID watershed and fish are likely averaging concentrations across a range that likely includes areas outside of the Site.

SECTION 4

Benthic Invertebrates

This section characterizes exposure, effects, and risk for benthic invertebrates. Risks to aquatic biota from contaminated surface water (aquatic plants, water-column invertebrates, amphibians, and fish) are evaluated in Section 3.

4.1 Exposure Characterization

Data were available to evaluate media-based and tissue-based chemical exposures to benthic invertebrates.

4.1.1 Media-Based Chemical Exposures

As with aquatic biota, benthic invertebrates at the Site are exposed primarily through the medium in which they live. Benthic invertebrates are exposed to COPECs in surface water and sediment and through dietary exposure; however, the primary exposure medium is sediment. Although other exposure pathways (such as direct exposure to water or dietary exposure for invertebrates) may contribute to total exposure for these receptors, exposure through sediment predominates. Consequently, estimates of exposure for benthic invertebrates may be represented as the concentration of COPECs in sediment (in mg/kg).

EPCs for the initial screening estimates included the maximum detected concentrations measured in sediment by area (Table 2-4). The mean concentration for each subarea of the Site was used as the EPC in the baseline evaluation of COPECs that failed the initial screening. In the calculation of the mean, one-half the detection limit was used for nondetected data.

4.1.2 Tissue-Based Chemical Exposures

Concentrations of COPECs in tissues of receptor animals may exert adverse effects through various mechanisms, including toxicity to the target organ or release from tissue reserves during episodic events. Thus, body burden or tissue data provide a measure of exposure.

Benthic invertebrates were collected from the Lagoon, NCL-East, and WMU Ditch areas of the Site. These samples were analyzed for metals and dioxins and furans. EPCs in the initial screening estimate were represented by the maximum whole-body invertebrate concentration by taxa and biota type (Table 2-7). For COPECs that failed this screening, the entire distribution of tissue data was used to calculate the baseline EPC.

4.2 Effects Characterization

Media- and tissue-based single-chemical toxicity data, as well as site-specific bioassay results, were available to evaluate effects to the benthic invertebrate community.

4.2.1 Media-Based Toxicity Values

Currently, there are no EPA criteria for contaminated sediment. In general, it is difficult to predict sediment concentrations at which toxicity occurs because the type and form of the sediment and the water chemistry of the overlying water affect bioavailability. However, sediment guidelines have been derived based on the relationship between the contaminant concentration in bulk sediment, the contaminant concentration in pore water, and measured biological effects (Ingersoll et al., 1996; Long and Morgan, 1990; Long et al., 1995; Persaud et al., 1993; MacDonald et al., 2000; Field et al., 2002). Additional summaries of sediment screening values are presented in Buchmann (2008). These sediment guidelines provide an initial benchmark for predicting the potential for adverse effects of elevated COPEC concentrations in sediment.

The freshwater sediment benchmarks were represented by the threshold effects concentrations (TEC) and PEC from MacDonald et al. (2000) as available. Benchmarks for marine sediments were represented by the T20 (20th percentile toxicity value) and T50 (median toxicity value) from Field et al. (2002). Additional, less

conservative values (freshwater upper effect thresholds and marine apparent effect thresholds) were extracted from Buchmann (2008). Screening benchmarks for freshwater and marine benthic invertebrates are shown in Table 3-1. Benchmarks for dioxin toxic equivalency quotients (TEQs) in sediment for fish, birds, and mammals were extracted from the literature (Table 4-1). Toxic equivalency factors (TEFs) needed to calculate dioxin TEQs for benthic invertebrates are not available. Therefore, fish benchmarks for dioxin TEQs were used as a surrogate for benthic invertebrates.

4.2.2 Tissue-Based Toxicity Values

Benchmarks for whole-body invertebrate tissue were developed from literature sources. Studies that reported invertebrate tissue levels associated with no effects and observed adverse effects were extracted from a data compilation titled *Linkage of effects to tissue residues: development of a comprehensive database for aquatic organisms exposed to inorganic and organic chemicals (*Jarvinen and Ankley, 1999). For each COPEC with data, the invertebrate test species were categorized to best represent the taxa collected at the Halaco Site. Then the lowest value among the LOECs for a taxa category was selected as the BERA LOEC for that group. If available, the NOEC of the same study was selected as the BERA NOEC. If a NOEC for the same study was not available, the highest NOEC below the lowest LOEC was selected as the BERA NOEC. Additional details are provided in Appendix F.

Invertebrate tissue NOECs and LOECs selected for use in the BERA are shown in Table 4-2. This table includes salient details of the selected studies (test species, test endpoint, observed effect). A column is also provided that indicates the Halaco taxa most similar to the test species. Beach hoppers, when present in a mixed species sample, made up more than 90 percent of the sample biomass; therefore, this species was used to select the appropriate benchmarks for these mixed samples.

4.2.3 Site-Specific Bioassays

Survival, growth, and reproduction endpoints in *Hyalella azteca* were evaluated in the site-specific sediment bioassays (chronic, 42-day tests). Results indicated statistically significant reductions in survival and reproduction, though no differences in growth. Although several samples across the OID Lagoon and NCL-East had reduced survival, reproduction, or both, evaluation of scatterplots and regression analyses of these data suggests that bioassay responses in most samples are driven by sediment characteristics (larger grain size and lower percentage of silt and clay). Only in the single NCL-East sample (NEL-007) do elevated COPEC concentrations appear to be associated with effects (this sample had the highest concentrations measured across all bioassay samples; these concentrations exceeded published effect levels for a number of COPECs).

4.2.4 Site-Specific Toxicity Values

Site-specific sediment LOECs were developed based on the NEL-007 bioassay sample results (Table 2-9; see Appendix C). These LOECs represent concentrations in sample NEL-007 that displayed significantly reduced survival and reproduction relative to controls. Concentrations of all COPECs measured in this sample were the highest concentrations measured across all bioassay samples collected and therefore, represent the maximum concentrations. Many of these COPECs also exceeded PEC values developed for sediment (MacDonald et al., 2000).

4.3 Risk Characterization

4.3.1 Initial Screening

The initial screening assessment for benthic invertebrates was conducted as outlined in Section 2.6. Maximum detected concentrations of inorganics (Table 4-3) and dioxin TEQs (Table 4-4) by area were compared to literature-based sediment quality benchmarks (Tables 3-1 and 4-1 for sediment benchmark values) using the HQ approach. Additionally, maximum detected concentrations of inorganics were compared to site-specific LOECs, also by area (Table 4-5); and sitewide maximum benthic invertebrate tissue concentrations (by taxa) were compared to literature-derived NOECs (Table 4-6).

Analytes that failed the initial screening (HQ ≥ 1) were retained for further evaluation in the baseline assessment. Because the site-specific toxicity data supersede literature-based values, only exceedances of the site-specific LOECs or tissue-based NOECs were carried forward for evaluation in the baseline assessment. If the maximum concentration of a COPEC was less than the site-specific LOEC or less than the tissue-based NOEC (or LOEC if a NOEC was unavailable), the analyte was considered to present no significant risk and was dropped from further evaluation. Analytes for which toxicity data were lacking were retained as uncertainties.

Results of these initial screenings against maximum values generally indicated exceedances of multiple analytes across all sediment areas of the Site. More COPECs exceeded literature-derived benchmarks (Table 4-3) than site-specific LOECs (Table 4-5). TEQs for fish, birds, and mammals in NCL-East and NCL-North areas and TEQs for fish in the OID Lagoon area passed the initial screening (Table 4-4). TEQs for birds and mammals in the OID Lagoon area and for fish, birds, and mammals in the Wetlands Beach area exceeded benchmark values. For invertebrate tissues, only maximum concentrations of copper and zinc in crayfish exceeded their respective tissue-based NOECs (Table 4-6).

4.3.2 Baseline Evaluation

The baseline evaluation included comparisons of mean dioxin TEQs by area to sediment quality benchmarks for fish, birds, and mammals (Table 4-7) and comparison of mean inorganic concentrations by subarea to site-specific LOECs (Table 4-8). For analytes with exceedances of benthic invertebrate tissue benchmarks (copper, zinc, and dioxins and furans), all tissue samples with detected concentrations for that analyte were compared to literature-derived LOECs (or a NOEC if a LOEC was unavailable) on a point-by-point basis (Table 4-9).

COPECs with a mean sediment concentration that is less than the dioxin TEQ high benchmark or the LOEC are not a risk to the benthic invertebrate community. However, if the benchmark is met or exceeded (HQ ≥ 1), risks to benthic invertebrates are possible. Analytes with mean whole-body invertebrate tissue concentrations that are below the LOEC are not a risk to the benthic invertebrate community. Exceedance of the LOEC indicates a potentially unacceptable risk to the benthic invertebrate community.

Mean dioxin concentrations in sediment at all areas were less than the high value (high HQ < 1; Table 4-7). For inorganics, only barium, beryllium, and magnesium at Lagoon Finger-Footbridge had a site-specific LOEC-based HQ greater than 1 (Table 4-8). Benthic invertebrate tissue concentrations of copper in crayfish exceeded the NOEC in two of the three crayfish samples from the WMU Ditch area. The zinc concentration in one crayfish sample also exceeded the LOEC at WMU Ditch (Table 4-9).

Although bioassay results for several sediment samples collected from the OID Lagoon and NCL-East had reduced survival, reproduction, or both, these effects in all samples, except one (NEL-007 in NCL-East), were likely driven by grain size rather than contamination (see Appendix C). This indicates that COPEC concentrations in OID Lagoon and Wetlands Beach sediments have a low potential to be toxic to the benthic invertebrate community.

4.3.3 Weight of Evidence

Four lines of evidence were available for benthic invertebrates: literature-based single-chemical sediment toxicity data, bioassay results, site-specific toxicity data, and tissue-based toxicity data. Each line-of-evidence for the benthic invertebrate community was evaluated in a weight-of-evidence approach as shown in Table 4-10.

Mean sediment and benthic invertebrate tissue concentrations of dioxins and furans (represented as fish, bird, and mammal TEQs) were below thresholds for effects. Although maximum concentrations of multiple inorganics across all sediment areas exceeded literature-based benchmarks, only mean concentrations of barium, beryllium, and magnesium at the Lagoon Finger-Footbridge subarea exceeded site-specific LOECs. Magnesium is an essential nutrient that is generally not considered a risk; however, magnesium concentrations in the toxic bioassay sample were significantly correlated with effects and therefore, may

contribute to the observed toxicity. Bioassay results indicated contaminant-related toxicity in NCL-East (location NEL-007). However, mean concentrations in NCL-East, and in the portion of NCL-East below 8 feet elevation, did not exceed the site-specific LOECs developed from this sample. This suggests that risks in this area may be spatially limited.

Copper in benthic invertebrate tissue (crayfish) exceeded the NOEC at WMU Ditch. Because a copper LOEC for crayfish was not available, risks to the benthic invertebrate community are uncertain. Although zinc in one benthic invertebrate tissue sample (crayfish) collected at WMU Ditch exceeded the threshold for effects, the mean of three crayfish samples from this area did not. This suggests that zinc is not likely a risk to the benthic invertebrate community.

Based on this evaluation, the weight-of-evidence is that barium, beryllium, and magnesium at Lagoon Finger-Footbridge may be a risk to the benthic invertebrate communities in these subareas. Risks from copper in the WMU Ditch subarea are uncertain; but are likely low because risks from copper were not identified using the site-specific toxicity data (that is, the LOECs developed from the bioassays).

Confidence in the risk conclusions for barium, beryllium, and magnesium is moderate because risks are based on site-specific toxicity data. In contrast, confidence in risks associated with copper is low because these risks are not supported by the site-specific toxicity data and because a concentration associated with adverse effects (that is, a LOEC) was not available.

4.3.4 Evaluation of Pyrethroid and Organophosphate Pesticides in Sediment

As described in Section 2.8.3.1, a subset of the sediment bioassay samples (LGF-001, LGF-003, LGM-003, LGF-007, and DSA-001) were analyzed for 11 pyrethroid and 2 organophosphate pesticides. Though these analytes are not considered COPECs for the Site, they were known to be present in the watershed. An evaluation of potential toxicity to benthic invertebrates from exposure to these analytes is provided in Appendix G of this BERA.

Anderson et al. (2010) provides a compilation of available sediment effect thresholds for six of the pyrethroids and for chlorpyrifos. These values are median lethal doses (lethal dose for 50 percent of a population [or of test organisms] [LD_{50}]) determined from toxicity tests using the benthic invertebrate *Hyallela azteca*. These toxicity values were compared to detected and nondetected concentrations in the five samples on a point-by-point basis.

Concentrations of chlorpyrifos, esfenvalerate, fenvalerate, and permethrin in all five samples were below LD_{50} values. In contrast, the concentration of bifenthrin in the Lagoon-Main sample (LGM-003) exceeded the LD_{50}. There were also exceedances of cyfluthrin, cypermethrin, and lambda cyhalothrin in the Lagoon-Main sample; however, these exceedances were based on nondetect data.

These results suggest that concentrations of bifenthrin in Lagoon-Main may be at levels of concern for benthic invertebrates. Detection limits for cyfluthrin, cypermethrin, and lambda-cyhalothrin in the Lagoon-Main sample are insufficient to determine risk; therefore, these are considered uncertainties.

SECTION 5

Terrestrial Plants and Soil Invertebrates

This section characterizes exposure, effects, and risk for terrestrial plant and soil invertebrate communities.

5.1 Exposure Characterization

Data were available to evaluate media-based chemical exposures in terrestrial plants and media-based and tissue-based chemical exposures to soil invertebrates as described below.

5.1.1 Media-Based Chemical Exposures

Terrestrial plants and soil invertebrates are exposed primarily through the soil in which they live. This exposure occurs as a consequence of living in a contaminated medium (that is, receptors are directly exposed to COPECs). Although other exposure pathways (such as dietary exposure for invertebrates or foliar uptake for plants) may contribute to total exposure for these receptors, exposure through the soil predominates. Consequently, estimates of exposure for terrestrial plants and soil invertebrates may be represented by the concentration of COPECs in the soil (in mg/kg).

EPCs for the initial screening were the maximum detected concentration of the COPEC measured in soil by area and depth (Table 2-6). The mean concentration for each subarea and depth of the Site was used as the EPC in the baseline evaluation of COPECs that failed the initial screening.

5.1.2 Tissue-Based Chemical Exposures

Concentrations of COPECs in tissues of receptor animals may exert adverse effects through various mechanisms, including toxicity to the target organ or release from tissue reserves during episodic events. Thus, body burden or tissue data provide a measure of exposure.

Terrestrial invertebrates were collected from the NCL-East (greater than 8 feet Elevation), NCL-North (NCL-Background and NCL-North), and Wetlands Beach (Wetland-East, Wetland-West, and WMU Ditch-15 feet South) areas of the Site. These samples were analyzed for metals and dioxins and furans. EPCs in the initial screening estimate were represented by the maximum whole-body invertebrate concentration by taxa and biota type (Table 2-7). For COPECs that failed this screening, the entire distribution of the tissue data was used as the baseline EPC.

5.2 Effects Characterization

Media-based single-chemical toxicity data were available to evaluate effects to the terrestrial plant community. For the soil invertebrate community, both media- and tissue-based single-chemical toxicity data were available.

5.2.1 Media-Based Toxicity Values

Single-chemical toxicity values for terrestrial plants and soil invertebrates have been developed for a limited number of analytes as part of the EPA EcoSSLs (EPA, 2007a). For analytes lacking EcoSSLs, additional data for terrestrial plants and soil invertebrates were obtained from the ORNL benchmark reports (Efroymson et al., 1997a; Efroymson et al., 1997b). Soil screening values for terrestrial plants and soil invertebrates are listed in Table 3-1.

5.2.2 Tissue-Based Toxicity Values

Benchmarks for whole-body invertebrate tissue were developed from literature sources as described in Section 4.2.2. Benchmarks developed for benthic invertebrates were used as a surrogate for soil invertebrates. Additional details are provided in Appendix F. Invertebrate tissue NOECs and LOECs selected for use in the BERA are shown in Table 4-2.

5.3 Risk Characterization

5.3.1 Initial Screening

The screening assessment for terrestrial plants and soil invertebrates was conducted as outlined in Section 2.6. Maximum detected concentrations of inorganics by area and depth were compared to literature-based terrestrial plant and soil invertebrate benchmarks (Table 5-1). Additionally, sitewide maximum terrestrial invertebrate tissue concentrations (by taxa) were compared to literature-derived NOECs and LOECs (Table 5-2).

If the maximum concentration of an analyte equaled or exceeded the plant or invertebrate benchmark or the invertebrate tissue-based NOEC, or LOEC if a NOEC was not available, (HQ $\geq$ 1) during the initial screening, that analyte was retained for further evaluation in the baseline assessment. If the maximum concentration of the analyte was less than the plant and invertebrate benchmark or less than the tissue-based NOEC (HQ < 1), the analyte was considered to present no significant risk and was dropped from further evaluation. Analytes for which toxicity data were lacking were retained as uncertainties.

Results of these initial screenings against maximum values indicated exceedances of multiple analytes across all soil areas of the Site (Table 5-1). Cadmium in soil passed the initial screening for plants and invertebrates; silver passed the initial screening for plants in all subareas (a soil invertebrate benchmark for silver was unavailable). Calcium, iron, magnesium, potassium, and sodium in soil were considered essential macronutrients and are not expected to adversely affect ecological receptors. Therefore, cadmium, silver, and these macronutrients in soil were not retained for further evaluation (though silver was retained as an uncertainty for soil invertebrates).

Cadmium, lead, mercury, selenium, and dioxin and furan concentrations in soil invertebrate tissue passed the initial screening and do not pose a risk to the soil invertebrate community (Table 5-2). Only chromium, copper, and zinc exceeded tissue benchmarks and were carried forward for evaluation in the baseline assessment.

5.3.2 Baseline Evaluation

The baseline evaluation included comparisons of mean soil concentrations by subarea and depth to literature-based plant and invertebrate benchmarks and to the 95% UTL background concentrations (Table 5-3). Multiple analytes exceeded benchmarks within the NCL-East (less than 8 feet elevation) subarea, which covers a large portion of the Site. To better define these risks, additional subdivisions of the data in this subarea were made and consist of four stepouts to the east of the WMU as follows (these are the sample locations within the area represented by the less-than-8-foot-elevation contour):

- WMU-1st Stepout = sample locations NEL-4 through NEL-11
- WMU-2nd Stepout = sample locations NEL-15 through NEL-22
- WMU-3rd Stepout = sample locations NEL-27 and NEL-29 through NEL-34
- WMU-4th Stepout = sample locations NEL-44 through NEL-47

Mean soil concentrations within these stepouts were compared to the literature-based plant and invertebrate benchmarks and to background by stepout and depth (Table 5-4).

At locations where terrestrial invertebrates were collected, for analytes with exceedances of terrestrial invertebrate tissue benchmarks, all samples with detected concentrations for that analyte were compared to literature-derived tissue LOECs (or NOECs if no LOEC was available) on a point-by-point basis (Table 5-5).

COPECs with a mean soil concentration less than a plant benchmark were not considered a risk to the terrestrial plant community. Those that were less than the soil invertebrate benchmark were not considered a risk to the soil invertebrate community. Additionally, if the plant or invertebrate benchmark is met or exceeded (HQ $\geq$ 1), but the mean soil concentration for a subarea is less than the 95% UTL background concentration, then risks to the terrestrial plant and soil invertebrate communities are not predicted.

In contrast, if the benchmark is met or exceeded (HQ $\geq$ 1) and the mean soil concentration for a subarea is greater than the 95% UTL background concentration, potentially unacceptable risks to either plants (if the plant benchmark is exceeded) or invertebrates (if the invertebrate benchmark is exceeded) are predicted. Analytes with mean whole-body invertebrate tissue concentrations that are below the LOEC are not a risk to the soil invertebrate community. Exceedance of the tissue-based LOEC indicates a potentially unacceptable risk to the terrestrial invertebrate community.

5.3.2.1 Terrestrial Plants

NCL-East

Multiple analytes across multiple subareas in NCL-East exceeded literature-based benchmarks for terrestrial plants (Tables 5-3 and 5-4). In all subareas of NCL-East, the number of analytes potentially presenting risks to plants decreased with increasing soil depth, and at McWane-5 feet South, McWane-Center, WMU-2nd Stepout, WMU-4th Stepout, and NCL-East (more than 8 feet elevation), no risks to plants were observed at depth. There was also a decreasing number of risk drivers with increasing stepout distance from the WMU. Due to very low bioavailability at higher pH ranges, EPA (2003b) indicates that aluminum is only considered to be a contaminant of concern at sites with pH values less than 5.5. The pH in this area ranged between 7.6 and 8.0.

The plant benchmark for chromium (1 mg/kg) is based on a highly available form of chromium. Risk conclusions based on this value are generally considered to have high uncertainty because most background values (at this and other sites) exceed this benchmark. Mean chromium concentrations, except at NCL-East (less than 8 feet elevation), were less than two times background. Within NCL-East (less than 8 feet elevation), chromium was about 10 times greater than background at the 1st stepout, but decreased to less than two times background by the 3rd and 4th stepouts.

NCL-North

Multiple analytes at NCL-Ditch and NCL-Pond exceeded plant benchmarks. The pH in this area ranged between 8.0 and 8.2. Mean chromium at NCL-Background and NCL-North are less than the background 95% UTL. Those at the other two subareas are less than two times background.

Wetlands Beach

No risks to plants were observed at background areas, Beach-Breach, Wetland-East, and Wetland-West based on measured soil concentrations. Multiple analytes across the remaining subareas exceeded plant benchmarks. In all of these remaining subareas except the Hueneme Parcel, the number of analytes potentially presenting risks to plants decreased or were not present (WMU Ditch) with depth. A decreasing number of risk drivers with stepout distance to the south of the WMU Ditch also was generally observed. The one exception was the 15 feet South stepout, which had the same number of risk drivers as WMU Ditch. However, concentrations of all of the risk drivers, except vanadium, were lower at WMU Ditch-15 feet South than at WMU Ditch. The pH in this area ranged between 7.6 and 7.9. Mean chromium at Beach-Background, Beach-Breach, Breach-Background, Wetland-East, and Wetland-West were less than the background 95% UTL. Concentrations at the other subareas, except the Hueneme Parcel and WMU Ditch out to the 15 feet South stepout, are less than two times background.

Mercury exceeded plant benchmarks at the Hueneme Parcel; however, mercury concentrations at the Site do not appear to be related to Halaco process waste because the waste itself does not differ from background. This suggests that elevated mercury at onsite locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to the terrestrial plant community.

5.3.2.2 Soil Invertebrates

NCL-East

Mean values of multiple analytes in soil across multiple subareas exceeded literature-based benchmarks for terrestrial invertebrates (Tables 5-3 and 5-4). In all subareas of NCL-East, the number of analytes potentially presenting risks to invertebrates decreased with increasing depth, and at McWane-5 feet South, McWane-Center, WMU-2nd Stepout, WMU-4th Stepout, and NCL-East (more than 8 feet elevation) no risks to invertebrates were observed at depth. A decreasing number of risk drivers with increasing stepout distance from the WMU also was observed.

Similar to plants, the invertebrate soil benchmark for chromium (0.4 mg/kg) is based on a highly available form of chromium. Risk conclusions based on this value are generally considered to have high uncertainty because most background values (including those at this Site) exceed this benchmark. Mean chromium at all subareas in this area, except NCL-East (less than 8 feet elevation) were less than two times background. Within NCL-East (less than 8 feet elevation), chromium was about 10 times greater than background at the 1st stepout, but rapidly decreased to less than two times background by the 3rd and 4th stepouts.

Invertebrate tissue data were available for NCL-East (more than 8 feet elevation). Concentrations of zinc in in one arthropod (beach hoppers, sow bugs, beetles) sample from this area exceeded the tissue benchmark.

NCL-North

Multiple analytes in soil at NCL-Ditch and NCL-Pond exceeded invertebrate benchmarks (Table 5-5). Mean chromium at NCL-Background and NCL-North are less than the background 95% UTL. Those at the other two subareas are less than two times background. Mercury exceeded soil invertebrate benchmarks at NCL-Pond; however, as previously indicated, elevated mercury at onsite locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to the soil invertebrate community.

Invertebrate tissue data were available for the NCL-Background and NCL-North subareas. Risks to snails from zinc were predicted. However, it should be noted that zinc toxicity data were not available for any mollusc species, and data for the test species *Daphnia magna* were used as a surrogate (lowest LOEC of the developed benchmarks for zinc). This may overestimate or underestimate risks to molluscs from zinc.

Wetlands Beach

No risks to invertebrates were observed at background areas and Wetland-East based on measured soil concentrations. Multiple analytes across multiple subareas exceeded invertebrate benchmarks. The number of analytes of potential risk to invertebrates generally decreased with depth. A decreasing number of risk drivers with stepout distance to the south of the WMU Ditch was also generally observed beginning with the 30 feet South stepout. Mean chromium at Beach-Background, Beach-Breach, Breach-Background, Wetland-East, and Wetland-West are less than the background 95% UTL. Those at the other subareas, except the Hueneme Parcel and WMU Ditch out to the 15 feet South stepout are less than two times background. Mercury exceeded soil invertebrate benchmarks at Beach-Breach, Hueneme Parcel, and WMU Ditch and all stepouts south of the WMU Ditch; however, as previously indicated, elevated mercury at onsite locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to the soil invertebrate community.

Invertebrate tissue data were available for Wetland-East, Wetland-West, and WMU Ditch-15 feet South. Risks to terrestrial insects were not observed at Wetland-West. Copper and zinc tissue concentrations in snails were determined to be a risk in the Wetland-East subarea; however, these risks are uncertain because mollusc toxicity data were not available for copper or zinc (as was previously discussed for zinc; see Table 4-2). Chromium, copper, and zinc exceedances in whole-body terrestrial invertebrate tissue collected at WMU Ditch-15 feet South are consistent with risks predicted from soil concentrations in surface soils in this subarea.

5.3.3 Weight-of-Evidence

One line of evidence (literature-based single-chemical soil toxicity data) was available for terrestrial plants and two lines of evidence (tissue-based toxicity data and literature-based single-chemical soil toxicity data) were available for soil invertebrates. Each line of evidence was evaluated in a weight-of-evidence approach as shown in Tables 5-6 and 5-7, respectively. The weight-of-evidence discussion is provided below by receptor.

5.3.3.1 Terrestrial Plants

Although aluminum concentrations in many areas of the Site exceeded both the plant benchmark and background 95% UTL, the pH of the soils at the Site (range of 7.6 to 8.2) are greater than 5.5; therefore, aluminum is not considered a contaminant of concern due to very low bioavailability (EPA, 2003b). Risks to the terrestrial plant community from exposure to aluminum are not predicted. Although mercury concentrations at the Hueneme Parcel exceeded the plant benchmark, these elevated concentrations are not considered to be site-related and therefore, risks to the terrestrial plant community are not site-related.

Given the uncertainty associated with the plant benchmark for chromium and low exceedance of the chromium background 95% UTL across many subareas, chromium is likely only a risk at the first two WMU stepouts in NCL-East (less than 8 feet elevation), Hueneme Parcel, and WMU Ditch to the 15 feet South stepout.

In all but two subareas (NCL-Pond and Hueneme Parcel), the number of analytes with potential risk to plants decreased with increasing depth, and in many cases no risks to plants were observed at depth. The number of risk drivers was also observed to decrease with increasing stepout distance to the east of the WMU, and with distance to the south of the WMU Ditch, particularly by the 30- and 50-foot stepouts.

Therefore, the weight-of-evidence is that there are no risks to the terrestrial plant community in the NCL-Background, NCL-North, Beach-Background, Beach-Breach, Breach-Background, Wetland-East, and Wetland-West subareas. In all other subareas, multiple analytes are a potential risk to the plant community, though these risks tend to decrease with soil depth and with distance to the east of the WMU and to the south of the WMU Ditch. Risks from barium, copper, manganese, selenium, vanadium, and zinc were widespread, whereas risks from antimony, chromium, and nickel were limited to certain subareas.

Confidence in the risk conclusions for plants is low because only literature-based toxicity data were available to evaluate risks to terrestrial plants.

5.3.3.2 Soil Invertebrates

Although mercury concentrations at several locations in NCL-North and Wetlands Beach subareas exceeded the soil invertebrate benchmark, these elevated concentrations are not considered to be site-related and therefore, risks to the soil invertebrate community are not site-related.

Given the uncertainty associated with the invertebrate soil benchmark for chromium and low exceedance of the chromium background UTL across many subareas, chromium is likely only a risk at the first two WMU stepouts in NCL-East (less than 8 feet elevation), Hueneme Parcel, and WMU Ditch to the 15 feet South stepout. Chromium risks in the WMU Ditch-15 feet South subarea are supported by the invertebrate tissue data in which chromium was observed to be a risk in the mixed invertebrate sample. Risks to terrestrial invertebrates from zinc in NCL-East (more than 8 feet elevation) were based on exceedances in arthropod tissue; however, zinc concentrations in soil did not exceed soil invertebrate benchmarks in this area. Risks to terrestrial invertebrates from zinc in the NCL-Background and NCL-North subareas and zinc and copper in the Wetland-East subarea were based on exceedances in mollusc tissue collected from these subareas. However, literature-based toxicity data for molluscs were not available, and data for other types of invertebrates were used as a surrogate. Because no risks were predicted in these areas based on screening of the soils, it is likely that the surrogate data overestimate risks to molluscs. Therefore, these predicted tissue-based risks were considered uncertain and given less weight than the media-based risk estimates.

In all but two subareas (Hueneme Parcel and Wetland-West), the number of analytes with potential risk to invertebrates decreased with increasing depth and in many cases no risks to soil invertebrates were observed at depth. The number of risk drivers was also observed to decrease with increasing stepout distance to the east of the WMU, and with distance to the south of the WMU Ditch, particularly by the 30- and 50-foot stepouts.

Media-based risks from chromium, copper, and zinc predicted in WMU Ditch-15 feet South were supported by the tissue-based risks for terrestrial invertebrates in this subarea.

Therefore, the weight-of-evidence is that there are no risks to the terrestrial invertebrate community in the Beach-Background and Breach-Background subareas. Although tissue-based risks from zinc or zinc and copper were predicted at NCL-Background, NCL-North, and Wetland-East, uncertainty associated with the surrogate species toxicity data indicate that more weight should be given to the media-based risk results in which no risks were observed at these three subareas. Tissue-based risks from zinc were predicted in NCL-East (more than 8 feet elevation), though these results were not supported by the media-based risk estimates, which showed no risk in this subarea. In all other subareas, multiple analytes are a potential risk to the terrestrial invertebrate community, though these risks tend to decrease with increasing soil depth and with distance to the east of the WMU and to the south of the WMU Ditch. Risks from barium, copper, manganese, and zinc were widespread, whereas risks from chromium and selenium were limited to certain subareas.

Confidence in the conclusions for chromium, copper, and zinc risks in the WMU Ditch subarea and no risks in the surface soils at Wetland-West are considered moderate because literature-based toxicity data and tissue-based toxicity data were available, and the results were consistent between the two lines of evidence. Soil invertebrate risks based on tissue data for zinc or zinc and copper at NCL-Background, NCL-North, and Wetland-East were not supported by the literature-based toxicity data line of evidence and have high uncertainty because surrogate taxa were used to represent snails collected in the subarea. The conclusion is that there is no risk to soil invertebrates at these subareas (that is, more weight was given to the literature-based toxicity data), but confidence in this conclusion is low given the inconsistent lines of evidence. Confidence in risks identified at areas lacking tissue data are considered to be low because only one line of evidence was available.

SECTION 6

Birds and Mammals

This section characterizes exposure, effects, and risk for birds and mammals.

6.1 Exposure Characterization

Birds and mammals are exposed through multiple pathways, including ingestion of abiotic media (surface water and sediment/soil) and biotic media (food), as well as inhalation and dermal contact. To address these multiple pathways, modeling is used. The end product, or exposure estimate, for birds and mammals is a dosage (amount of chemical in milligrams per kilogram receptor body weight per day [mg/kg/day]) rather than a media concentration, as is the case for the other receptors. This is a function of both the multiple pathway approach and the typical methods used in toxicity testing for birds and mammals.

The general form of the model used to estimate exposure of birds and mammals to COPECs in surface water, sediment, soil, and food is as follows (Suter et al., 2000):

$$E_t = E_o + E_d + E_i$$

Where:

E_t = the total chemical exposure experienced by wildlife
E_o, E_d, and E_i = oral, dermal, and inhalation exposure, respectively

Oral exposure occurs through the consumption of contaminated food, water, or sediment/soil. Dermal exposure occurs when contaminants are absorbed directly through the skin, and inhalation exposure occurs when volatile compounds or fine particulates are inhaled into the lungs. Although methods are available for assessing dermal exposure to humans (EPA, 1992e), data necessary to estimate dermal exposure generally are not available for wildlife (EPA, 1993). Similarly, methods and data necessary to estimate wildlife inhalation exposures are poorly developed (EPA, 1993) or limited (some data are available through the EPA Integrated Risk Information System [IRIS] database). Additionally, a wildlife receptor's exposure to contaminants by inhalation and dermal contact usually contributes little to its overall exposure. Dermal exposure also is likely to be low, even in burrow-dwelling animals, because of the presence of protective dermal layers (for example, feathers, fur, or scales). Thus, for the purposes of this assessment, both dermal and inhalation exposures were assumed to be negligible.

Because dermal and inhalation exposures are excluded, total chemical exposure experienced by wildlife (E_t) is equal to oral exposure (E_o). By replacing E_o with a generalized exposure model modified from Suter et al. (2000), the previous equation was rewritten as follows:

$$E_t = \left[\left[\sum_{i=1}^{n} B_{ij} \times P_i \times FIR\right] + \left[Soil_j \times P_s \times FIR\right] + \left[Water_j \times WIR\right]\right] x\, AUF$$

Where:

E_t = total exposure (mg/kg/day)
$Soil_j$ = chemical concentration in sediment or soil (mg/kg dry weight)
P_s = sediment or soil ingestion rate as proportion of diet (unitless)
FIR = food ingestion rate (kilograms [kg] food/kg body weight/day)
B_{ij} = chemical concentration in biota type (i) (mg/kg wet weight)
P_i = proportion of biota type (i) in diet (unitless)
$Water_j$ = chemical concentration in water (mg/L)
WIR = water ingestion rate (liters [L] water/kg body weight/day)
AUF = area use factor (area of site/home range of receptor) (unitless)

The water portion of this equation was not included in the oral exposure estimate because the RI data did not identify a clear impact from the former Halaco operations to surface water.

6.1.1 Definition of Model Parameters

To apply the exposure model, appropriate model parameters must be defined. The model parameters are outlined as follows.

Exposure Point Concentrations. For the initial screen, the maximum detected concentration of each COPEC by area was used for the EPC. COPECs that failed the initial screening were evaluated based on mean concentrations by subarea. This is because wildlife are mobile, traveling and experiencing exposure over the range of habitats they occupy, so their exposure is best described by mean chemical concentrations in areas they inhabit (Suter et al., 2000). Because birds and mammals utilizing the Site are not likely to forage at depth, only surface data (0 to 6 inches bgs) for soil and sediment were used.

Life History Parameters. The specific life history parameters required to estimate exposure of each receptor to COPECs include body weight, ingestion rates of food, dietary components and percentage of the overall diet represented by each major food type, and approximate amount of soil and/or sediment that may be incidentally ingested based on feeding habits. These parameters, as well as foraging or home range information, were obtained from the literature and are presented in Table 6-1.

Bird and mammal receptors for the Halaco Site include Belding's savannah sparrow, western snowy plover, California least tern, California vole, and ornate shrew. Because the sparrow forages in both aquatic and terrestrial habitats, sediment-associated risks for a 100 percent aquatic-feeding sparrow and soil-associated risks for a 100 percent terrestrial-feeding sparrow were evaluated. For aquatic-feeding sparrows, a diet of 50 percent aquatic invertebrates and 50 percent marsh plants was assumed. In contrast, a diet of 50 percent terrestrial invertebrates (45 percent arthropods and 5 percent terrestrial snails) and 50 percent terrestrial plants was assumed for terrestrial-feeding sparrows.

Many wildlife species are highly mobile, covering large areas in search of food, water, and shelter. The exposure that individuals experience depends on the amount of time they spend at a contaminated site. Site use depends on the size of the site relative to the receptor's home range. The shrew, vole, and sparrow receptors have very small home range sizes (less than 1 hectare) and are expected to forage onsite 100 percent of the time. Although terns and plovers may forage over distances that are larger than the Site, good foraging habitat is present onsite. Therefore, these receptors were also assumed to forage onsite 100 percent of the time.

Bioaccumulation Models. Measurements of COPEC concentrations in wildlife foods (for example, aquatic invertebrates, fish, plants, soil invertebrates, and small mammals) are a critical component for the estimation of oral exposure of birds and mammals. A bioaccumulation study was conducted at the Site to develop site-specific bioaccumulation values (Section 2.8.3.2). Collocated sediment and aquatic invertebrates and collocated soil and terrestrial invertebrates were collected for this analysis. Results of the study suggest that metals and dioxins and furans in sediment and soil are not highly bioavailable and not readily accumulated by biota. However, site-specific BAFs (ratio between biota concentration and soil or sediment concentration) were calculated. BAFs were calculated for bioaccumulation to benthic invertebrates from sediment and for bioaccumulation to terrestrial invertebrates from soil. Sufficient data were available to develop models for two types of terrestrial invertebrates: arthropods and molluscs (snails). For this BERA, median site-specific BAFs were used for both the initial and baseline assessments, as available.

For analytes and food types (for example, plants) lacking site-specific data, bioaccumulation models derived from the literature were applied to develop risk estimates. Significant regressions or median BAFs were used (Note: in cases where the regression model was not recommended by the study authors, the BAF was used). For aquatic receptors, soil-to-plant BAFs or regressions were used as a surrogate to represent uptake from sediment to aquatic plants. The site-specific and literature-based bioaccumulation models that describe uptake from sediment-to-aquatic or benthic invertebrates, soil-to-plants, soil-to-terrestrial invertebrates

(arthropods), and soil-to-terrestrial invertebrates (molluscs) are presented in Tables 6-2, 6-3, 6-4, and 6-5, respectively.

California least terns are wholly piscivorous. Because adequate site-specific fish tissue samples were available, dietary fish concentrations were not modeled. Instead, the actual measured whole-body fish tissue concentrations by area or subarea were used to represent the dietary concentrations for terns.

6.2 Effects Characterization

Single-chemical oral toxicity data and field surveys were available to evaluate effects on birds. Single-chemical oral toxicity data were available for mammals.

6.2.1 Oral Toxicity Values

Single-chemical toxicity data for birds and mammals consist of NOAEL and LOAEL TRVs. Appropriate toxicity studies were selected from published literature based on several criteria:

- Studies were of chronic exposures or exposures during a critical stage of life (for example, reproduction).
- Exposure was oral through food to ensure data were representative of oral exposures expected for wildlife in the field.
- Emphasis was placed on studies of reproductive impacts to ensure relevancy to population-level effects.
- Studies presented adequate information to evaluate and determine the magnitude of exposure and effects (or no-effects concentrations).

Specifically, toxicity studies were selected to serve as the TRV if exposure was chronic or during reproduction (a critical lifestage), the dosing regime was sufficient to identify both a NOAEL and an LOAEL, and the study considered ecologically relevant effects (growth, reproduction, or survival). If multiple studies for a given COPEC meet these criteria, the study generating the lowest reliable toxicity value was selected to be the TRV. The bird and mammal TRVs are presented in Table 6-6.

6.2.2 Avian Field Surveys

Field surveys for California least tern, western snowy plover, and Belding's savannah sparrow populations were available. These surveys included data collected at Ormond Beach (located immediately adjacent to the Site) and multiple locations within California where these special-status species occur. Population metrics included breeding success (number of fledglings per pair) for terns and breeding season abundance for plovers (number of individuals) and sparrows (number of breeding territories). These population metrics measured at Ormond Beach were compared to those from other nearby locations and to totals for the statewide populations to determine whether population metrics at the Halaco Site differed from the other locations. Results of the field survey analyses suggest that exposure to contaminants from the Halaco Site are not adversely affecting reproduction of California least terns or abundance of western snowy plovers and Belding's savannah sparrows utilizing Ormond Beach. Details of this evaluation are provided in Section 2.8.5.

6.3 Risk Characterization

6.3.1 Initial Screening

The screening assessment for birds and mammals was conducted as outlined in Section 2.6. Maximum detected sediment concentrations by area were used to estimate exposure (represented as daily dosage) to aquatic-feeding Belding's savannah sparrow (Table 6-7) and western snowy plover (Table 6-8), and overall maximum whole-body fish concentrations were used to estimate exposure in the California least tern (Table 6-9). For soil-associated birds and mammals, maximum detected soil concentrations by area were used to estimate exposure to terrestrial-feeding Belding's savannah sparrow (Table 6-10) and California vole

and ornate shrew (Table 6-11). These dosage estimates were compared to literature-based TRVs (NOAELs and LOAELs) to determine initial screening HQs.

If the maximum exposure estimate of an analyte-receptor combination equaled or exceeded the NOAEL (HQ ≥ 1) during the initial screening, that analyte was retained for further evaluation in the baseline assessment. If the maximum exposure estimate for an analyte-receptor combination was less than the NOAEL (HQ < 1), the analyte was considered to present no significant risk and was dropped from further evaluation for that bird or mammal receptor. Analytes for which toxicity data were lacking were retained as uncertainties.

Results of these initial screenings against maximum exposure estimates indicated exceedances of multiple analytes across all aquatic and terrestrial areas of the Site as follows:

- **Aquatic Receptors** – Arsenic, cadmium, and cobalt exposures to aquatic-feeding sparrows and plovers, as well as manganese, nickel, and silver exposures to aquatic-feeding sparrows, passed the initial screening (Tables 6-7 and 6-8 for sparrows and plovers, respectively). Aluminum, barium, chromium, copper, manganese, and mercury exposures to terns passed the initial screening (Table 6-9). Antimony, arsenic, cadmium, beryllium, cobalt, nickel, silver, thallium, vanadium, and dioxins and furans were not detected in any fish sample and are not considered a risk to least terns. Therefore, these analyte-receptor combinations were not considered a risk to individual aquatic-feeding sparrows, plovers, or terns and were dropped from further evaluation. The remaining analyte-receptor combinations were retained for further evaluation in the baseline assessment.
- **Terrestrial Receptors** – Arsenic, cobalt, and manganese passed the initial screening for terrestrial-feeding sparrows (Table 6-10). For voles, all analytes except aluminum, barium, beryllium, copper, selenium, and zinc passed the initial screening (Table 6-11). Arsenic, beryllium, cobalt, silver, thallium, and vanadium passed the initial screening for shrews (Table 6-11). These analyte-receptor combinations that passed the initial screenings for terrestrial-feeding sparrows, voles, and shrews were dropped from further evaluation. The remaining analyte-receptor combinations were retained for further evaluation in the baseline assessment.

6.3.2 Baseline Evaluation

Baseline evaluations used the mean sediment, soil, or fish concentrations by subarea to calculate exposures for the bird and mammal receptors. To simplify comparisons, exposure and risk estimate equations for the sparrow (aquatic- and terrestrial-feeding), plover, vole, and shrew were back-calculated, resulting in risk-based concentrations (RBCs) for soil or sediment. RBCs were calculated using NOAELs for the special-status birds, and LOAELs for the mammals. To better quantify risk ranges at the Site, LOAEL-based RBCs were also calculated for special-status avian species. RBCs are media concentrations associated with exposure equal to the NOAEL or LOAEL, and are presented for each bird and mammal receptor in Table 6-12. Additional details of the RBC calculation are provided in Appendix H. RBC comparisons by subarea were performed as indicated below by receptor and habitat.

Aquatic Wildlife: NOAEL-based RBCs for the aquatic-feeding sparrow and plover were compared to the mean sediment concentrations by subarea and to the background 95% UTL for inorganics (Table 6-13a) and to the mean sediment concentrations by subarea for dioxins and furans (represented as avian TEQ; Table 6-14a). LOAEL-based RBC comparisons for inorganics and dioxin/furans are shown in Tables 6-13b and 6-14b. RBCs were not calculated for the tern, but rather, actual measured mean fish tissue concentrations by subarea were used to calculate the exposure dosage and this was compared to the avian TRVs (Table 6-15). Multiple analytes exceeded sparrow and plover RBCs within the NCL-East (less than 8 feet elevation) subarea, which covers a large portion of the Site. To better define these exceedances, additional subdivisions of the data in this subarea were made and consist of four stepouts to the east of the WMU (see Section 5.3.2). Mean concentrations within these stepouts were compared to NOAEL-based (Table 6-16a) and LOAEL-based RBCs (Table 6-16b) for the aquatic-feeding sparrow and plover and to background.

Terrestrial Wildlife: NOAEL-based RBCs for the terrestrial-feeding sparrow and LOAEL-based RBCs for the vole and shrew were compared to the mean soil concentrations by subarea and to background (Table 6-17a). LOAEL-based comparisons for all terrestrial receptors are shown in Table 6-17b. As with aquatic wildlife, NCL-East (less than 8 feet elevation) was further evaluated by comparison of mean concentrations within four stepouts to NOAEL-based RBCs for the terrestrial-feeding sparrow and LOAEL-based RBCs for the vole and shrew (Table 6-18a). Comparisons using LOAEL-based RBCs for the sparrow are shown in Table 6-18b.

The receptors for this BERA include three special-status avian species. Because any risk to individuals of a special-status species is considered unacceptable, these species were primarily evaluated using either the NOAEL-based RBC (sparrows and plovers) or the NOAEL (terns), though an evaluation using LOAEL-based RBCs and LOAELs is provided to quantify the range of risk. COPECs with a mean sediment or soil concentration that is less than NOAEL-based RBCs or NOAELs for birds or less than the LOAEL-based RBCs for mammals are not a risk to individual birds or mammal populations, respectively. Additionally, if either the NOAEL-based RBCs or NOAELs for birds or the LOAEL-based RBCs for mammals is met or exceeded (HQ $\geq$ 1), but the mean soil or sediment concentration for a subarea is less than the 95% UTL background concentration, then risks to the birds and mammals are not predicted. In contrast, if either the NOAEL-based RBCs or NOAELs for birds or the LOAEL-based RBCs for mammals is met or exceeded (HQ $\geq$ 1) and the mean soil or sediment concentration for a subarea is greater than the 95% UTL background concentration, potentially unacceptable risks to individual birds or mammalian populations are predicted. If the LOAEL-based RBCs or LOAELs for birds are met or exceeded (HQ $\geq$ 1) and the mean soil or sediment concentration for a subarea is greater than the 95% UTL background concentration, unacceptable risks to individual birds are predicted. Only the NOAEL-based risks for birds are discussed in this section. Comparisons between NOAEL-based and LOAEL-based risks for birds are used to discuss the range of risks in Section 8.

6.3.2.1 Aquatic-Feeding Belding's Savannah Sparrow

NCL-East

Multiple analytes across this area exceeded NOAEL-based RBCs for aquatic-feeding sparrows (Tables 6-13a, 6-14a, and 6-16a). There was a decreasing number of risk drivers with increasing stepout distance from the WMU (Table 6-16a). Although vanadium and selenium concentrations across this area and all four stepouts exceeded the sparrow RBCs, vanadium and selenium risks are uncertain because their background UTLs also exceeded the sparrow RBC. Vanadium at the 1st stepout was less than two times background and decreased to approximately background levels by the 4th stepout (32.7 mg/kg compared to 32.5 mg/kg for background). Selenium is three times background in the 1st stepout, but also decreases to near background levels by the 4th stepout.

Due to very low bioavailability at higher pH ranges, EPA (2003b) indicates that aluminum is only considered to be a contaminant of concern at sites with pH values less than 5.5. The pH in this area ranged between 7.6 and 8.0; therefore, risks from aluminum are unlikely.

NCL-North

Exceedances of the NOAEL-based RBCs for aquatic-feeding sparrows within the NCL-Ditch and NCL-Pond subareas were limited to lead, selenium, and vanadium (Tables 6-13a and 6-14a). The mean vanadium concentrations at the two NCL-North subareas were very close to background (1.06 times background UTL at NCL-Ditch and 1.22 times at NCL-Pond).

OID Lagoon

Exceedances of the NOAEL-based RBCs for aquatic-feeding sparrows within the OID Lagoon area were limited to mercury, selenium, and vanadium (Tables 6-13a and 6-14a). Selenium concentrations at all sites, except Lagoon Finger-Footbridge and vanadium at OID-Site are very close (less than 1.5 times) to their respective background UTLs, which also exceeded the sparrow RBC. Mercury exceeded NOAEL-based RBCs

for aquatic-feeding sparrows at Lagoon Finger-Footbridge; however, mercury concentrations at the Site do not appear to be related to Halaco process waste because the waste itself does not differ from background. This suggests that elevated mercury at onsite locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to sparrows.

Wetlands Beach

Multiple analytes at WMU Ditch and the 1st stepout (5 feet South) exceeded NOAEL-based RBCs for aquatic-feeding sparrows (Tables 6-13a and 6-14a). The pH in this area ranged between 7.6 and 7.9. Mercury exceeded NOAEL-based RBCs for aquatic-feeding sparrows at WMU Ditch and subareas; however, as previously indicated elevated mercury at onsite locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to sparrows.

Site-Specific Field Surveys

Field survey data for Belding's savannah sparrows nesting at Ormond Beach and 31 other locations in Southern California were available for 8 separate years between 1973 and 2010 (Section 2.8.5). When the year with the greatest number of breeding territories at Ormond Beach was excluded, the number of breeding territories at Ormond Beach was significantly correlated with the total number of territories in Southern California. These results suggest that exposure to contaminants from the Halaco Site are not adversely affecting abundance of Belding's savannah sparrow.

6.3.2.2 Western Snowy Plover

NCL-East

Multiple analytes across this area exceeded NOAEL-based RBCs for plovers that were derived using literature-based benchmarks for birds (Tables 6-13a, 6-14a, and 6-16a). There was a decreasing number of risk drivers with stepout distance from the WMU (Table 6-16a). Vanadium and selenium concentrations across this area and all four stepouts exceeded the plover RBCs. However, vanadium and selenium risks are uncertain as described for the aquatic-feeding sparrow. Aluminum is not considered a concern given the pH range in this area (7.6 to 8.0).

NCL-North

Multiple analytes at NCL-Ditch and NCL-Pond exceeded NOAEL-based RBCs for plovers (Tables 6-13a and 6-14a). As described for the sparrow, mean vanadium concentrations at these subareas are near background. The pH in this area ranged between 8.0 and 8.2. Mercury exceeded NOAEL-based RBCs for plover at NCL-Pond; however, as previously indicated elevated mercury at onsite locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to plovers.

OID Lagoon

Exceedances of the NOAEL-based RBCs for plovers within the OID Lagoon area were limited to aluminum, mercury, selenium, and vanadium (Tables 6-13a and 6-14a). Selenium concentrations at all sites, except Lagoon Finger-Footbridge and vanadium at OID-Site are very close (less than 1.5 times) to their respective background UTLs, which also exceeded the plover RBC. Although pH at this area is not available, pH across the Site ranged from 7.6 to 8.2 and is likely to be close to or within this range at OID Lagoon. Mercury exceeded NOAEL-based RBCs for plover at several lagoon subareas; however, as previously indicated elevated mercury at onsite locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to plovers.

Wetlands Beach

Multiple analytes at WMU Ditch and the 1st stepout (5 feet South) exceeded NOAEL-based RBCs for plovers (Tables 6-13a and 6-14a). The pH in this area ranged between 7.6 and 7.9. Mercury exceeded NOAEL-based RBCs for plover at WMU Ditch and subareas; however, as previously indicated elevated mercury at onsite

locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to plovers.

Site-Specific Field Surveys

Field survey data for western snowy plovers nesting at Ormond Beach and seven other locations in San Luis Obispo, Santa Barbara, and Ventura Counties, California, were available (Section 2.8.5). When the 3 years with the greatest numbers of individuals during the breeding season at Ormond Beach were excluded, abundance at Ormond Beach was significantly correlated with abundance in the larger three-county area. These results suggest that exposure to contaminants from the Halaco Site are not adversely affecting abundance of western snowy plover.

6.3.2.3 California Least Tern

Selenium exceeded the NOAEL at all subareas within the NCL-East, OID Lagoon, and Wetlands Beach areas, except WMU-3rd Stepout and WMU-4th Stepout (Table 6-15). As previously described, selenium concentrations decrease with stepout distance from the WMU, ranging from three times background in the 1st stepout to less than two times background in the 2nd stepout, and near the background level by the 4th stepout. Selenium concentrations at all OID Lagoon subareas, except Lagoon Finger-Footbridge, are very close (less than 1.5 times) to the background UTL. The mean selenium concentration at WMU Ditch is about 3.5 times background. Also, selenium concentrations in fish tissue are very similar across all locations (OID Lagoon, NCL-East, and WMU Ditch), suggesting that concentrations in fish may not be site-related.

Site-Specific Field Surveys

Field survey data for California least tern nesting at Ormond Beach and those nesting within the State of California as a whole were available for the 2000, 2007, 2009, 2010, and 2011 breeding seasons (Section 2.8.5). Mean breeding success (fledglings per pair) at Ormond Beach did not differ from the statewide population. These results suggest that exposure to contaminants from the Halaco Site are not adversely affecting reproduction among California least tern.

6.3.2.4 Terrestrial-Feeding Belding's Savannah Sparrow

NCL-East

Multiple analytes across multiple subareas exceeded NOAEL-based RBCs for terrestrial-feeding sparrows that were derived using literature-based benchmarks for birds (Tables 6-17a and 6-18a). There was a decreasing number of risk drivers with stepout distance from the WMU (Table 6-18a). As previously indicated, aluminum is not considered a risk driver at pH values greater than 5.5 (the pH range is 6.7 to 8.0 in this area). Although vanadium concentrations across this area and all four stepouts exceeded the NOAEL-based RBCs for terrestrial-feeding sparrows, vanadium risks are uncertain because the background UTL also exceeded the NOAEL-based terrestrial-feeding sparrow RBC. Vanadium at the 1st stepout was less than two times background and decreased to background levels by the 4th stepout (32.7 mg/kg compared to 32.5 mg/kg for background).

NCL-North

No risks to sparrows from soil exposures at NCL - Background and NCL-North were identified (Tables 6-17a and 6-18a). Multiple analytes at NCL-Ditch and NCL-Pond exceeded NOAEL-based RBCs for terrestrial-feeding sparrows. The mean vanadium concentrations at these two NCL-North subareas are very close background (1.06 times background UTL at NCL-Ditch and 1.22 times at NCL-Pond). The pH in this area ranged between 8.0 and 8.2.

Wetlands Beach

No risks to terrestrial-feeding sparrows were observed at background areas or the Wetland-West subarea (Tables 6-17a and 6-18a). Multiple analytes across the other subareas exceeded NOAEL-based RBCs for terrestrial-feeding sparrows. There was a decreasing number of risk drivers with stepout distance to the

south of the WMU Ditch, though concentrations of these risk drivers generally decreased with distance to the south from WMU Ditch (except vanadium, which was greater at WMU Ditch-15 feet South). Vanadium risks are considered uncertain because background also exceeds the NOAEL-based terrestrial-feeding sparrow RBC; mean vanadium concentrations were less than two times background at WMU Ditch and all stepouts to the south, except at 5 feet South where the mean vanadium concentration was less than background. The pH in this area ranged between 7.6 and 7.9. Mercury exceeded NOAEL-based RBCs for terrestrial-feeding sparrows at Hueneme Parcel and WMU Ditch-5 feet South; however, as previously indicated elevated mercury at onsite locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to sparrows.

Site-Specific Field Surveys

Field survey data for Belding's savannah sparrows nesting at Ormond Beach and 31 other locations in Southern California were available for 8 separate years between 1973 and 2010 (Section 2.8.5). When the year with the greatest number of breeding territories at Ormond Beach was excluded, the number of breeding territories at Ormond Beach was significantly correlated with the total number of territories in Southern California. These results suggest that exposure to contaminants from the Halaco Site are not adversely affecting abundance of Belding's savannah sparrow.

6.3.2.5 California Vole

NCL-East

No risks to voles were observed at McWane-Center, the 4th WMU stepout, and NCL-East (more than 8 feet elevation) (Tables 6-17a and 6-18a). As previously discussed, risks from exposure to aluminum are not predicted because pH in this area ranges from 6.7 to 8.0.

NCL-North

No risks to voles were observed at NCL-Background and NCL-North (Tables 6-17a and 6-18a). The pH in this area ranged between 8.0 and 8.2.

Wetlands Beach

No risks to voles were observed at background areas, Hueneme Parcel, Wetland-East, and Wetland-West, and the 30 feet and 50 feet stepouts south of WMU Ditch (Tables 6-17a and 6-18a). Multiple analytes within WMU Ditch and the 5 feet and 15 feet stepouts exceeded LOAEL-based RBCs for voles. The pH in this area ranged between 7.6 and 7.9.

6.3.2.6 Ornate Shrew

NCL-East

Multiple analytes across multiple subareas exceeded LOAEL-based RBCs for shrews derived using literature-based benchmarks for mammals (Tables 6-17a and 6-18a). There was a decreasing number of risk drivers with stepout distance from the WMU (Table 6-18a). As previously indicated, aluminum is not considered a risk driver at pH values greater than 5.5 (range 6.7 to 8.0 in this area).

NCL-North

No risks to shrews from soil exposures at NCL-Background and NCL-North were predicted (Tables 6-17a and 6-18a). Multiple analytes at NCL-Ditch and NCL-Pond exceeded LOAEL-based RBCs for shrews. The pH in this area ranged between 8.0 and 8.2.

Wetlands Beach

No risks to terrestrial shrews were observed at background areas or the Wetland-West subarea (Tables 6-17a and 6-18a). Multiple analytes across the other subareas exceeded LOAEL-based RBCs for shrews. A decreasing number of risk drivers with stepout distance to the south of WMU Ditch was generally observed. The one exception was the 15 feet South stepout, which had the same number of risk drivers as

WMU Ditch. However, concentrations of all of these risk drivers were lower at WMU Ditch-15 feet South than at WMU Ditch. The pH in this area ranged between 7.6 and 7.9. Mercury exceeded LOAEL-based RBCs for shrews at Hueneme Parcel; however, as previously indicated, elevated mercury at onsite locations is not site-related (not from the Halaco process waste). Therefore, mercury was not retained as a site-related risk to shrews.

6.3.3 Weight-of-Evidence

Two lines of evidence (single-chemical oral toxicity data and field surveys) were available for birds; one line of evidence (single-chemical oral toxicity data) was available for mammals. Each line-of-evidence for the bird and mammal receptors was evaluated in a weight-of-evidence approach as shown in Table 6-19. Risk conclusions for aquatic and terrestrial wildlife are outlined below by receptor.

6.3.3.1 Aquatic Wildlife

Aquatic-Feeding Belding's Savannah Sparrow

Multiple analytes exceeded the aquatic-feeding Belding's savannah sparrow RBCs across most areas of the Site. However, some analytes are not likely a risk, or are likely to be of very low risk. Moreover, breeding data for sparrows suggest that risks, if present, are not affecting breeding sparrows. Details of these issues are as follows:

- Although aluminum concentrations in many areas of the Site exceeded both the sparrow RBC and background UTL, the pH of the sediments at the Site (range of 7.6 to 8.2) are greater than 5.5; therefore, aluminum is not considered a contaminant of concern due to very low bioavailability (EPA, 2003b). Risks to individual aquatic Belding's savannah sparrow from exposure to aluminum are not predicted.
- Mercury concentrations at some locations in OID Lagoon and WMU Ditch exceeded the NOAEL-based RBC for aquatic-feeding sparrows. These elevated concentrations are not considered to be site-related and therefore, risks to sparrows are not site-related.
- Mean vanadium concentrations across the Site were either less than the background UTL or were less than 1.5 times background. This suggests that risks to sparrows from vanadium are likely low. Although selenium concentrations at some subareas are near background levels, others range up to 3.5 times background and risks from selenium cannot be excluded. The number of risk drivers was observed to decrease with stepout distance to the east of the WMU and also decreases from the WMU Ditch to the WMU Ditch-5 feet South.
- Despite the potential risks identified using literature-based oral toxicity data, results of breeding season field surveys indicate that the number of Belding's savannah sparrow breeding territories at Ormond Beach is correlated with the total number of territories at other Southern California locations. Ormond Beach aquatic-feeding sparrows are likely to forage in areas affected by Halaco Site contamination. Thus, it does not appear that exposure to Site contaminants is adversely affecting breeding sparrows.

The weight-of-evidence is that there are no risks to individual aquatic Belding's savannah sparrow at NCL-North. In all other subareas, dietary exposure modeling suggests multiple analytes are a potential risk to individual aquatic sparrows. These results are tempered, however, by the available field survey data, which indicate that breeding season abundance of Belding's savannah sparrows at Ormond Beach is unaffected by Halaco Site contamination. Site-specific information is given more weight than results obtained from comparisons to literature-based information; therefore, risks to sparrows are predicted to be absent or very low.

Confidence in the risk conclusions for aquatic-feeding Belding's savannah sparrows is moderate because single-chemical toxicity data and site-specific field surveys were available to evaluate risks to sparrows.

Western Snowy Plover

All subareas of the Site had at least one analyte that exceeded the plover RBC. The number of risk drivers was observed to decrease with stepout distance to the east of the WMU and also decreases from the WMU Ditch to the WMU Ditch-5 feet South. However, some analytes are not likely a risk or are likely to be of very low risk. Moreover, breeding data for plovers suggest that risks, if present, are not affecting breeding plovers. Details of these issues are as follows:

- As described above for the Belding's savannah sparrow, risks from aluminum, vanadium, and selenium are considered low, and those from mercury are not likely to be site-related.
- Despite the potential risks identified using literature-based oral toxicity data, results of breeding season field surveys indicate that the number of adult western snowy plovers at Ormond Beach is correlated with the total number of breeding plovers for the larger three-county area. This result suggests that exposure to Halaco Site contaminants is not adversely affecting breeding plovers.

The weight-of-evidence is that dietary exposure modeling suggests multiple analytes across the Site are a potential risk to individual snowy plovers. These results are tempered, however, by the available field survey data, which indicate that breeding season abundance of western snowy plovers at Ormond Beach is unaffected by Halaco Site contamination. Site-specific information is given more weight than results obtained from comparisons to literature-based information; therefore, risks to plovers are predicted to be absent or very low.

Confidence in the risk conclusions for western snowy plover is moderate because single-chemical toxicity data and site-specific field surveys were available to evaluate risks to plovers.

California Least Tern

Selenium was the only analyte that was detected in fish at concentrations sufficient to pose a risk to terns. Although selenium concentrations at some subareas are near background levels, others range up to 3.5 times background. Therefore, risks from selenium cannot be excluded. However, it should be noted that selenium concentrations in fish tissue are very similar across all locations (OID Lagoon, NCL-East, and WMU Ditch), suggesting that concentrations in fish may not be site-related.

Additionally, results of breeding season field surveys indicate that mean breeding success (number of fledglings per pair) for California least terns nesting at Ormond Beach did not differ from the statewide population. Because the breeding success of Ormond Beach terns is comparable to other locations across the state of California, exposure to Halaco Site contaminants does not appear to be adversely affecting breeding terns.

The weight-of-evidence is that selenium is the only analyte identified as a potential risk to individual California least terns, though fish tissue data suggest that these risks are not site-related. Moreover, the available field survey data indicate that breeding success of California least terns at Ormond Beach is unaffected by Halaco Site contamination. Site-specific information is given more weight than results obtained from comparisons to literature-based information; therefore, risks to terns are predicted to be absent or very low.

Confidence in the risk conclusions for California least tern is moderate to high because single-chemical toxicity data and site-specific field surveys were available to evaluate risks, and because field surveys evaluated reproduction success.

6.3.3.2 Terrestrial Wildlife

Terrestrial-Feeding Belding's Savannah Sparrow

Multiple analytes exceeded the terrestrial-feeding Belding's savannah sparrow RBCs across most areas of the Site. The number of risk drivers was observed to decrease with stepout distance to the east of the WMU and distance to the south of WMU Ditch. However, some analytes are not likely a risk or are likely to be of

very low risk. Moreover, breeding data for sparrows suggest that risks, if present, are not affecting breeding sparrows. Details of these issues are as follows:

- As described above for the aquatic-feeding sparrow, risks from aluminum, vanadium, and selenium are considered low, and those from mercury are not likely to be site-related.
- Despite the potential risks identified using literature-based oral toxicity data, results of breeding season field surveys indicate that abundance of sparrows is comparable to other locations and Halaco Site contaminants are not adversely affecting breeding sparrows.

The weight-of-evidence is that there are no risks to the individual terrestrial Belding's savannah sparrows at the NCL-Background, NCL-North, Beach-Background, Breach-Background, and Wetland-West subareas. In all other subareas, risk results are tempered with the available field survey data, which indicate that breeding season abundance of Belding's savannah sparrows at Ormond Beach is unaffected by Halaco Site contamination. Site-specific information is given more weight than results obtained from comparisons to literature-based information; therefore, risks to sparrows are predicted to be absent or very low.

Confidence in the risk conclusions for terrestrial-feeding Belding's savannah sparrows is moderate because single-chemical toxicity data and site-specific field surveys were available to evaluate risks to sparrows.

California Vole

California vole populations were not found to be a risk at many areas of the Site, though a few analtyes exceeded LOAEL-based RBCs for voles at about half the subareas. The number of risk drivers decreased with stepout distance to the east of the WMU, with no risks to voles in the 2nd, 3rd, and 4th stepouts. Similarly, the number of risk drivers decreased with distance to the south of the WMU Ditch, with no risks to voles in the 30- and 50-foot stepouts. However, some analytes are not likely a risk or are likely to be of very low risk. As described above for the aquatic-feeding sparrow, risks from aluminum and selenium are considered low.

The weight-of-evidence is that risks to the California vole population are predicted only for the WMU-1st Stepout, NCL-Ditch, NCL-Pond, WMU Ditch, WMU Ditch-5 feet South, and WMU Ditch-15 feet South subareas. These risks tend to decrease with distance to the south of the WMU Ditch. Risks from selenium are somewhat uncertain because the background UTL also exceeds the vole RBC. Risks from barium, beryllium, copper, and selenium were predicted at WMU-1st Stepout. Only selenium was a risk at NCL-Ditch and NCL-Pond. Copper and selenium at WMU Ditch and WMU Ditch-5 feet South, and copper at WMU Ditch-15 feet South were a risk to the vole population.

Confidence in the risk conclusions for California vole is low because only single-chemical toxicity data were available to evaluate risks to voles.

Ornate Shrew

Multiple analytes exceeded the ornate shrew RBCs across most areas of the Site. The number of risk drivers was observed to decrease with stepout distance to the east of the WMU and distance to the south of WMU Ditch. As described above for the aquatic-feeding sparrow, risks from aluminum and selenium are considered low, and those from mercury are not likely to be site-related.

The weight-of-evidence is that there are no risks to the ornate shrew population at the NCL-Background, NCL-North, Beach-Background, Breach-Background, and Wetland-West subareas. In all other subareas, at least one analyte was found to present a risk to shrews. Risks were observed to decrease with distance to the east of the WMU and to the south of WMU Ditch. Risks from selenium, though widespread, are somewhat uncertain because the background UTL also exceeds the shrew RBC. Risks from copper were observed in all subareas, except those with no risks. Risks from barium, lead, nickel, and zinc also were widespread, whereas risks from antimony, chromium, and manganese were limited to certain subareas.

Confidence in the risk conclusions for ornate shrew is low because only single-chemical toxicity data were available to evaluate risks.

SECTION 7

Uncertainties

Uncertainties are inherent in all risk assessments. The nature and magnitude of the uncertainties depend on the amount and quality of data available, the degree of knowledge concerning site conditions, and the assumptions made to perform the assessment. A qualitative evaluation of the major uncertainties associated with this assessment, in no particular order of importance, is outlined below.

- 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. Only recently collected data, obtained in accordance with a single sampling and analysis plan (2000-2011), were used to decrease sampling and analytical variability. Additionally, the data were validated.
- Representative species were selected to reduce uncertainty; however, differences between the species evaluated in the BERA and those at the Site including physiology, reproductive biology, and/or foraging habits can result in different exposures and sensitivities for different receptors. This may result in an overestimation or underestimation of risk.
- Several exposure routes were considered minor and were not included in the exposure analysis. Risks may be underestimated because these routes were not quantified.
- Individuals within a population vary in a number of life history and behavioral traits. The dose models incorporate some of this variability by estimating average values for most model parameters. Most of these models, however, are focused on adult individuals and may not accurately represent ingestion of COPECs by small juvenile stages that may feed in a different manner. Depending on the behavior and proportion of juveniles among the population, the risk may be overestimated or underestimated.
- Site-specific data on COPEC concentrations in some wildlife foods (for example, plants) or for some analytes for benthic or terrestrial invertebrates were not available. Literature-based BAFs and regression models were used to estimate bioaccumulation. The suitability of these bioaccumulation models to conditions at the Site is unknown. Therefore, concentrations of COPECs in biota present at the Site and, consequently, the dietary exposures of birds and mammals, may be either higher or lower than values estimated in the BERA.
- The BERA assumed that all receptors live and forage onsite 100 percent of the time. Receptors such as the western snowy plover and California least tern forage over areas that may be larger than the Halaco Site and, therefore, are not likely to be consistently exposed to the maximum concentrations of COPECs in soil. As a consequence, risk to these receptors is likely overestimated.
- Toxicity data were not available for all COPECs or media. COPECs for which toxicity data were unavailable were not evaluated, or surrogate toxicity data were used. Risks may be overestimated or underestimated.
- There is low confidence in some of the TRVs/benchmarks used in this BERA because of the limited amount of toxicity data on which they are based. This may result in an overestimation or underestimation of risk.
- Uncertainty factors were used to estimate chronic NOAEL-equivalent bird or mammal TRVs for some analytes that lacked NOAEL data (for example, molybdenum TRVs for birds, see Table 6-6). The suitability of these uncertainty factors is unknown. As a consequence, risk to these receptors is likely overestimated.
- Data concerning soil ingestion rates for the bird and mammal receptors were not available. Consequently, the soil ingestion rates were estimated based on assumed similarities to other species for

which data were available. The suitability of these assumptions is unknown. Although this uncertainty may result in underestimation of exposure (and risk), it is more likely that exposure and risk are overestimated.

- Life history data for birds and mammals at the Halaco Site were not available. Therefore, exposure parameters were either modeled on the basis of allometric relationships (such as food ingestion rates) or were based on data from the same species in other portions of its range. Because diet composition as well as food, water, and soil ingestion rates can differ among individuals and locations, published parameter values may not accurately reflect individuals present at the Site. Consequently, risk may be either overestimated or underestimated.
- Toxicity data were not available for some COPEC-receptor combinations considered in this assessment. Therefore, COPECs for which toxicity data were unavailable were not evaluated (but were retained as uncertainties). Exclusion of COPECs from evaluation underestimates aggregate risk.
- Bioavailability in the toxicity studies used for development of TRVs is generally high because many toxicity tests are performed using soluble salts of inorganic chemicals (as in the case of chromium toxicity to plants). Site-specific bioavailability data were lacking. Instead, it was assumed that all COPECs evaluated in this BERA were 100 percent bioavailable. Because analytes are generally not 100 percent bioavailable, exposure and risk may be overestimated.
- Literature-derived toxicity data based on laboratory studies were used to evaluate risk to all receptor groups, and in some cases, were the only available toxicity data. It was assumed that effects observed in laboratory species were indicative of effects that would occur in wild species. The suitability of this assumption is unknown. Consequently, risk may be either overestimated or underestimated.
- In this assessment, risks from COPECs were each considered independently for many receptors (that is, receptors that lacked ambient media toxicity data). In contrast, site-specific bioassays for some receptors allowed evaluation of chemical mixtures. Because chemicals may interact in an additive, antagonistic, or synergistic manner, evaluation of single-chemical risk may either underestimate or overestimate risks associated with chemical mixtures.
- Ambient media toxicity bioassays were conducted on the laboratory species *Hyallela azteca* (an amphipod). It was assumed that this species is representative of the benthic invertebrates found at the Halaco Site. The suitability of this assumption is unknown. Consequently, risk may be either overestimated or underestimated.
- Tissue-based toxicity data for aquatic invertebrates were derived from literature sources. In most cases, available laboratory species were used as surrogates for species collected at the Site. It was assumed that tissue levels at which effects occurred in these surrogate species are representative of invertebrate species collected at the Site. Additionally, these aquatic invertebrate tissue levels were assumed to be representative of tissue levels that would cause effects in terrestrial invertebrates collected at the Site. The suitability of these assumptions is unknown. Consequently, risk based on the invertebrate tissue exposures may be either overestimated or underestimated.
- Tissue-based toxicity data for fish were derived from literature sources. In most cases, available laboratory species were used as surrogates for species collected at the Site. It was assumed that tissue levels at which effects occurred in these surrogate species are representative of fish collected at the Site. The suitability of this assumption is unknown. Consequently, risk based on fish tissue exposures may be either overestimated or underestimated.

SECTION 8

Risk Results by Medium

Risks to aquatic biota, fish, benthic invertebrates, terrestrial plants, soil invertebrates, and birds and mammals were identified in this BERA. To better understand the risk profiles across the Site, a series of weight-of-evidence summary tables was created. Risk results and information from the tables are summarized in this section.

Some of the identified risks do not appear to be site-related (that is, some risks are not the result of Halaco's operations). In particular, risks from surface water appear to be associated primarily with other contaminant sources in the watershed (CH2M HILL, 2012), and no site-related risks from surface water were identified (Section 3); therefore, a risk summary table was not created for surface water.

Risk summary tables were developed for sediment (Tables 8-1 through 8-4) and soil (Tables 8-5 through 8-8). These tables have been spatially ordered to show risks across areas and across concentration gradients. For example, background areas are placed at the top of the table as a reference for the other areas; stepouts to the south of WMU Ditch and east of the WMU show a general pattern of decreasing risk with distance from the WMU Ditch and the WMU.

Each of the weight-of-evidence tables includes, for each subarea, the total number of analytes that "failed" (that is, analytes that may present a risk to one or more receptors), the maximum number of receptors that failed, and the total number of receptor-analyte combinations that failed. Additionally, the number of subareas with risks is shown for each receptor in the rows at the bottom of the table. These tables allow an analysis of risks across receptors, analytes, and areas/subareas, which are summarized below by medium.

Generally, but not always, the higher the number of analytes and receptors in the weight-of-evidence tables, the higher the level of confidence in the predicted risk. An important exception is when certain lines of evidence, such as site-specific field surveys or toxicity tests, are available to override literature-based toxicity data. This is the case for the sparrows, plovers, and terns, where field survey data provide strong evidence that these avian species are not adversely affected by Site contamination. There are also analyte-specific exceptions, such as chromium, where the toxicity benchmark may not reflect the form of chromium found at the Site. Risks from selenium and vanadium are also judged to be low across much of the Site where toxicity benchmarks are close to background levels. These cases are discussed further in Sections 8.1 through 8.3. Section 9 summarizes the risks by area and subarea.

8.1 Surface Water

As discussed in Section 3, several risks to aquatic biota from surface water exposures were initially identified. However, none but aluminum are believed to be site-related. Further evaluation of aluminum indicated that risks were overestimated. Namely, water hardness is high at the Site and the toxicity of aluminum decreases with increasing water hardness. Additionally, aluminum has a low bioavailability in sediment (pH > 5.5 at the Site) and therefore, exceedances of fish tissue benchmarks were likely due to sediment present in the fish gut rather than aluminum concentrations in fish tissue.

The conclusion is that there are no site-related risks to the aquatic biota community, fish populations, or individual tidewater goby from exposure to surface water at the Site. There were few differences in the initial risk profile between high and low water conditions and final conclusions (no site-related risk) were the same for both water conditions.

8.2 Sediment

Weight-of-evidence conclusions for sediment exposures to aquatic-feeding Belding's savannah sparrows, western snowy plovers, California least terns, benthic invertebrates (based on site-specific LOECs and

measured whole-body, benthic invertebrate tissue), and fish (based on measured whole-body fish tissue) are shown in Table 8-1 (by area and subarea) and Table 8-3 (by WMU stepout). Analytes that are identified as risks to special-status avian species in Tables 8-1 and 8-3 are those for which the no-effect levels (NOAELs) and background UTLs were exceeded. Summary tables were created to display risks to avian receptors based on the LOAELs (Table 8-2 for area and subarea risks and Table 8-4 for risks at the WMU stepouts). Risks to other receptors do not change, but are included in these tables to show the entire risk profile. The weight-of-evidence conclusions are summarized in Section 8.2.1 (all subareas) and Section 8.2.2 (WMU stepouts in NCL-East [less than 8 feet elevation]).

In areas that experience periodic wetting and drying, such as NCL-East, there may be both sediment-related risks (addressed in this section) and soil-related risks (addressed in Section 8.3).

8.2.1 All Subareas

The sediment-associated weight-of-evidence conclusions across all subareas (Table 8-1) are provided below. NOAELs are used to predict risks for special-status avian species; however, it should be noted that risks to avian receptors are not considered likely given the available breeding and population data for the receptors of concern (see Section 8.2.3). If avian risks are removed, sediment-associated risks are limited to Lagoon Finger-Footbridge and WMU Ditch. Results by receptor, analyte, and area are as follows.

- **Receptors** (based on number of analytes that fail and number of areas/subareas with risks)
  - No analytes or areas with risk: Fish (no site-related risks; represented by fish tissue results)
  - Less than or equal to three analytes or areas with risks: California least tern (see Section 8.2.3) and benthic invertebrates (based on site-specific LOECs[3] and measured tissue concentrations)
  - More than three analytes or areas with risks: Belding's savannah sparrow and western snowy plover (see Section 8.2.3)
- **Analytes** (based on number of areas/subareas with risks and number of receptors with risks)
  - No areas or receptors with risk: Aluminum (not a concern given the pH at the Site), antimony, arsenic, cadmium, cobalt, manganese, mercury (no site-related risks), nickel, silver, and thallium
  - Spatially limited risks: Beryllium, chromium, magnesium, zinc, and dioxin and furan TEQs
  - Widespread risks: Barium, copper, lead, selenium, and vanadium (although widespread, risks from some of these analytes are low; see Sections 8.23 and 8.2.4)
- **Areas** (based on number of analytes that fail, maximum number of receptors that fail, and total receptor-analyte combinations that fail)
  - No analytes or receptors with risk: OID-North
  - Less than five total receptor-analyte combinations that fail: Lagoon-Main, Lagoon Finger-West, Lagoon Finger-East, and OID-Site
  - More than five total receptor-analyte combinations that fail: NCL-East (less than 8 feet elevation), NCL-Ditch, NCL-Pond, Lagoon Finger-Footbridge, WMU Ditch, and WMU Ditch-5 feet South

Although some differences were observed, the sediment risk profile did not significantly change when the weight-of-evidence for birds was based on the LOAEL (instead of the NOAEL as shown above) (Table 8-2).

[3] Adverse effects to benthic invertebrates associated with Site contaminants were observed in one bioassay sample from NCL-East; however, average concentrations across this and all other subareas were not a risk to benthic invertebrates based on the site-specific LOECs developed from the bioassay sample.

8.2.2 NCL-East (less than 8 feet elevation) – WMU Stepouts

The sediment-associated risks across the four WMU stepouts (Table 8-3) using NOAELs for special-status avian species are provided below. However, it should be noted that risks to avian receptors are not considered likely given the available breeding and population data for the receptors of concern (see Section 8.2.3). If avian risks are removed, the conclusion is that there are no sediment-associated risks in NCL-East (less than 8 feet elevation) and the WMU stepouts. Results by receptor, analyte, and area are as follows.

- **Receptors** (based on number of analytes that fail and number of areas/subareas with risks)
  - No analytes or areas with risk: Benthic invertebrates (based on site-specific LOECs[4] and measured tissue concentrations) and fish (represented by fish tissue results)
  - Less than or equal to three analytes or areas with risks: California least tern (see Sections 8.2.3 and 8.2.4)
  - More than three analytes or areas with risks: Belding's savannah sparrow and western snowy plover (see Section 8.2.3)
- **Analytes** (based on number of areas/subareas with risks and number of receptors with risks)
  - No areas or receptors with risk: Aluminum, antimony, arsenic, beryllium, cadmium, cobalt, magnesium, manganese, mercury, nickel, silver, thallium, and dioxin and furan TEQs
  - Spatially limited risks: Barium, chromium, and zinc
  - Widespread risks: Copper, lead, selenium, and vanadium (although widespread, risks from some of these analytes are low; see Sections 8.2.3 and 8.2.4)
- **Areas** (based on number of analytes that fail, maximum number of receptors that fail, and total receptor-analyte combinations that fail)
  - No analytes or receptors with risk: None
  - Less than or equal to five total receptor-analyte combinations that fail: WMU-3rd Stepout and WMU-4th Stepout
  - More than five total receptor-analyte combinations that fail: WMU-1st Stepout and WMU-2nd Stepout

As was observed across all subareas, little change to the overall risk profile for the WMU stepouts was observed when risks to birds were based on the LOAEL (instead of the NOAEL as shown above) (see Table 8-4).

Information for some receptors (special-status species) and for some analytes also affects the risk conclusions for sediment.

8.2.3 Receptor-Specific Considerations

Field surveys that compare breeding parameters for Belding's savannah sparrows, western snowy plovers, and California least terns nesting at Ormond Beach to other state-wide or Southern California locations indicate that the abundance of sparrows and plovers and reproductive success of terns at Ormond Beach is consistent with other locations. These surveys provide strong evidence that these avian species are not adversely affected by contamination at the Halaco Site. Therefore, it is reasonable to remove aquatic-feeding sparrows, plovers, and terns from the weight-of-evidence summaries in Tables 8-1 through 8-4.

[4] Adverse effects to benthic invertebrates associated with Site contaminants were observed in one bioassay sample from NCL-East; however, average concentrations across this subarea were not a risk to benthic invertebrates based on the site-specific LOECs developed from the bioassay sample.

This removal is represented by placing parentheses around the avian receptors in the sediment tables. If these avian species are removed, the magnitude and extent of sediment-associated risks is significantly reduced, with limited risks to benthic invertebrates.

As described in Section 3, fish tissue results indicate that individual tidewater gobies (a special-status species found at the Site) are not at risk from site-related contamination. This conclusion is further supported by the limited population information that is available for this species. Marek (2012) suggests that as many as one million tidewater gobies may reside in the Ormond Beach Lagoon. However, this species can have wide natural fluctuations in abundance, both throughout the year and between years. For purposes of recovery of the species, the USFWS considers the tidewater gobies in Ormond Beach Lagoon to be a part of a meta-population that consists of the other local habitats in the area including such areas as Santa Clara River, Ventura River, and Mugu/Calleguas Creek. Due to their high abundance, tidewater gobies at Ormond Beach Lagoon are considered a source population that may recolonize other extirpated sites. Marek (2012) indicates that recolonization "can happen when storms flush gobies out to sea and they make their way back into an adjacent estuary/lagoon." For example, Mugu/Calleguas creek was recently discovered to have been recolonized. Although this information suggests that Halaco Site contamination is having little or no effect on the tidewater goby (and possibly other fish species), population data needed to make statistical comparisons between the Ormond Beach Lagoon population and other populations in California are not available. Therefore, risks identified for fish are considered low, but are retained in the risk conclusions for sediment.

8.2.4 Analyte Considerations

Selenium was identified as a risk to multiple receptors across all sediment areas, except OID-North. However, the background 95% UTL exceeded sparrow and plover RBCs. Within the NCL-East (<8 feet Elev) subarea, selenium was about three times background at the 1st stepout, but decreased to near background levels by the 4th stepout. Selenium concentrations in all subareas with risk in the OID Lagoon area, except Lagoon Finger-Footbridge, are less than one and a half times background.

Concentrations of selenium that are less than two times background in subareas OID-Site, Lagoon-Main, Lagoon Finger-West, Lagoon Finger-East, and the 3rd and 4th WMU stepouts are likely to be within the range of background for the region and suggest that incremental risk (site-associated risk) is low (incremental HQ < 1). Thus, although risks cannot be excluded, they are likely to be considered acceptable. The removal of risks from selenium at these subareas is represented by parentheses in Tables 8-1 through 8-4. Concentrations of selenium at NCL-Ditch, NCL-Pond, Lagoon Finger-Footbridge, WMU Ditch, WMU Ditch-5 feet South, and the first two WMU stepouts are well above background and may be site-related.

8.3 Soil

Weight-of-evidence conclusions for soil exposures to terrestrial-feeding Belding's savannah sparrows, California voles, ornate shrews, terrestrial plants, and terrestrial invertebrates (based on literature-derived effects data and measured whole-body, terrestrial invertebrate tissue) are presented in Tables 8-5 (by subarea). Conclusions are broken out in more detail in Table 8-7 by WMU stepout. As was done for sediment, additional tables showing the risk results using the LOAEL for the special-status bird were developed (Table 8-6 for subarea risks and Table 8-8 for risks at the WMU stepouts).

In some areas that experience periodic wetting and drying, such as portions of NCL-East, there may be both soil-related and sediment-related risks.

8.3.1 All Subareas

The soil-associated weight-of-evidence conclusions across all subareas (Table 8-5) are provided below. NOAELs are used for special-status avian species. See Section 8.2 for a discussion of sediment-related risks. However, it should be noted that risks to avian receptors are not considered likely given the available

breeding population data for the receptors of concern (see Section 8.3.3). Results by receptor, analyte, and area are as follows.

- **Receptors** (based on number of analytes that fail and number of areas/subareas with risks)
  - No analytes or areas with risks: None
  - Less than or equal to three analytes or areas with risks: California vole and soil invertebrates (based on measured tissue concentrations)
  - More than three analytes or areas with risks: Belding's savannah sparrow (see Section 8.3.3), ornate shrew, plants, and soil invertebrates (based on literature-derived benchmarks)
- **Analytes** (based on number of areas/subareas with risks and number of receptors with risks)
  - No areas or receptors with risk: Aluminum, arsenic, beryllium, cadmium, cobalt, mercury (no site-related risks), silver, and thallium
  - Spatially limited risks: Antimony
  - Widespread risks: Barium, chromium, copper, lead, mercury, nickel, selenium, vanadium, and zinc (however, see Section 8.3.4 for chromium, selenium, and vanadium)
- **Areas** (based on number of analytes that fail, maximum number of receptors that fail, and total receptor-analyte combinations that fail)
  - No analytes or receptors with risk: NCL-Background, NCL-North, Beach-Background, Breach-Background, Wetland-West, and Beach-Breach
  - Less than or equal to 15[5] total receptor-analyte combinations that fail: McWane-5 feet South, McWane-Center, NCL-East (greater than 8 feet elevation), Hueneme Parcel, Wetland-East, WMU Ditch-30 feet South, and WMU Ditch-50 feet South
  - More than 15 total receptor-analyte combinations that fail: NCL-East (less than 8 feet elevation), NCL-Ditch, NCL-Pond, WMU Ditch, and WMU Ditch-5 feet South, and WMU Ditch-15 feet South

Although some differences were observed, the risk profile in soils across the Site did not significantly change when risks to birds were based on the LOAEL (instead of the NOAEL as shown above) (see Table 8-6).

8.3.2 NCL-East (less than 8 feet elevation) – WMU Stepouts

The soil-associated risks across the four WMU stepouts (Table 8-7) are provided below. NOAELs are used for special-status avian species. See Section 8.2 for a discussion of sediment-related risks. However, it should be noted that risks to avian receptors are not considered likely given the available breeding population data for the receptors of concern (see Section 8.3.3). Results by receptor, analyte, and area are as follows.

- **Receptors** (based on number of analytes that fail and number of areas/subareas with risks)
  - No analytes or areas with risks: Soil invertebrates (based on measured tissue concentrations)
  - Less than or equal to three analytes or areas with risks: None
  - More than three analytes or areas with risks: Belding's savannah sparrow (however, see Section 8.3.3), California vole, ornate shrew, soil invertebrates (based on literature-derived benchmarks), and plants

[5] The break-point for the number of receptor-analyte combinations that fail is greater for soil compared to sediment because there are more receptors to consider for soil as compared to sediment.

- **Analytes** (based on number of areas/subareas with risks and number of receptors with risks)
  - No areas or receptors with risk: Aluminum, arsenic, cobalt, mercury, silver, and thallium
  - Spatially limited risks: Antimony, beryllium, cadmium, manganese, and zinc
  - Widespread risks: Barium, chromium, copper, lead, nickel, selenium, and vanadium (however, see Section 8.3.4 for chromium, selenium, and vanadium)
- **Areas** (based on number of analytes that fail, maximum number of receptors that fail, and total receptor-analyte combinations that fail)
  - No analytes or receptors with risk: None
  - Less than or equal to 15 total receptor-analyte combinations that fail: WMU-3rd Stepout and WMU-4th Stepout
  - More than 15 total receptor-analyte combinations that fail: WMU-1st Stepout and WMU-2nd Stepout

As was observed across all other subareas, little change to the overall risk profile for the WMU stepouts was observed when risks to birds were based on the LOAEL (instead of the NOAEL as shown above) (see Table 8-8).

As with sediment, information for some receptors (special-status species) and for some analytes affects the risk conclusions for soil.

8.3.3 Receptor-Specific Considerations

Field surveys that compare breeding parameters for Belding's savannah sparrows nesting at Ormond Beach to other Southern California locations indicate that the abundance at Ormond Beach is consistent with other locations. These surveys provide strong evidence that this avian species is not adversely affected by contamination at the Halaco Site. Therefore, it is reasonable to remove terrestrial-feeding sparrows from the weight-of-evidence summaries in Tables 8-5 and 8-6. This removal is represented by placing parentheses around the avian receptors in the soil tables. In general, this has little effect on the overall risk profile in soils, because most of the analytes and areas with sparrow risks are also a risk to shrews, plants, or invertebrates.

BAFs developed from the contaminant concentrations measured in soil and invertebrates collected at the Site are generally less than one. This indicates that the bioavailability of most contaminants at the Halaco Site is low, although the relatively narrow range of soil contaminant concentrations make it more difficult to detect relationships, if they exist, between soil and tissue concentrations. This low bioavailability suggests that risks to terrestrial plant and soil invertebrate receptors also may be low (that is, actual exposure is less than exposure in the tests conducted to derive the literature-based toxicity values, which generally use highly bioavailable forms of metals). No changes were made to the risk profile for soil, but the results for plants and invertebrates are qualified.

Site-specific bioassays can be used to determine toxicity, as well as to develop site-specific toxicity values. However, bioassays were not conducted for terrestrial plants and soil invertebrates because methods to evaluate terrestrial plants and soil invertebrates in salt marsh habitat are not well-developed and have not been successful at other sites. Namely, salinity is often the cause of the observed adverse effect rather than site contaminants.

8.3.4 Analyte Considerations

Chromium was identified as a risk to terrestrial plants and soil invertebrates across many areas of the Site. However, there is high uncertainty in the plant and soil invertebrate benchmarks (values are extremely low and are often exceeded by background). Because the chromium concentrations in the McWane-5 feet South, McWane-Center, 3rd and 4th WMU stepouts, NCL-East (greater than 8 feet elevation), NCL-Ditch,

NCL-Pond, WMU Ditch-30 feet South, and WMU-Ditch 50 feet South subareas are less than two times background, incremental risk from chromium in these subareas is low (incremental HQ < 1). Therefore, risks to plants and soil invertebrates in these areas are likely not unacceptable; these cases are indicated with parentheses in Tables 8-5 through 8-8.

As was discussed for sediment, selenium was identified as a risk to multiple receptors across all sediment areas. However, incremental risks at McWane-Center, NCL-East (greater than 8 feet elevation), Hueneme Parcel, WMU Ditch-50 feet South, and the 2nd, 3rd and 4th WMU stepouts are low (incremental HQ < 1) and selenium risks in these subareas are likely not unacceptable. Similarly, incremental risks from vanadium are likely low because mean concentrations across the subareas are either less than background or less than two times background. Therefore, risks to sparrows and plants from exposure to vanadium are likely not unacceptable. These cases for selenium and vanadium are indicated with parentheses in Tables 8-5 through 8-8.

SECTION 9

Summary of Risk by Area

This section summarizes site-related ecological risks by area. An overview of the BERA is provided first (Section 9.1), followed by the development of RBC thresholds (Section 9.2), and a summary of risks by ranking exceedances of RBC thresholds by area and subarea (Section 9.3). The rankings may be used to select areas proposed for remediation, or they may be modified by other factors that reflect the magnitude of the risks or the level of confidence placed in the risk estimates. The rankings could be modified to increase the weighting of risks to certain receptors, or remediation could be proposed in lower ranked locations more likely to provide habitat to sensitive receptors.

9.1 BERA Methodology

The Halaco Site is located on the Pacific Ocean shoreline within the Ormond Beach area, at the southern extent of the City of Oxnard. The Site is bisected by the OID, a surface water channel that drains upstream agricultural, commercial, and residential areas of the Oxnard Plain. Immediately to the north and east of the Halaco Properties is a wetland area owned by TNC. To the south are a wetland area, a lagoon, and the Pacific Ocean. Halaco operated a secondary metal smelter at the Site for about 40 years (1965 to 2004). Three removal actions were conducted to address immediate risks, but it has been estimated that more than 700,000 cubic yards of waste solids from smelter-related activities remain onsite.

A SLERA conducted using data collected in 2006 and 2007 suggested potential risks to ecological receptors and identified data gaps. Subsequent sampling from 2009 through 2011 included additional soil, sediment, surface water, and groundwater samples to supplement prior sampling and Tier 2 biological sampling to support a baseline ERA ("BERA"). These Tier 2 samples included collocated tissue (benthic invertebrate, fish, and terrestrial invertebrate) and media (sediment or soil) to determine site-specific bioaccumulation, and sediment used to conduct site-specific laboratory toxicity tests.

A BERA was conducted at the Halaco Site in accordance with EPA guidance for ERAs within the Superfund Program (EPA, 1997). The BERA evaluates risks to a variety of ecological receptors exposed to metals and other contaminants present in water, soil, sediment, benthic and soil invertebrate tissue, and fish tissue at the Site. Risk estimates were developed for more than 20 areas or subareas at the Site. In many areas, there are multiple contaminants posing a risk to a particular receptor, and multiple receptors at risk. The receptors evaluated in the BERA include aquatic biota, fish, benthic invertebrates, terrestrial plants, soil invertebrates, birds, and mammals. Risks to special status species (the tidewater goby, western snowy plover, California least tern, and Belding's Savannah sparrow) were estimated using more conservative assumptions.

Three different approaches were used to estimate risks: site-specific field surveys, site-specific sediment toxicity tests, and comparisons of contaminant concentrations measured in water, soil, sediment, or tissue to literature-based toxicity values. The level of confidence that should be placed in the risk estimates varies. Risk conclusions were considered to be of moderate strength if data consisted of literature-based toxicity and one site-specific line of evidence. If only literature-based toxicity data were available to evaluate risks, the strength of risk conclusions was considered low. None of the risk estimates included in this assessment are considered strong. That would require multiple lines of evidence for a given receptor, including site-specific field surveys or toxicity tests, and all lines of evidence in agreement.

For comparisons to literature-based toxicity values, generally, the higher the number of contaminants and receptors showing a risk, the greater the risk. An important exception occurs when relatively strong lines of evidence, such as site-specific field surveys or toxicity tests, are available. In such cases, the stronger lines of evidence are given more weight and may be used to override literature-based risk estimates. This is the case for the sparrows, plovers, and terns, where field survey data provide strong evidence that these avian species are not adversely affected by site contamination, overriding literature-based risk estimates.

Similarly, site-specific sediment toxicity tests were given more weight than literature-based risk estimates for benthic invertebrates.

The RBCs and analyses used to determine the risk conclusions, as well as potential action levels, are described in the following sections.

9.2 Risk-Based Concentration Thresholds

The first step in summarizing the risks by area was to develop *risk-based concentration thresholds*, also called RBCs, for each receptor. As described in Section 9.3, the measured concentration of each contaminant is then compared to the corresponding RBC, the number of exceedances at each location counted, and the total placed into one of six risk categories ranging from no risk (no exceedances) to relatively higher risk.

RBCs were derived for all analyte-receptor combinations that may be at risk, even if the risk was determined to be unlikely or low. For example, field survey data suggest that western snowy plover, California least tern, and Belding's savannah sparrow are not likely to be at risk; however, RBCs were developed for these receptors.

The benthic invertebrate RBCs for sediment are represented by the site-specific LOECs developed from the sediment bioassays. For terrestrial plants and invertebrates, the risk-based values are set equal to literature-derived benchmarks. For wildlife (birds and mammals), RBCs were derived by back-calculation of the exposure and risk estimate using the LOAEL. The LOAEL was used for birds because population data indicate that risks are unlikely. RBCs are shown in Table 9-1; a more detailed description of the calculation of RBCs for wildlife is provided in Appendix H.

Aluminum, arsenic, cadmium, cobalt, silver, thallium, and dioxins/furans do not present a risk at the Site. Mercury in Halaco wastes does not appear to be different from the background level; thus, elevated mercury onsite is not likely site-related. Therefore, none of these analytes are included in Table 9-1.

The RBCs presented in Table 9-1 are based on the assumption that all analytes are 100 percent bioavailable. However, COPECs present in media consumed by wildlife receptors are not absorbed with perfect (100 percent) efficiency; to assume so overestimates both exposure and risk. Instead, the absorption efficiency or bioavailability of a chemical varies as a function of many factors, including the chemical form of the COPEC, medium in which the COPEC is present, interactions with other COPECs, interactions with ingested food, the environment within the receptor's gastrointestinal tract, etc.

To account for the bioavailability of COPECs at the Site being less than 100 percent, total exposure estimates for analytes with bioavailability data, except nickel, were adjusted by bioavailability fractions specific for each COPEC determined to be a risk. For nickel only, the total exposure from the diet was adjusted using literature-based dietary bioavailability data; and exposure from soil or sediment was adjusted using literature-based soil bioavailability data. RBCs were then recalculated using the literature-based bioavailability information (see Appendix H for a description of the bioavailability data). Note that bioavailability may differ between soil/sediment and diet. For the purpose of this assessment, unless otherwise stated (i.e., for nickel), all ingested media were pooled and only a single bioavailability value was employed.

Inclusion of this bioavailability information resulted in lower exposure and risk estimates, which increased the RBCs from about 2 to 10 times compared to RBCs calculated assuming 100 percent bioavailability. The bioavailability-adjusted RBCs for wildlife are presented in Table 9-2 and are used in Figures 9-1 through 9-3.

9.3 Risk Conclusions

This section provides a summary of risks by ranking the exceedances of risk thresholds into risk categories ranging from no risk (no exceedances) to relatively higher risk. To accomplish this, a sample-by-sample comparison to the RBCs was completed for all sediment- and soil-associated receptors for analytes that may present a risk to one or more receptors. Risks identified for surface water exposures to aquatic biota were

not considered to be site-related (see Section 3.3.3). Therefore, surface water is not included in the sample-by-sample comparisons.

The RBCs for benthic invertebrates, terrestrial plants, and soil invertebrates shown in Table 9-1 were used in the sample-by-sample comparison. In cases where the RBC was less than the background UTL, the background value was used in the analysis. Field surveys evaluating abundance and/or breeding success provide strong evidence that Belding's savannah sparrows, western snowy plovers, and California least terns nesting at Ormond Beach are not adversely affected by contamination at the Halaco Site (see Section 2.8.5 for data sources and analyses). The level of confidence in this conclusion is relatively high because it is based on site-specific data. Therefore, birds were not included in the sample-by-sample comparison. For mammals, the bioavailability-adjusted RBCs shown in Table 9-2 were used. The sample-by-sample analysis is provided in Appendix I.

The number of exceedances of the RBCs across all receptors and analytes were counted to obtain a total number of exceedances for each sample location. For example, if chromium, copper, and selenium exceeded for 2, 3, and 2 receptors, respectively, then the count would be 7 exceedances for that location. Next, uncertainties related to nondetects (NDs) and benchmarks were identified and counted. For example, there were some exceedances of the mammal RBCs by selenium NDs. Additionally, the chromium benchmarks for plants and invertebrates, and the manganese, selenium, and vanadium benchmarks for plants are uncertain (see Appendix I for details). The receptor-analyte combinations affected by these uncertainties were summed and then subtracted from the total exceedances to get the net exceedances (that is, total exceedances minus exceedances based on uncertainties) for a location.

Exceedances based on uncertain RBCs or toxicity data were only subtracted from the total exceedances if other receptors with more reliable RBCs had no exceedances for the analyte. As an example, the selenium benchmark for plants is uncertain and was exceeded, but the benchmark for shrews, which was less uncertain than that for plants, was also exceeded; therefore, the exceedance for plants was not subtracted out of the total exceedances. The justification for this process is that if the concentration is high enough to exceed the benchmarks for other receptors, then it may be high enough to be a risk to plants, even if the plant benchmark is uncertain. The total and net exceedances for each sample location are provided in Appendix I. The number of net exceedances was used to rank each sample location into the following relative risk categories:

- 0 = no exceedances for any receptor or analyte (that is, no risk)
- 1 = no net exceedances, but uncertainties due to exceedances based on ND concentration data and/or uncertain benchmarks
- 2 = 1 or 2 net exceedances
- 3 = 3 to 5 net exceedances
- 4 = 6 to 10 net exceedances
- 5 = 11 or more net exceedances

A cumulative frequency analysis of the net exceedances was completed to evaluate the distribution of net exceedances by category and is presented in Appendix I. As shown in Figure I-1 in Appendix I, the category assignments follow natural break points in the distribution, which provides support for these rankings.

Lastly, the risk category for each sample location was mapped to provide a depiction of the relative risks across the Halaco Site. Figures 9-1, 9-2, and 9-3 show the risk categories by sediment/soil sample location for the surface, 2 feet bgs, and 4 feet bgs sample depths, respectively.

Category 0 samples had no exceedances and concentrations pose no risk to ecological receptors. Risks to ecological receptors cannot be excluded in Category 1 samples; however, uncertainties associated with NDs and benchmarks suggest risks at these locations are *de minimus*. Risks in Category 2 samples are limited to

one or two analyte-receptor combinations, and in terrestrial areas are limited to exceedances by plants; therefore, these risks are considered to be low. In comparison, risks for Category 3 samples are considered moderate (generally 2 or more receptors and analytes with exceedances), and those for Categories 4 and 5 are considered relatively high compared to other locations as there are multiple analytes and receptors with exceedances.

The following themes in the distribution of risks were identified:

- Risks decrease with distance from the WMU, except at sample locations HUP-1 through HUP-4 and NEL-59. These exceptions are discussed below.
- Areas or subareas at highest risk include the lower elevation portions of NCL-East (less than 8 feet elevation), the area immediately south of the Waste Management Area (WMU Ditch), and the area immediately north of the Waste Management Area (NCL-Ditch, NCL-Pond). These locations represent depressed areas where sedimentation of Halaco wastes has occurred.
- Risks decrease with depth across all areas and subareas.

The risks are summarized below by area.

9.3.1 NCL-East

This section summarizes site-related risks in NCL-East. The NCL-East area includes the subareas described in the report as “NCL-East (less than 8 feet elevation)” and “NCL-East (greater than 8 feet elevation).” Also summarized are subareas along the dirt road that extends west from the terminus of McWane Boulevard. These subareas are identified as “McWane Blvd-Center” (data collected from the center of the dirt road), and “McWane-5 feet South” (data collected 5 feet to the south of the dirt road). Relative risks for surface and 2-foot bgs depths are shown in Figures 9-1 and 9-2. Samples were not collected at 4 feet bgs in this area. Risks in this area are summarized as follows:

- Portions of NCL-East (i.e., NCL-East less than 8 feet elevation) have standing water for part of the year. The risk estimates assume that these areas may be wet (with standing water) or dry, providing aquatic or terrestrial habitat. Generally, the risk estimates are higher for areas assumed to provide both wetland and terrestrial habitat.
- Although risks were predicted throughout NCL-East, contaminant concentrations in soil and sediment, and associated risks, generally decreased with distance from the Waste Management Area (Figure 9-1). More specifically, relatively greater risks are observed to closely follow the depressed locations within NCL-East (that is, those areas less than 8 feet in elevation), where sedimentation of Halaco wastes has occurred.
- Risks from contaminated sediment and soil in NCL-East were greatest along its western side. Samples collected immediately adjacent to the Waste Management Area (referred to in the report as “WMU - 1st Stepout”) had greater than 11 net exceedances (Category 5) at 9 of the 11 locations, with multiple analytes and receptors represented:
  - Copper concentrations exceeded RBCs for terrestrial plants, soil invertebrates, and shrews at all 11 locations in this stepout. The vole RBC was also exceeded at 2 of the 11 locations.
  - Antimony, nickel, lead, selenium, chromium, zinc, and barium concentrations also exceeded RBCs for terrestrial plants, soil invertebrates, benthic invertebrates, and/or shrews at many of the 11 locations.
  - The concentration of copper in benthic invertebrate tissue (crayfish) collected in the 1st WMU Stepout (one location sampled) also exceeded its published toxicity benchmark.

- In the remainder of NCL-East, the number of analytes posing a risk, and the number of receptors at risk, decreased in comparison with the 1st WMU Stepout. Contaminant concentrations generally decreased as the distance from the Waste Management Area increased, though Category 4 and 5 samples are observed in the 2nd and 3rd WMU Stepouts. One notable exception is sample NEL-59, which has a Category 4 ranking. This surface soil sample, located in the northeast corner of NCL-East, has an elevated lead concentration. However, other metals in this sample do not appear to be elevated proportionately as in samples of Halaco's waste and soils and sediments affected by Halaco's wastes. Therefore, it is unlikely that the elevated lead (and select other metals in the sample) are from Halaco.
- Category 4 samples were also observed in the McWane samples collected just north of the 3rd WMU Stepout.
- Risks significantly decreased with depth as shown in Figure 9-2. There are only two Category 4 locations (from the 1st WMU Stepout) in the 2-foot bgs samples collected in NCL-East.
- The levels and spatial patterns of metals concentrations above background indicate that Halaco's wastes are the source of the risk.

9.3.2 NCL-North

This section summarizes site-related risks in the NCL-North area, including the "NCL-Ditch" and "NCL-Pond" subareas. Relative risks for surface and 2-foot bgs depths are shown in Figures 9-1 and 9-2. Samples were not collected at 4 feet bgs in this area. Risks in this area are summarized as follows:

- The risk estimates assume that the NCL-Ditch and NCL-Pond subareas (like portions of NCL-East) may be wet (with standing water) or dry, providing both aquatic and terrestrial habitat. As with NCL-East, the risk estimates are higher for areas assumed to provide both wetland and terrestrial habitat.
- In most of NCL-North, measured concentrations in soil and sediment were at background levels and relative risks were low or *de minimus* (Figure 9-2).
- In the NCL-Ditch and NCL-Pond subareas, contaminant concentrations and risks were similar to NCL-East, with higher relative risks in the lower elevation portions of the pond and along the ditch where sedimentation of Halaco wastes has occurred. In these Category 4 and 5 locations, multiple analytes and receptors had exceedances:
  - In the NCL-Ditch, copper concentrations exceeded the RBC for shrews at all four locations, the terrestrial plant RBC at two locations, and the soil invertebrate RBC at one location. Zinc and selenium also exceeded terrestrial plant, soil invertebrate, and/or mammal RBCs at most or all of the four locations, and barium exceeded an RBC at one location.
  - In the NCL-Pond, copper concentrations exceeded the shrew RBC at 5 of 19 locations, and the plant and soil invertebrate RBCs at 3 locations. Zinc, selenium, and barium also exceeded terrestrial plant, soil invertebrate, benthic invertebrate, and/or mammal RBCs at some of the 19 locations.
- Risks significantly decreased with depth as shown in Figure 9-2, though two Category 4 locations were observed in the western portion of the pond.
- The levels and spatial patterns of metals concentrations above background indicate that Halaco's wastes are the source of the risk.

9.3.3 OID Lagoon

This section summarizes the site-related risks in the OID and lagoon. These areas include the subareas described in the report as "OID-North," "OID-Site," "Lagoon Finger-Footbridge," "Lagoon-Main," "Lagoon Finger-West," and "Lagoon Finger-East."

Relative site-related risks for the surface, 2-foot bgs, and 4-foot bgs depths are shown in Figures 9-1, 9-2, and 9-3. Risks in this area are summarized as follows:

- The risk estimates assume that the majority of the year there is standing water in the OID and lagoon, providing aquatic (rather than terrestrial) habitat.
- No risks were identified in surface sediment samples across all OID Lagoon subareas (Figure 9-1). Additionally, there are no risks, except for one sample with a Category 2 ranking, in the 4-foot bgs samples (Figure 9-3).
- In contrast to other areas of the Site, risks for the OID Lagoon increased from the surface to the 2-foot bgs samples (Figures 9-1 and 9-2). In this case, the contaminated sediments appear to have been buried by cleaner sediment at the surface.
- All samples in the lagoon "finger" spanned by a footbridge (that is, the "Lagoon Finger-Footbridge" subarea represented by samples LGF-1 through LGF-2), and one sample in the Lagoon Finger-Main subarea (LGM-2) were ranked as Category 2 and 3 risks. Risks to benthic invertebrates from barium, beryllium, and magnesium concentrations in the footbridge samples were identified. Because there are fewer analytes and receptors at risk for sediment-only samples (in contrast to samples evaluated as aquatic and terrestrial habitat), a Category 3 ranking should be considered as a potentially high risk relative to other aquatic habitat areas.
- Halaco's wastes appear to be the source of the risk, based on the levels and spatial patterns of contamination.

Potential risks in surface water (aluminum, barium, and manganese) and fish tissue (aluminum, copper, and selenium) were initially identified. However, none but aluminum are believed to be site-related. Concentrations of barium and manganese in surface water are similar across the Site and at background locations. Similarly, concentrations of copper and selenium in fish tissue are similar across all areas and are not likely to be site-related. Further evaluation of aluminum indicated that risks were overestimated. Namely, water hardness is high at the Site and the toxicity of aluminum decreases with increasing water hardness. Additionally, aluminum has a low bioavailability in sediment (pH greater than 5.5 at the Site), and therefore, exceedances of fish tissue benchmarks were likely due to sediment present in the fish gut rather than aluminum concentrations in fish tissue.

9.3.4 Wetlands Beach

This section summarizes the site-related risks in the wetlands and beach areas. These areas include the following subareas described in the report:

- WMU Ditch, WMU Ditch-5 feet South, WMU Ditch-15 feet South, WMU Ditch-30 feet South, and WMU Ditch-50 feet South
- Wetland-West and Wetland-East
- Beach-Breach
- Hueneme Parcel

Relative risks for surface, 2-foot bgs, and 4-foot bgs depths are shown in Figures 9-1, 9-2, and 9-3. The 4-foot bgs samples were collected only from the WMU Ditch subarea. Risks in this area are summarized as follows:

- The risk estimates in the WMU Ditch and WMU Ditch-5 feet South subareas of the Wetlands Beach area assume that these subareas are seasonally wet (with standing water) and may provide both aquatic and terrestrial habitat depending on the water levels at the Site. All other Wetlands Beach subareas are defined as terrestrial habitat.

- Relative risks across the Wetlands Beach area decreased with distance south of the Waste Management Area, and the highest relative risks were associated with the WMU Ditch out to the samples collected 15 feet south of the ditch (Figure 9-1).
- All WMU Ditch surface samples located immediately adjacent to the Waste Management Area were ranked as Category 5, as were most samples in the WMU Ditch-5 feet South and WMU Ditch-15 feet South samples. Within these subareas, there were exceedances for multiple analytes and receptors:
  - Copper concentrations exceeded RBCs for shrews at all eight locations in each of the WMU Ditch, WMU Ditch-5 feet South, and WMU Ditch-15 feet South subareas. Additionally, copper RBCs for terrestrial plants and soil invertebrates were exceeded at seven of eight locations in WMU Ditch and WMU Ditch-5 feet South, and at all eight locations in WMU Ditch-15 feet South. Copper concentrations at several locations also exceeded the RBC for voles.
  - Antimony, lead, and nickel concentrations exceeded RBCs for terrestrial plants and shrews at one or more of the eight locations in each of the WMU Ditch, WMU Ditch-5 feet South, and WMU Ditch-15 feet South subareas.
  - Concentrations of chromium, manganese, zinc, selenium, and barium also exceeded RBCs for terrestrial plants, soil invertebrates, and/or mammals at some locations.
  - Benthic invertebrate tissue concentrations (crayfish) exceeded benchmarks for copper and zinc at one or more locations in the WMU Ditch subarea.
- Further from the WMU Ditch, in the “WMU Ditch-30 feet South” and “WMU Ditch -50 feet South” areas, copper and zinc concentrations (and therefore, relative risk) decrease but remain above RBCs for some receptors.
- Risks in the WMU Ditch and WMU subareas south of the ditch area significantly decreased with depth as shown in Figure 9-2 and Figure 9-3 (for WMU Ditch samples only), though one Category 5 location in the WMU Ditch-5 feet South subarea and one Category 4 location in the WMU Ditch subarea were observed in the 2-foot and 4-foot bgs samples, respectively.
- The Wetland-East subarea is located just south of the WMU Ditch subareas. Risks in this subarea are lower than for the samples associated with the WMU Ditch, though two locations are ranked as Category 3. These risks are primarily associated with concentrations of copper (exceedances of plant, invertebrate, and shrew RBCs at several sample locations).
- Relative risks in the “Wetland-West” subarea, located to the west and south of the Waste Management Area, are relatively low, with most samples ranked as no or *de minimus* risks (that is, Category 0 or 1).
- Risks in the Wetland-East and Wetland-West subareas decreased with depth (Figure 9-2), with all but one 2-foot bgs sample ranked as no or *de minimus* risks (that is, Category 0 or 1).
- The Beach-Breach sampling locations are not shown in the relative risk figures; however, no risks were identified in this subarea, where measured concentrations were similar to background levels.
- Within the “Hueneme Parcel” subarea, one location (HUP-1) has relatively high risks (Category 4). The elevated levels of lead, copper, chromium, and zinc are not accompanied by elevated levels of some of the other constituents associated with Halaco’s wastes, including aluminum and magnesium, suggesting that Halaco may not be the source.
- Relative risks in the Hueneme Parcel generally decrease with depth, though there are some exceptions (Figures 9-1, 9-2, and 9-3). For example, relative risks at HUP-1 are similar (considered high) in the surface and 2-foot bgs samples, but have decreased to relatively low risk by the 4-foot bgs sample.

SECTION 10

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Tables

TABLE 1-1

Summary of Tier 2 Ecological Risk Assessment Samples

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

				Number of Samples Collected at Each Planned Location[a]						
Media	**Planned Areas to Sample**	**Concentration Ranges**	**Planned Sample Locations**	**Soil**	**Sediment**	**Terrestrial Invertebrates**	**Benthic Invertebrates**	**Bottom Fish**	**Water-Column Fish**	**Bioassay**
Terrestrial										
Soil	Wetlands, NCL North	Low	WLE-007	1	--	1	--	--	--	--
			WLW-008	1	--	1	--	--	--	--
			NNB-001	1	--	1	--	--	--	--
			NNB-006	1	--	1	--	--	--	--
			NNL-002	1	--	1	--	--	--	--
	NCL East	Medium	NEL-025	1	--	1	--	--	--	--
			NEL-028	1	--	1	--	--	--	--
			NEL-040	1	--	0[b]	--	--	--	--
			NEL-041	1	--	0[b]	--	--	--	--
			NEL-043	1	--	0[b]	--	--	--	--
	WMU Ditch	High	DSC-002	1	--	1	--	--	--	--
			DSC-003	1	--	1	--	--	--	--
			DSD-004	1	--	1	--	--	--	--
			DSD-005	1	--	1	--	--	--	--
			DSD-008	1	--	1	--	--	--	--
Aquatic										
Sediment	Lagoon Finger	Low	LGF-007	--	1	--	0	0	1 (1)	1
			LFG-008	--	1	--	0	2	1	1
			LGF-009	--	1	--	0	1	1	1
			LGF-010	--	1	--	0	1	1	1
			LGF-012	--	1	--	0	1	1	1
	Lagoon Finger, Lagoon Main, NCL Eas	Medium	LGF-001	--	1	--	0	2	1	1
			LGF-003	--	1	--	0	1	1	1
			LGM-001	--	1	--	2	1	1	1
			LGM-003	--	1	--	0	1	1	1
			NEL-021	--	1	--	1	1	0	1
	WMU Ditch, NCL East	High	DSA-001	--	1	--	2	1	0	1
			DSA-003	--	1	--	2	2	0	1
			DSA-006	--	1	--	2	2	0	1
			NEL-007	--	1	--	2 (1)	1	0	1
			NEL-009	--	1	--	1	2	0	1

Notes:

-- = no samples were planned

N (N) = number of primary samples (number of duplicate samples)

[a] Tissues were collected as composite samples of the same species when possible.

[b] Samples were planned for this location and effort was made to collect them; however, sufficient biomass could not be collected.

TABLE 2-1

Federally Listed Special-Status Species that May Occur Near the Site

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Common Name	Species	Status
Plants		
Salt marsh bird's-beak	*Cordylanthus maritimus* spp. *maritimus*	E
Fish		
Tidewater goby	*Eucyclogobius newberryi*	E
Birds		
California brown pelican	*Pelecanus occidentalis*	E
California least tern	*Sterna antillarum browni*	E, CH
Western snowy plover	*Charadrius alexandrinus nivosus*	T, CH
Light-footed clapper rail	*Rallus longirostris levipes*	E
Mammals		
Southern sea otter	*Enhydra lutris nereis*	T

Notes:

Federally-listed species provided by the Fish and Wildlife Service (FWS 2009)

Status Codes for Federally-listed Species

CH = critical habitat

E = endangered

T = threatened

TABLE 2-2

Assessment Endpoints and Measures of Exposure and Effects

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Assessment Endpoints								
Entity	**Attribute**	**Conceptual Model Group**	**Representative Receptor**	**Assessment Level**	**Available Lines of Evidence**	**Measures of Exposure**	**Measures of Effect**	**Effect Level**
Aquatic plants, water-column invertebrates, amphibians, and fish	Growth, reproduction, or survival	Aquatic Organism	NA	Community	Single-chemical Toxicity Data	Maximum measured detected or nondetected surface water concentrations in the initial screen or the entire distribution of data in the baseline assessment	Benchmark values for toxic effects that could affect growth, reproduction, or survival	Chronic National Recommended Water Quality Criteria - CCC
					Tissue-based Toxicity Data	Measured concentrations of COPECs in fish tissue	Whole-body concentration benchmarks associated with decreased survival, growth, or reproduction	Literature-based LOECs
Tidewater Goby	Growth, reproduction, or survival	Aquatic Organism/Special-status Species	Tidewater goby	Individual	Single-chemical Toxicity Data	Maximum measured detected or nondetected surface water concentrations in the initial screen and the entire distribution of data in the baseline	Benchmark values for toxic effects that could affect growth, reproduction, or survival	Chronic National Recommended Water Quality Criteria - CCC
					Tissue-based Toxicity Data	Measured concentrations of COPECs in fish tissue	Whole-body concentration benchmarks associated with decreased survival, growth, or reproduction	Literature-based NOECs
Benthic Invertebrates	Growth, reproduction, or survival	Sediment Biota	NA	Community	Single-chemical Toxicity Data	Maximum measured detected or nondetected sediment concentrations in the initial screen or the entire distribution of data in the baseline assessment	Benchmark values for toxic effects that could affect growth, reproduction, or survival	Threshold Effect Concentration and Probable Effect Concentration Benchmarks
					Site-specific Toxicity Data	Maximum measured detected or nondetected sediment concentrations in the initial screen or the entire distribution of data in the baseline assessment	Benchmark values for toxic effects that could affect growth, reproduction, or survival developed from the site-specific toxicity tests	Site-specific LOECs
					Ambient Media Toxicity Tests	Chronic, 42-day sediment bioassays using the freshwater amphipod *Hyalella azteca*	Bioassays using site-specific sediment for survival, growth, and reproduction	Statistically significant reduction relative to controls
					Tissue-based Toxicity Data	Measured concentrations in benthic invertebrate tissue	Whole-body concentration benchmarks associated with decreased survival, growth, or reproduction	Literature-based LOECs
Terrestrial Plants	Growth, reproduction, or survival	Soil Biota	NA	Community	Single-chemical Toxicity Data	Maximum measured detected or nondetected soil concentrations in the initial screen or the entire distribution of data in the baseline assessment	Benchmark values for toxic effects that could affect growth, reproduction, or survival	EcoSSLs or other literature-based effects levels (e.g., ORNL benchmarks)
Soil Invertebrates	Growth, reproduction, or survival	Soil Biota	NA	Community	Single-chemical Toxicity Data	Maximum measured detected or nondetected soil concentrations in the initial screen or the entire distribution of data in the baseline assessment	Benchmark values for toxic effects that could affect growth, reproduction, or survival	EcoSSLs or other literature-based effects levels (e.g., ORNL benchmarks)
					Tissue-based Toxicity Data	Measured concentrations in terrestrial invertebrate tissue	Whole-body concentration benchmarks associated with decreased survival, growth, or reproduction	Literature-based LOECs

TABLE 2-2

Assessment Endpoints and Measures of Exposure and Effects

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Assessment Endpoints								
Entity	**Attribute**	**Conceptual Model Group**	**Representative Receptor**	**Assessment Level**	**Available Lines of Evidence**	**Measures of Exposure**	**Measures of Effect**	**Effect Level**
Birds	Growth, reproduction, or survival	Sediment Invertivore/Special-status Species	Western Snowy Plover	Individual	Single-chemical Toxicity Data	Exposure estimates based on maximum measured detected or nondetected sediment concentrations and estimated biota concentrations (using site-specific bioaccumulation models) for initial screen; mean sediment concentrations and estimated biota concentrations (using site-specific bioaccumulation models) for baseline assessment	No effect levels from toxicity studies that demonstrate affects to growth, reproduction, or survival	Literature-based NOAELs LOAELs used to provide a range of risk
					Field Survey Data	Exposure estimates based on abundance during the breeding season (number of individuals)	Statistical comparison of abundance at Ormond Beach to abundance at other coastal locations in California	Statistical significance (Ormond Beach abundance is equal to, greater than, or less than other locations)
	Growth, reproduction, or survival	Piscivore/Special-status Species	California Least Tern	Individual	Single-chemical Toxicity Data	Exposure estimates based on maximum detected concentrations of fish tissue collected onsite for the initial screen; mean fish tissue concentrations for baseline assessment	No effect levels from toxicity studies that demonstrate affects to growth, reproduction, or survival	Literature-based NOAELs LOAELs used to provide a range of risk
					Field Survey Data	Exposure estimates based on breeding success (number fledglings per pair)	Statistical comparison of breeding success at Ormond Beach to breeding success at other coastal locations in California	Statistical significance (Ormond Beach breeding success is equal to, greater than, or less than other locations)
	Growth, reproduction, or survival	Aquatic-feeding Omnivore/Special-status Species	Belding's Savannah Sparrow	Individual	Single-chemical Toxicity Data	Exposure estimates based on maximum measured detected or nondetected sediment concentrations and estimated biota concentrations (using site-specific bioaccumulation models) for initial screen; mean sediment concentrations and estimated biota concentrations (using site-specific bioaccumulation models) for baseline assessment	No effect levels from toxicity studies that demonstrate affects to growth, reproduction, or survival	Literature-based NOAELs LOAELs used to provide a range of risk
					Field Survey Data	Exposure estimates based on abundance during the breeding season (number of breeding territories per pair)	Statistical comparison of abundance at Ormond Beach to abundance at other coastal locations in California	Statistical significance (Ormond Beach abundance is equal to, greater than, or less than other locations)
	Growth, reproduction, or survival	Terrestrial - feeding Omnivore/Special-status Species	Belding's Savannah Sparrow	Individual	Single-chemical Toxicity Data	Exposure estimates based on maximum measured detected or nondetected soil concentrations and estimated biota concentrations (using site-specific bioaccumulation models) for initial screen; mean soil concentrations and estimated biota concentrations (using site-specific bioaccumulation models) for baseline assessment	No effect levels from toxicity studies that demonstrate affects to growth, reproduction, or survival	Literature-based NOAELs LOAELs used to provide a range of risk
					Field Survey Data	Exposure estimates based on abundance during the breeding season (number of breeding territories per pair)	Statistical comparison of abundance at Ormond Beach to abundance at other coastal locations in California	Statistical significance (Ormond Beach abundance is equal to, greater than, or less than other locations)

TABLE 2-2

Assessment Endpoints and Measures of Exposure and Effects

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Assessment Endpoints								
Entity	**Attribute**	**Conceptual Model Group**	**Representative Receptor**	**Assessment Level**	**Available Lines of Evidence**	**Measures of Exposure**	**Measures of Effect**	**Effect Level**
Mammals	Growth, reproduction, or survival	Terrestrial Herbivore	California Vole	Population	Single-chemical Toxicity Data	Exposure estimates based on maximum measured detected or nondetected soil concentrations and estimated biota concentrations (using literature-derived bioaccumulation models) for initial screen; mean soil concentrations and estimated biota concentrations (using literature-derived bioaccumulation models) for baseline assessment	Benchmark values (NOAELs for initial screening and LOAELs for baseline) for toxic effects that could affect growth, reproduction, or survival	Literature-based LOAELs
	Growth, reproduction, or survival	Terrestrial Insectivore	Ornate Shrew	Population	Single-chemical Toxicity Data	Exposure estimates based on maximum measured detected or nondetected soil concentrations and estimated biota concentrations (using site-specific bioaccumulation models) for initial screen; mean soil concentrations and estimated biota concentrations (using site-specific bioaccumulation models) for baseline assessment	Benchmark values (NOAELs for initial screening and LOAELs for baseline) for toxic effects that could affect growth, reproduction, or survival	Literature-based LOAELs

Notes:

CCC = Criterion Continuous Concentration

COPEC = Contaminants of potential ecological concern

EcoSSL = Ecological Soil Screening Level developed by EPA (2007)

EPA = U.S. Environmental Protection Agency

LOAEL = No Observed Adverse Effect Level

LOEC = Lowest Observed Effects Concentration

NA = Not applicable

NOAEL = No Observed Adverse Effect Level

NOEC = No Observed Effects Concentration

ORNL = Oak Ridge National Laboratory

TABLE 2-3

Summary Statistics for Inorganic Analytes in Surface Water (µg/L)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

				Dissolved Concentrations					Total Concentrations						
Analyte	**Area**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**
Aluminum	Lagoon	2	4	55.6	29.6	37.6	42.5	99.9667	4	4	91.20	49.64	43.6	80.1	161
Aluminum	NCL - East	3	4	71.0	23.3	63.7	72.4	96.8	3	4	401.01	244.11	74.1	504	559
Aluminum	OID	6	20	46.1	21.6	24.8	42.5	122	9	21	62.52	43.83	34.9	42.5	214
Aluminum	Other drains	1	4	52.6	20.2	82.8	42.5	85	1	4	73.63	62.25	85	42.5	167
Aluminum	Seawater	2	4	40.1	3.9	34.3	41.85	85	2	4	65.03	26.70	70.6	63.2	110
Aluminum	WMU ditch	0	2	42.5	0	85	42.5	85	2	2	94.90	17.11	82.8	94.9	107
Antimony	Lagoon	2	4	0.45	0.16	0.44	0.5	0.96	4	2	0.40	0.10	0.43	0.435	0.94
Antimony	NCL - East	0	4	0.39	0.06	0.58	0.4175	0.84	0	4	0.42	0.04	0.73	0.425	0.91
Antimony	OID	9	20	0.36	0.18	0.19	0.3075	1.1	10	21	0.36	0.16	0.21	0.39	1.1
Antimony	Other drains	1	4	0.47	0.37	0.4	0.3375	2	1	4	0.43	0.39	0.29	0.255	2
Antimony	Seawater	0	4	3.5	1.73	4	3.5	10	0	4	0.89	0.82	0.49	0.65	4
Antimony	WMU ditch	2	2	0.56	0.01	0.55	0.555	0.56	2	2	0.43	0.01	0.42	0.43	0.44
Arsenic	Lagoon	4	4	8.68	4.01	5.1	8.2	13.2	4	4	8.15	3.73	5.2	7	13.4
Arsenic	NCL - East	4	4	9.53	0.22	9.3	9.5	9.8	4	4	8.05	2.15	5.9	8.2	9.9
Arsenic	OID	20	20	7	3.09	2.8	5.8	12.3	21	21	6.58	2.62	3.1	5.5	12.2
Arsenic	Other drains	4	4	8.5	5.94	2.9	7.1	16.9	4	4	6.80	3.36	3.2	6.4	11.2
Arsenic	Seawater	4	4	36.7	2.56	33.6	36.85	39.5	4	4	31.85	14.03	11.2	37.45	41.3
Arsenic	WMU ditch	2	2	0.14	2	4.8	4.9	5	2	2	4.85	0.35	4.6	4.85	5.1
Barium	Lagoon	4	4	30.5	8.57	21.8	30.9	38.4	4	4	35.2	11.6	24.5	35.2	46
Barium	NCL - East	4	4	57.73	4.45	53.7	56.65	63.9	4	4	78.8	7.3	68.1	81.55	83.8
Barium	OID	20	20	29.52	7.69	18.6	29.05	45.4	21	21	35.2	8.7	22.2	34.7	48.7
Barium	Other drains	4	4	50.35	10.20	36.3	52.2	60.7	4	4	53.8	11.5	40.8	52.8	68.8
Barium	Seawater	2	4	5.4	2.43	6.1	5.475	7.6	4	2	5.5	1.2	6.1	5.325	9.1
Barium	WMU ditch	2	2	38.45	1.06	37.7	38.45	39.2	2	2	46.2	0.0	46.2	46.2	46.2
Beryllium	Lagoon	0	4	0.33	0	0.66	0.33	0.66	0	4	0.33	0	0.66	0.33	0.66
Beryllium	NCL - East	0	4	0.33	0	0.66	0.33	0.66	3	4	0.12	0.14	0.046	0.0575	0.66
Beryllium	OID	1	20	0.32	0.06	0.043	0.33	0.66	1	21	0.30	0.09	0.036	0.33	0.66
Beryllium	Other drains	0	4	0.41	0.16	0.66	0.33	1.3	0	4	0.57	0.49	0.66	0.33	2.6
Beryllium	Seawater	0	4	1.15	0.58	1.3	1.15	3.3	0	4	1.15	0.58	1.3	1.15	3.3
Beryllium	WMU ditch	0	2	0.33	0	0.66	0.33	0.66	0	2	0.33	0	0.66	0.33	0.66
Cadmium	Lagoon	0	4	0.25	0	0.5	0.5	0.5	0	4	0.5	0	0.5	0.5	0.5
Cadmium	NCL - East	0	4	0.25	0	0.5	0.25	0.5	3	4	0.5	0	0.5	0.5	0.5
Cadmium	OID	1	20	0.23	0.06	0.039	0.25	0.5	1	21	0.40	0.19	0.032	0.5	0.5
Cadmium	Other drains	0	4	0.31	0.13	0.5	0.5	1	0	4	0.625	0.25	0.5	0.5	1
Cadmium	Seawater	0	4	0.88	0.43	1	1.75	2.5	0	4	1.63	1.03	0.5	1.75	2.5
Cadmium	WMU ditch	0	2	0.25	0	0.5	0.5	0.5	0	2	0.5	0	0.5	0.5	0.5
Calcium	Lagoon	4	4	237750	47204	206000	218500	308000	4	4	240000	54093	203000	218500	320000
Calcium	NCL - East	4	4	225750	5620	220000	225000	233000	4	4	226000	15253	209000	225500	244000
Calcium	OID	20	20	289450	67432	165000	268000	377000	21	21	289571	61948	168000	260000	384000
Calcium	Other drains	4	4	234250	34712	196000	235000	271000	4	4	235750	26475	207000	235500	265000
Calcium	Seawater	4	4	342000	6325	334000	343000	348000	4	4	310750	20386	290000	310500	332000
Calcium	WMU ditch	2	2	221500	3536	219000	221500	224000	2	2	223500	707	223000	223500	224000

TABLE 2-3

Summary Statistics for Inorganic Analytes in Surface Water (µg/L)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

		Dissolved Concentrations							Total Concentrations						
Analyte	Area	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
Chromium	Lagoon	0	4	3.89	2.23	1.1	5	10	0	4	3.82	2.35	0.59	5	10
Chromium	NCL - East	0	4	5	0	10	5	10	0	4	2.64	2.73	0.49	2.6475	10
Chromium	OID	0	20	4.78	0.98	1.2	5	10	0	21	4.79	0.97	1.1	5	10
Chromium	Other drains	0	4	2.65	2.72	0.39	2.6975	10	0	4	5	0	10	5	10
Chromium	Seawater	0	4	5	0	10	5	10	0	4	5	0	10	5	10
Chromium	WMU ditch	0	2	5	0	10	5	10	0	2	5	0	10	5	10
Cobalt	Lagoon	1	4	0.51	0.15	0.73	0.475	1	3	4	0.69	0.30	0.61	0.64	1.1
Cobalt	NCL - East	3	4	0.62	0.18	0.67	0.695	0.75	2	4	0.62	0.37	0.5	0.635	0.95
Cobalt	OID	12	20	0.73	0.26	0.41	0.78	1.1	10	21	0.75	0.42	0.57	0.435	1.3
Cobalt	Other drains	0	4	0.38	0.02	0.71	0.385	0.79	2	4	0.46	0.21	0.54	0.435	0.7
Cobalt	Seawater	2	4	0.67	0.26	0.85	0.6675	0.93	2	4	0.74	0.21	0.81	0.705	1.2
Cobalt	WMU ditch	0	2	0.36	0.00	0.71	0.3575	0.72	2	2	0.63	0.01	0.62	0.625	0.63
Copper	Lagoon	4	4	3.9	2.16	2	3.45	6.7	4	4	3.98	1.59	2.8	3.4	6.3
Copper	NCL - East	4	4	11.08	1.69	8.8	11.5	12.5	4	4	13.78	5.90	5.9	15.4	18.4
Copper	OID	20	20	3.97	2.02	2.2	3.5	10.7	21	21	4.20	1.94	2.6	4	10.8
Copper	Other drains	4	4	2.28	1.15	1.2	2	3.9	2	4	1.69	0.61	1.6	1.875	3.9
Copper	Seawater	2	4	2.74	1.29	3.1	2.7	4	2	4	2.23	1.67	1.6	2.05	4
Copper	WMU ditch	2	2	2.4	0.28	2.2	2.4	2.6	2	2	3.75	0.49	3.4	3.75	4.1
Iron	Lagoon	3	4	126.90	89.47	50.6	118.8	220	4	4	267	134	187	206.5	468
Iron	NCL - East	2	4	121.71	161.97	57.9	45.675	364	4	4	363	158	131	428.5	465
Iron	OID	20	20	120.17	78.04	15.6	130.5	291	21	21	279	120	61	271	696
Iron	Other drains	4	4	263.35	273.66	54.6	171.9	655	2	4	815	719	123	664	1810
Iron	Seawater	0	4	50	0	100	50	100	2	4	105	58	34.6	113.75	158
Iron	WMU ditch	1	2	34.35	22.13	18.7	34.35	100	2	2	139	15	128	138.5	149
Lead	Lagoon	2	4	0.281	0.25	0.11	0.21	0.62	4	4	0.53	0.45	0.26	0.32	1.2
Lead	NCL - East	0	4	0.400	0.13	0.43	0.4425	1	4	4	1.98	1.14	0.31	2.45	2.7
Lead	OID	19	20	0.240	0.17	0.039	0.19	0.7	11	21	0.35	0.29	0.18	0.26	1.5
Lead	Other drains	0	4	0.460	0.40	0.16	0.38	2	2	4	0.42	0.59	0.065	0.1475	1.3
Lead	Seawater	0	4	1.298	1.39	0.18	1.3	5	1	4	1.17	0.96	0.19	1	5
Lead	WMU ditch	0	2	0.073	0.03	0.1	0.0725	0.19	2	2	0.32	0.06	0.28	0.32	0.36
Magnesium	Lagoon	4	4	223000	121746	115000	208500	360000	4	4	227500	131234	116000	207000	380000
Magnesium	NCL - East	4	4	248250	4193	244000	247500	254000	4	4	252250	12527	238000	252000	267000
Magnesium	OID	20	20	176730	90803	85300	122000	316000	21	21	175257	92489	83300	115000	358000
Magnesium	Other drains	4	4	285250	237743	104000	202000	633000	4	4	259250	189076	111000	195500	535000
Magnesium	Seawater	4	4	1260000	37417	1220000	1255000	1310000	4	4	1262500	17078	1240000	1265000	1280000
Magnesium	WMU ditch	2	2	118500	3536	116000	118500	121000	2	2	115500	2121	114000	115500	117000
Manganese	Lagoon	4	4	145.025	150	16.9	118.6	326	4	4	197.25	93.19	116	174	325
Manganese	NCL - East	4	4	128.275	34	94.1	124	171	4	4	172.50	25.25	155	162.5	210
Manganese	OID	20	20	192.955	150	25.3	164.5	395	21	21	244.53	101.68	33.3	240	378
Manganese	Other drains	4	4	331.5	149	205	303	515	4	4	336.25	166.19	159	329.5	527
Manganese	Seawater	3	4	3.2	3	1.2	2.05	15	2	4	2.41	0.62	1.6	2.5	6.1
Manganese	WMU ditch	2	2	95.45	38	68.9	95.45	122	2	2	175.00	18.38	162	175	188

TABLE 2-3

Summary Statistics for Inorganic Analytes in Surface Water (µg/L)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

				Dissolved Concentrations					Total Concentrations						
Analyte	**Area**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**
Mercury	Lagoon	0	4	0.079	0.04	0.03	0.1	0.2	0	4	0.061	0.045	0.038	0.063	0.2
Mercury	NCL - East	1	4	0.079	0.04	0.017	0.1	0.2	0	4	0.100	0	0.2	0.1	0.2
Mercury	OID	0	20	0.096	0.02	0.028	0.1	0.2	0	21	0.062	0.041	0.034	0.1	0.2
Mercury	Other drains	0	4	0.058	0.05	0.027	0.059	0.2	0	4	0.062	0.044	0.048	0.06225	0.2
Mercury	Seawater	0	4	0.063	0.04	0.047	0.064	0.2	0	4	0.100	0	0.2	0.1	0.2
Mercury	WMU ditch	0	2	0.1	0	0.2	0.1	0.2	0	2	0.100	0	0.2	0.1	0.2
Nickel	Lagoon	4	4	8.9	1.41	7.3	8.75	10.7	4	4	7.53	1.39	6.6	6.95	9.6
Nickel	NCL - East	4	4	8.6	0.18	8.4	8.6	8.8	4	4	7.90	1.46	6.4	8	9.2
Nickel	OID	20	20	9.6	1.80	6.2	9.45	12.9	21	21	9.03	2.08	6.3	8	13
Nickel	Other drains	4	4	6.7	0.96	5.6	6.8	7.6	4	4	5.25	0.42	4.8	5.2	5.8
Nickel	Seawater	4	4	6.7	1.16	5.1	7.05	7.7	4	4	6.63	1.66	5	6.65	8.2
Nickel	WMU ditch	2	2	7.7	0.42	7.4	7.7	8	2	2	6.95	0.21	6.8	6.95	7.1
Potassium	Lagoon	4	4	59250	42307	21300	55350	105000	4	4	59825	41092	22800	57750	101000
Potassium	NCL - East	4	4	82575	2326	80400	82300	85300	4	4	83525	2910	81300	82650	87500
Potassium	OID	20	20	35334	28146	6790	19850	79700	21	21	33380	26974	5300	19100	95200
Potassium	Other drains	4	4	84625	85117	23200	52650	210000	4	4	77700	65714	24500	56650	173000
Potassium	Seawater	4	4	473000	16391	462000	466500	497000	4	4	453500	30006	433000	441500	498000
Potassium	WMU ditch	2	2	22200	849	21600	22200	22800	2	2	23150	495	22800	23150	23500
Selenium	Lagoon	3	4	5.83	7.79	1.7	2.05	35	2	4	10.70	7.89	3	11.15	35
Selenium	NCL - East	0	4	17.50	0	35	17.5	35	0	4	17.50	0	35	17.5	35
Selenium	OID	7	20	12.32	7.26	2	17.5	35	9	21	11.15	7.55	1.4	17.5	35
Selenium	Other drains	0	4	17.50	0	35	17.5	35	2	4	10.83	7.71	4	10.9	35
Selenium	Seawater	0	4	17.50	0	35	17.5	35	0	4	17.50	0	35	17.5	35
Selenium	WMU ditch	0	2	17.50	0	35	17.5	35	0	2	17.50	0	35	17.5	35
Silver	Lagoon	0	4	0.18	0	0.36	0.18	0.36	0	4	0.18	0	0.36	0.18	0.36
Silver	NCL - East	0	4	0.18	0	0.36	0.18	0.36	1	4	0.142	0.076	0.029	0.18	0.36
Silver	OID	2	20	0.17	0.04	0.038	0.18	0.36	0	21	0.164	0.050	0.025	0.18	0.36
Silver	Other drains	0	4	0.23	0.09	0.36	0.18	0.72	0	4	0.225	0.09	0.36	0.18	0.72
Silver	Seawater	0	4	0.55	0.42	0.1	0.63	1.8	0	4	0.585	0.371	0.36	0.63	1.8
Silver	WMU ditch	0	2	0.18	0	0.36	0.18	0.36	0	2	0.18	0	0.36	0.18	0.36
Sodium	Lagoon	4	4	1372250	967822	490000	1334500	2330000	4	4	1417250	1014050	503000	1428000	2310000
Sodium	NCL - East	4	4	1757500	57373	1710000	1740000	1840000	4	4	1737500	38622	1700000	1735000	1780000
Sodium	OID	20	20	836450	651156	184000	466000	1860000	21	21	804714	634903	185000	461000	2190000
Sodium	Other drains	4	4	2168250	2239263	573000	1315000	5470000	4	4	1920000	1705638	610000	1330000	4410000
Sodium	Seawater	4	4	10257500	237820	9930000	10300000	10500000	4	4	10070000	504843	9590000	10045000	10600000
Sodium	WMU ditch	2	2	521000	18385	508000	521000	534000	2	2	519000	4243	516000	519000	522000
Thallium	Lagoon	0	4	0.38	0.24	0.034	0.5	1	0	4	0.26	0.28	0.035	0.2615	1
Thallium	NCL - East	0	4	0.26	0.28	0.026	0.2585	1	0	4	0.14	0.24	0.026	0.0165	1
Thallium	OID	0	20	0.26	0.24	0.027	0.295	1	1	21	0.26	0.24	0.044	0.08	1
Thallium	Other drains	0	4	0.26	0.27	0.026	0.2675	1	0	4	0.63	0.25	1	0.5	2
Thallium	Seawater	0	4	1.75	0.87	2	1.75	5	0	4	1.75	0.87	2	1.75	5
Thallium	WMU ditch	0	2	0.5	0	1	0.5	1	0	2	0.5	0	1	0.5	1

TABLE 2-3

Summary Statistics for Inorganic Analytes in Surface Water (µg/L)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

				Dissolved Concentrations					Total Concentrations						
Analyte	**Area**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**
Vanadium	Lagoon	4	4	2.05	0.62	1.4	1.95	2.9	4	4	2.28	0.63	1.8	2.05	3.2
Vanadium	NCL - East	3	4	1.29	0.62	0.75	1.55	1.7	4	4	2.33	0.78	1.2	2.6	2.9
Vanadium	OID	19	20	1.64	0.60	0.79	1.85	3	21	21	2.08	0.45	1.5	2.1	3.6
Vanadium	Other drains	3	4	1.15	0.58	0.99	1.095	1.9	2	4	1.00	0.63	0.83	0.9	1.8
Vanadium	Seawater	2	4	1.79	1.11	1.5	1.65	3.1	4	4	4.20	2.07	2	4.25	6.3
Vanadium	WMU ditch	2	2	1.85	0.07	1.8	1.85	1.9	2	2	1.75	0.21	1.6	1.75	1.9
Zinc	Lagoon	0	4	19.84	11.74	18.5	20.05	60	1	4	5.83	3.95	4.8	5.025	21.7
Zinc	NCL - East	2	4	5.39	5.06	3.8	3.35	12.9	4	4	16.50	10.31	4.8	15.7	29.8
Zinc	OID	0	20	14.61	11.99	5.2	10.95	60	9	21	14.20	10.67	5	9	60
Zinc	Other drains	0	4	9.61	13.60	4.2	3.175	60	1	4	12.04	12.33	6.4	7.475	60
Zinc	Seawater	0	4	16.06	16.09	4	16.125	60	2	4	16.98	15.05	3.2	17.35	60
Zinc	WMU ditch	0	2	16.45	19.16	5.8	16.45	60	2	2	7.40	1.13	6.6	7.4	8.2

Notes:

µg/L = micrograms per liter

N = sample size

TABLE 2-4

Summary Statistics for Inorganic Analytes in Sediments (mg/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
Aluminum	NCL - East	0-6 in	50	50	31295	39810	2150	12200	159000
Aluminum	NCL - East	2 ft	44	44	10325	3959	5290	9445	22900
Aluminum	NCL - North	0-6 in	22	22	13885	4526	5920	13450	27800
Aluminum	NCL - North	2 ft	16	16	14351	5925	6360	12650	25700
Aluminum	OID Lagoon	0-6 in	49	49	5582	5665	1110	3500	23900
Aluminum	OID Lagoon	2 ft	39	39	8755	8724	1330	5840	34100
Aluminum	OID Lagoon	2 to 6	18	18	7024	6577	1220	3735	20600
Aluminum	Wetlands Beach	0-6 in	21	21	61695	39622	3760	54500	166000
Aluminum	Wetlands Beach	2 ft	18	18	6234	8527	1620	2790	37400
Aluminum	Wetlands Beach	2 to 6	9	9	5852	5170	1480	3590	16100
Antimony	NCL - East	0-6 in	50	50	2.85	4.30	0.24	0.735	20.1
Antimony	NCL - East	2 ft	44	44	0.30	0.20	0.11	0.265	1.4
Antimony	NCL - North	0-6 in	13	22	0.73	0.50	0.21	0.535	2.2
Antimony	NCL - North	2 ft	3	16	0.67	0.35	0.46	0.59	1.9
Antimony	OID Lagoon	0-6 in	43	49	0.50	0.35	0.077	0.43	1.7
Antimony	OID Lagoon	2 ft	39	39	0.99	1.69	0.056	0.29	7.7
Antimony	OID Lagoon	2 to 6	18	18	0.27	0.15	0.11	0.2	0.61
Antimony	Wetlands Beach	0-6 in	21	21	5.08	3.28	0.34	4.9	10.4
Antimony	Wetlands Beach	2 ft	18	18	0.36	0.48	0.12	0.215	2.2
Antimony	Wetlands Beach	2 to 6	9	9	0.34	0.32	0.084	0.2	1.1
Arsenic	NCL - East	0-6 in	50	50	4.74	4.66	0.83	3.65	33.7
Arsenic	NCL - East	2 ft	44	44	4.16	1.60	1.8	3.7	9.4
Arsenic	NCL - North	0-6 in	22	22	3.65	1.68	0.89	3.35	7.2
Arsenic	NCL - North	2 ft	15	16	3.83	1.34	0.91	4.05	5.5
Arsenic	OID Lagoon	0-6 in	49	49	2.66	1.96	0.61	1.9	7.5
Arsenic	OID Lagoon	2 ft	39	39	4.03	3.80	0.73	2.4	18.2
Arsenic	OID Lagoon	2 to 6	18	18	3.11	2.46	0.81	2.35	9.3
Arsenic	Wetlands Beach	0-6 in	21	21	5.24	2.91	1.1	5	10.7
Arsenic	Wetlands Beach	2 ft	18	18	1.59	0.72	0.79	1.4	3.3
Arsenic	Wetlands Beach	2 to 6	9	9	2.23	1.61	1.1	1.5	6.2
Barium	NCL - East	0-6 in	50	50	672	1049	49.9	200	5040
Barium	NCL - East	2 ft	44	44	145	41	94.2	132.5	277
Barium	NCL - North	0-6 in	22	22	424	1042	103	166.5	5060
Barium	NCL - North	2 ft	16	16	231	342	68.6	146.5	1500
Barium	OID Lagoon	0-6 in	42	49	99	93	12.2	76.6	410
Barium	OID Lagoon	2 ft	37	39	1024	2236	24	116	9100
Barium	OID Lagoon	2 to 6	15	18	381	1245	12.7	84.1	5360
Barium	Wetlands Beach	0-6 in	21	21	1142	873	67.4	927	3110
Barium	Wetlands Beach	2 ft	15	18	88	131	13.9	44.3	578
Barium	Wetlands Beach	2 to 6	8	9	139	219	16.3	53.3	706
Beryllium	NCL - East	0-6 in	41	50	2.51	3.67	0.14	0.815	16.8
Beryllium	NCL - East	2 ft	31	44	0.51	0.22	0.25	0.445	1.1
Beryllium	NCL - North	0-6 in	22	22	1.70	3.81	0.29	0.86	18.7
Beryllium	NCL - North	2 ft	16	16	1.19	1.36	0.4	0.86	6.2
Beryllium	OID Lagoon	0-6 in	24	49	0.44	0.41	0.051	0.29	1.4
Beryllium	OID Lagoon	2 ft	18	39	2.99	7.71	0.073	0.32	39.6
Beryllium	OID Lagoon	2 to 6	7	18	0.41	0.37	0.08	0.255	1.1
Beryllium	Wetlands Beach	0-6 in	21	21	5.15	4.54	0.26	4.2	19.9
Beryllium	Wetlands Beach	2 ft	13	18	0.33	0.45	0.09	0.145	2
Beryllium	Wetlands Beach	2 to 6	5	9	0.48	0.58	0.086	0.25	1.9
Cadmium	NCL - East	0-6 in	50	50	1.46	1.55	0.098	0.98	6.7
Cadmium	NCL - East	2 ft	44	44	0.92	0.43	0.34	0.795	2.1
Cadmium	NCL - North	0-6 in	22	22	1.30	0.74	0.2	1.15	3.7
Cadmium	NCL - North	2 ft	16	16	1.16	0.56	0.35	1	2.7
Cadmium	OID Lagoon	0-6 in	42	49	0.68	0.60	0.049	0.47	3.5
Cadmium	OID Lagoon	2 ft	36	39	0.70	0.93	0.038	0.45	5
Cadmium	OID Lagoon	2 to 6	18	18	0.57	0.48	0.086	0.485	1.6
Cadmium	Wetlands Beach	0-6 in	21	21	1.97	1.35	0.049	1.7	4.1
Cadmium	Wetlands Beach	2 ft	18	18	0.38	0.38	0.084	0.24	1.4
Cadmium	Wetlands Beach	2 to 6	9	9	0.33	0.21	0.13	0.24	0.69

TABLE 2-4

Summary Statistics for Inorganic Analytes in Sediments (mg/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
Calcium	NCL - East	0-6 in	50	50	10326	6709	2190	8690	32100
Calcium	NCL - East	2 ft	44	44	23388	12062	8050	22250	66900
Calcium	NCL - North	0-6 in	22	22	25031	30067	3240	14800	111000
Calcium	NCL - North	2 ft	16	16	30561	27591	7590	22650	116000
Calcium	OID Lagoon	0-6 in	49	49	43033	47532	3890	16400	178000
Calcium	OID Lagoon	2 ft	39	39	36826	46439	2090	11400	179000
Calcium	OID Lagoon	2 to 6	18	18	18115	28716	4070	7990	126000
Calcium	Wetlands Beach	0-6 in	21	21	18191	17360	1620	8180	52500
Calcium	Wetlands Beach	2 ft	18	18	6698	6239	1420	3890	23300
Calcium	Wetlands Beach	2 to 6	9	9	7647	3958	2960	5850	15400
Chromium	NCL - East	0-6 in	50	50	61.10	78.53	6.2	24.85	342
Chromium	NCL - East	2 ft	44	44	18.63	8.79	8.8	15.55	51.2
Chromium	NCL - North	0-6 in	22	22	21.61	8.93	13.6	18.4	51.3
Chromium	NCL - North	2 ft	16	16	19.14	7.06	7.5	19.2	35.6
Chromium	OID Lagoon	0-6 in	49	49	12.79	9.77	0.64	9.8	41.2
Chromium	OID Lagoon	2 ft	39	39	20.44	23.15	3	9.1	86.4
Chromium	OID Lagoon	2 to 6	18	18	16.02	14.89	3.6	12	57.9
Chromium	Wetlands Beach	0-6 in	21	21	114.44	103.10	5.4	83.7	472
Chromium	Wetlands Beach	2 ft	18	18	12.09	12.61	3.6	8.25	58
Chromium	Wetlands Beach	2 to 6	9	9	11.89	6.91	5.4	9.4	24.2
Cobalt	NCL - East	0-6 in	27	50	7.06	2.60	1.4	6.7	13.7
Cobalt	NCL - East	2 ft	22	44	7.23	2.51	3.5	6.65	15.9
Cobalt	NCL - North	0-6 in	17	22	7.75	1.88	2.9	7.45	11.5
Cobalt	NCL - North	2 ft	13	16	8.31	2.41	4.5	8.45	13.5
Cobalt	OID Lagoon	0-6 in	7	49	4.10	3.80	0.76	3.2	18.8
Cobalt	OID Lagoon	2 ft	3	39	3.95	3.32	0.98	3.7	14.9
Cobalt	OID Lagoon	2 to 6	4	18	4.62	4.19	0.93	2.15	12.6
Cobalt	Wetlands Beach	0-6 in	10	21	5.06	2.34	1.1	5.2	9.2
Cobalt	Wetlands Beach	2 ft	9	18	2.01	1.93	0.87	1.25	6.9
Cobalt	Wetlands Beach	2 to 6	5	9	2.91	3.08	1.1	1.4	10.2
Copper	NCL - East	0-6 in	50	50	591.7	1014.5	15.9	86.15	3950
Copper	NCL - East	2 ft	44	44	26.1	30.3	8.1	15.85	160
Copper	NCL - North	0-6 in	22	22	58.3	65.0	14.5	35.25	270
Copper	NCL - North	2 ft	16	16	27.4	23.1	7.9	19.8	97.4
Copper	OID Lagoon	0-6 in	44	49	31.7	30.5	1.3	25.5	119
Copper	OID Lagoon	2 ft	32	39	101.6	200.5	1.1	23.6	803
Copper	OID Lagoon	2 to 6	14	18	20.0	22.3	1.8	11.85	91.2
Copper	Wetlands Beach	0-6 in	21	21	1423.3	1025.2	55.6	1260	3970
Copper	Wetlands Beach	2 ft	18	18	80.8	176.8	6.1	24.35	772
Copper	Wetlands Beach	2 to 6	9	9	47.6	58.7	3	34.4	191
Iron	NCL - East	0-6 in	50	50	17015	4688	5370	18300	24400
Iron	NCL - East	2 ft	44	44	19859	6462	10700	18250	40000
Iron	NCL - North	0-6 in	22	22	22007	5186	9060	21800	34500
Iron	NCL - North	2 ft	16	16	23131	7496	10700	23100	40400
Iron	OID Lagoon	0-6 in	49	49	11187	10008	2420	8230	43200
Iron	OID Lagoon	2 ft	39	39	12244	10948	3130	8520	48200
Iron	OID Lagoon	2 to 6	18	18	14941	13884	3130	6395	40700
Iron	Wetlands Beach	0-6 in	21	21	9985	3741	3690	10900	16900
Iron	Wetlands Beach	2 ft	18	18	6921	6255	3130	4350	24400
Iron	Wetlands Beach	2 to 6	9	9	9728	9329	3310	5780	32700
Lead	NCL - East	0-6 in	50	50	89.89	119.56	7.3	28.95	616
Lead	NCL - East	2 ft	44	44	8.72	6.40	4	6.3	41.8
Lead	NCL - North	0-6 in	22	22	59.51	72.09	6.1	34	306
Lead	NCL - North	2 ft	16	16	17.57	14.24	3	15.5	58
Lead	OID Lagoon	0-6 in	48	49	12.85	12.17	0.89	10.3	46.8
Lead	OID Lagoon	2 ft	39	39	26.78	35.95	1.5	8.5	128
Lead	OID Lagoon	2 to 6	18	18	6.22	4.70	1.7	4.55	15.1
Lead	Wetlands Beach	0-6 in	21	21	159.58	144.21	13.7	122	641
Lead	Wetlands Beach	2 ft	18	18	10.71	15.75	2.1	4.8	69.7
Lead	Wetlands Beach	2 to 6	9	9	7.59	6.29	2.1	5	21.5

TABLE 2-4

Summary Statistics for Inorganic Analytes in Sediments (mg/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
Magnesium	NCL - East	0-6 in	50	50	13752.8	12983.5	1490	8455	55600
Magnesium	NCL - East	2 ft	44	44	7353.6	2447.4	3480	6815	14300
Magnesium	NCL - North	0-6 in	22	22	8445.0	3614.1	3480	7700	22800
Magnesium	NCL - North	2 ft	16	16	9217.5	3309.7	3440	8895	16500
Magnesium	OID Lagoon	0-6 in	49	49	4243.6	3611.2	934	3070	14500
Magnesium	OID Lagoon	2 ft	39	39	15658.5	27073.7	1050	4070	116000
Magnesium	OID Lagoon	2 to 6	18	18	5174.4	4637.2	1050	2690	12800
Magnesium	Wetlands Beach	0-6 in	21	21	13250.0	8159.4	1250	11900	31200
Magnesium	Wetlands Beach	2 ft	18	18	3035.4	3543.6	837	1470	11300
Magnesium	Wetlands Beach	2 to 6	9	9	3812.2	3226.3	1080	2470	9810
Manganese	NCL - East	0-6 in	50	50	473.5	460.4	62.5	282.5	2100
Manganese	NCL - East	2 ft	44	44	338.3	102.9	202	321.5	606
Manganese	NCL - North	0-6 in	22	22	317.4	191.5	90.8	269	986
Manganese	NCL - North	2 ft	16	16	400.1	157.6	129	408	670
Manganese	OID Lagoon	0-6 in	49	49	272.2	230.2	46.5	189	989
Manganese	OID Lagoon	2 ft	39	39	405.1	451.4	51.4	252	1660
Manganese	OID Lagoon	2 to 6	18	18	280.4	316.4	48.3	155.5	1270
Manganese	Wetlands Beach	0-6 in	21	21	644.8	385.2	57.1	599	1470
Manganese	Wetlands Beach	2 ft	18	18	127.3	147.8	33.8	61.95	626
Manganese	Wetlands Beach	2 to 6	9	9	248.6	322.7	51.3	121	1060
Mercury	NCL - East	0-6 in	18	50	0.086	0.055	0.014	0.0755	0.18
Mercury	NCL - East	2 ft	8	44	0.097	0.058	0.013	0.12	0.23
Mercury	NCL - North	0-6 in	3	22	0.135	0.054	0.03	0.135	0.23
Mercury	NCL - North	2 ft	4	16	0.114	0.052	0.02	0.13	0.2
Mercury	OID Lagoon	0-6 in	14	49	0.118	0.102	0.015	0.12	0.58
Mercury	OID Lagoon	2 ft	18	39	0.072	0.057	0.015	0.04	0.24
Mercury	OID Lagoon	2 to 6	5	18	0.101	0.049	0.027	0.12	0.18
Mercury	Wetlands Beach	0-6 in	3	21	0.185	0.128	0.019	0.17	0.6
Mercury	Wetlands Beach	2 ft	0	18	0.120	0.039	0.02	0.125	0.18
Mercury	Wetlands Beach	2 to 6	1	9	0.115	0.033	0.028	0.12	0.14
Nickel	NCL - East	0-6 in	49	50	42.0	41.6	5	20.85	179
Nickel	NCL - East	2 ft	44	44	18.8	7.7	9.2	16.7	46.3
Nickel	NCL - North	0-6 in	22	22	23.6	7.1	10.1	22.35	42.9
Nickel	NCL - North	2 ft	16	16	22.8	6.9	9.1	23.05	33.3
Nickel	OID Lagoon	0-6 in	36	49	11.4	10.5	2.4	8.7	49.5
Nickel	OID Lagoon	2 ft	30	39	15.3	12.7	3.2	11.8	49.6
Nickel	OID Lagoon	2 to 6	13	18	13.0	11.4	2.6	6.45	34.8
Nickel	Wetlands Beach	0-6 in	21	21	67.9	41.1	6	61.6	154
Nickel	Wetlands Beach	2 ft	18	18	9.0	11.6	2.7	4.1	50.4
Nickel	Wetlands Beach	2 to 6	9	9	10.0	8.6	2.8	5.8	28.8
Potassium	NCL - East	0-6 in	50	50	4322	1458	770	4480	7300
Potassium	NCL - East	2 ft	44	44	5600	2942	2320	4880	19900
Potassium	NCL - North	0-6 in	22	22	4585	1054	1930	4560	6690
Potassium	NCL - North	2 ft	16	16	4569	1428	1920	4440	6800
Potassium	OID Lagoon	0-6 in	43	49	1982	2269	335	999	10100
Potassium	OID Lagoon	2 ft	39	39	2334	2361	357	1070	8710
Potassium	OID Lagoon	2 to 6	18	18	3290	3617	362	963.5	10700
Potassium	Wetlands Beach	0-6 in	21	21	1632	951	360	1460	3500
Potassium	Wetlands Beach	2 ft	15	18	1257	2128	340	418	7540
Potassium	Wetlands Beach	2 to 6	6	9	2322	3733	330	584	11300
Selenium	NCL - East	0-6 in	47	50	1.62	1.26	0.53	1.05	5.6
Selenium	NCL - East	2 ft	44	44	0.72	0.27	0.36	0.66	1.8
Selenium	NCL - North	0-6 in	13	22	2.74	3.02	0.17	2.1	15.2
Selenium	NCL - North	2 ft	7	16	1.60	1.58	0.064	1.185	6
Selenium	OID Lagoon	0-6 in	35	49	1.36	1.25	0.3	0.9	6.8
Selenium	OID Lagoon	2 ft	28	39	0.98	0.61	0.31	0.7	2.5
Selenium	OID Lagoon	2 to 6	14	18	0.78	0.39	0.26	0.68	1.6
Selenium	Wetlands Beach	0-6 in	19	21	2.60	2.16	0.3	2.1	8.1
Selenium	Wetlands Beach	2 ft	13	18	0.57	0.26	0.3	0.525	1.2
Selenium	Wetlands Beach	2 to 6	7	9	0.51	0.21	0.27	0.48	0.82

TABLE 2-4

Summary Statistics for Inorganic Analytes in Sediments (mg/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
Silver	NCL - East	0-6 in	29	50	1.14	1.24	0.13	0.65	4.9
Silver	NCL - East	2 ft	5	44	0.63	0.19	0.13	0.635	1.2
Silver	NCL - North	0-6 in	8	22	0.53	0.19	0.22	0.52	1.2
Silver	NCL - North	2 ft	2	16	0.60	0.21	0.35	0.555	1.3
Silver	OID Lagoon	0-6 in	12	49	0.78	0.45	0.23	0.65	2.8
Silver	OID Lagoon	2 ft	19	39	1.06	1.08	0.13	0.67	5
Silver	OID Lagoon	2 to 6	9	18	0.61	0.18	0.16	0.65	0.85
Silver	Wetlands Beach	0-6 in	19	21	1.52	0.97	0.26	1.2	3.6
Silver	Wetlands Beach	2 ft	9	18	0.47	0.23	0.13	0.61	0.83
Silver	Wetlands Beach	2 to 6	3	9	0.56	0.14	0.22	0.62	0.67
Sodium	NCL - East	0-6 in	50	50	2575	1305	861	2225	6220
Sodium	NCL - East	2 ft	44	44	2903	2149	977	1875	8990
Sodium	NCL - North	0-6 in	22	22	2345	1241	567	1920	5120
Sodium	NCL - North	2 ft	16	16	2105	883	797	2030	3700
Sodium	OID Lagoon	0-6 in	49	49	4406	4204	975	2730	20800
Sodium	OID Lagoon	2 ft	39	39	3838	3207	358	3100	13000
Sodium	OID Lagoon	2 to 6	18	18	3619	3105	742	2060	9840
Sodium	Wetlands Beach	0-6 in	21	21	3148	2318	757	2600	10700
Sodium	Wetlands Beach	2 ft	18	18	888	609	446	631.5	2510
Sodium	Wetlands Beach	2 to 6	9	9	1035	716	587	800	2900
Thallium	NCL - East	0-6 in	47	50	0.213	0.117	0.04	0.21	0.71
Thallium	NCL - East	2 ft	44	44	0.238	0.089	0.1	0.205	0.49
Thallium	NCL - North	0-6 in	6	22	0.420	0.170	0.048	0.39	0.67
Thallium	NCL - North	2 ft	0	16	0.551	0.118	0.35	0.515	0.74
Thallium	OID Lagoon	0-6 in	39	49	0.216	0.198	0.028	0.16	0.69
Thallium	OID Lagoon	2 ft	39	39	0.132	0.123	0.027	0.083	0.49
Thallium	OID Lagoon	2 to 6	18	18	0.159	0.132	0.029	0.092	0.39
Thallium	Wetlands Beach	0-6 in	18	21	0.199	0.327	0.023	0.078	1.4
Thallium	Wetlands Beach	2 ft	18	18	0.056	0.073	0.019	0.024	0.27
Thallium	Wetlands Beach	2 to 6	9	9	0.093	0.112	0.025	0.041	0.36
Vanadium	NCL - East	0-6 in	50	50	41.81	18.51	12.8	36.6	125
Vanadium	NCL - East	2 ft	44	44	33.50	12.21	16.6	29.2	70.4
Vanadium	NCL - North	0-6 in	22	22	38.60	13.21	16.2	34.55	62.7
Vanadium	NCL - North	2 ft	16	16	36.33	9.96	11.2	35.1	53
Vanadium	OID Lagoon	0-6 in	49	49	22.98	18.04	2.6	18.2	72.1
Vanadium	OID Lagoon	2 ft	39	39	21.39	16.31	4.7	15.5	63.6
Vanadium	OID Lagoon	2 to 6	18	18	22.75	19.76	5.6	11.4	64.6
Vanadium	Wetlands Beach	0-6 in	21	21	34.60	17.91	6.6	29	74.7
Vanadium	Wetlands Beach	2 ft	18	18	12.86	9.57	5	9.25	36.3
Vanadium	Wetlands Beach	2 to 6	9	9	16.81	12.82	7.3	10.2	45.9
Zinc	NCL - East	0-6 in	50	50	567.3	943.9	30.8	131	4570
Zinc	NCL - East	2 ft	44	44	63.3	46.7	24.7	47.75	311
Zinc	NCL - North	0-6 in	22	22	196.8	182.3	57.2	107.5	790
Zinc	NCL - North	2 ft	16	16	93.7	54.6	32.2	77.05	253
Zinc	OID Lagoon	0-6 in	49	49	106.6	98.8	9.4	70	427
Zinc	OID Lagoon	2 ft	39	39	166.3	282.9	8.5	60	1250
Zinc	OID Lagoon	2 to 6	18	18	43.9	34.2	8.9	41.7	104
Zinc	Wetlands Beach	0-6 in	21	21	1193.7	827.9	81.3	981	3670
Zinc	Wetlands Beach	2 ft	18	18	1098.5	4467.7	13.8	30.25	19000
Zinc	Wetlands Beach	2 to 6	9	9	80.7	137.3	7.8	36.7	441

Notes:

mg/kg = milligrams per kilogram

N = sample size

TABLE 2-5

Summary Statistics for Dioxins/Furans in Sediments (ng/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
1,2,3,4,6,7,8-HpCDD	NCL - East	0-6 in	4	7	13.84	10.52	5	9.9	30
1,2,3,4,6,7,8-HpCDD	NCL - North	0-6 in	3	3	21.67	14.15	13	14	38
1,2,3,4,6,7,8-HpCDD	OID Lagoon	0-6 in	22	30	70.69	93.66	0.074	11.4	298
1,2,3,4,6,7,8-HpCDD	OID Lagoon	2 ft	13	21	97.60	161.25	0.059	2.18	459
1,2,3,4,6,7,8-HpCDD	OID Lagoon	2 to 6	2	10	4.97	14.74	0.039	0.22	46.9
1,2,3,4,6,7,8-HpCDD	Wetlands Beach	0-6 in	7	9	62.30	104.62	5	8.8	310
1,2,3,4,6,7,8-HpCDF	NCL - East	0-6 in	4	7	10.99	6.94	5	6.9	19
1,2,3,4,6,7,8-HpCDF	NCL - North	0-6 in	2	3	8.40	4.13	5	7.2	13
1,2,3,4,6,7,8-HpCDF	OID Lagoon	0-6 in	14	30	22.38	30.15	0.051	5	110
1,2,3,4,6,7,8-HpCDF	OID Lagoon	2 ft	11	21	81.39	196.52	0.049	1.5	747
1,2,3,4,6,7,8-HpCDF	OID Lagoon	2 to 6	1	10	5.18	15.78	0.036	0.2075	50.1
1,2,3,4,6,7,8-HpCDF	Wetlands Beach	0-6 in	6	9	85.51	154.77	5	6.7	460
1,2,3,4,7,8,9-HpCDF	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
1,2,3,4,7,8,9-HpCDF	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
1,2,3,4,7,8,9-HpCDF	OID Lagoon	0-6 in	9	30	2.70	2.48	0.1	1.975	9.57
1,2,3,4,7,8,9-HpCDF	OID Lagoon	2 ft	8	21	9.70	24.15	0.11	0.38	96.5
1,2,3,4,7,8,9-HpCDF	OID Lagoon	2 to 6	2	10	0.95	2.17	0.101	0.27	7.12
1,2,3,4,7,8,9-HpCDF	Wetlands Beach	0-6 in	3	9	12.22	13.07	5	5	40
1,2,3,4,7,8-HxCDD	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
1,2,3,4,7,8-HxCDD	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
1,2,3,4,7,8-HxCDD	OID Lagoon	0-6 in	3	30	2.08	2.44	0.036	0.375	6.49
1,2,3,4,7,8-HxCDD	OID Lagoon	2 ft	4	21	1.62	3.59	0.054	0.21	11.6
1,2,3,4,7,8-HxCDD	OID Lagoon	2 to 6	2	10	0.15	0.09	0.041	0.13	0.32
1,2,3,4,7,8-HxCDD	Wetlands Beach	0-6 in	2	9	6.37	3.06	5	5	14
1,2,3,4,7,8-HxCDF	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
1,2,3,4,7,8-HxCDF	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
1,2,3,4,7,8-HxCDF	OID Lagoon	0-6 in	15	30	4.41	6.36	0.11	3.945	31.8
1,2,3,4,7,8-HxCDF	OID Lagoon	2 ft	13	21	35.45	91.94	0.07	1.09	346
1,2,3,4,7,8-HxCDF	OID Lagoon	2 to 6	3	10	2.64	7.61	0.1	0.165	24.3
1,2,3,4,7,8-HxCDF	Wetlands Beach	0-6 in	3	9	17.22	22.77	5	5	68
1,2,3,6,7,8-HxCDD	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
1,2,3,6,7,8-HxCDD	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
1,2,3,6,7,8-HxCDD	OID Lagoon	0-6 in	16	30	4.15	3.77	0.097	5	13
1,2,3,6,7,8-HxCDD	OID Lagoon	2 ft	10	21	5.68	9.32	0.098	0.27	28.2
1,2,3,6,7,8-HxCDD	OID Lagoon	2 to 6	2	10	0.17	0.09	0.0543	0.15	0.32
1,2,3,6,7,8-HxCDD	Wetlands Beach	0-6 in	3	9	9.19	8.94	5	5	31
1,2,3,6,7,8-HxCDF	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
1,2,3,6,7,8-HxCDF	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
1,2,3,6,7,8-HxCDF	OID Lagoon	0-6 in	10	30	3.29	4.34	0.031	1.99	18
1,2,3,6,7,8-HxCDF	OID Lagoon	2 ft	9	21	13.81	35.85	0.042	0.19	134
1,2,3,6,7,8-HxCDF	OID Lagoon	2 to 6	4	10	1.13	3.05	0.028	0.133	9.81
1,2,3,6,7,8-HxCDF	Wetlands Beach	0-6 in	2	9	13.11	21.17	5	5	69
1,2,3,7,8,9-HxCDD	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
1,2,3,7,8,9-HxCDD	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
1,2,3,7,8,9-HxCDD	OID Lagoon	0-6 in	15	30	3.90	3.51	0.12	5	12.2
1,2,3,7,8,9-HxCDD	OID Lagoon	2 ft	11	21	5.85	10.76	0.092	0.31	34
1,2,3,7,8,9-HxCDD	OID Lagoon	2 to 6	2	10	0.23	0.14	0.052	0.2155	0.506
1,2,3,7,8,9-HxCDD	Wetlands Beach	0-6 in	3	9	8.14	6.64	5	5	24
1,2,3,7,8,9-HxCDF	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
1,2,3,7,8,9-HxCDF	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
1,2,3,7,8,9-HxCDF	OID Lagoon	0-6 in	7	30	1.92	2.34	0.113	0.7115	7.9
1,2,3,7,8,9-HxCDF	OID Lagoon	2 ft	8	21	2.86	8.97	0.089	0.27	41.1
1,2,3,7,8,9-HxCDF	OID Lagoon	2 to 6	3	10	0.26	0.33	0.078	0.1705	1.2
1,2,3,7,8,9-HxCDF	Wetlands Beach	0-6 in	3	9	8.50	7.34	5	5	26
1,2,3,7,8-PeCDD	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
1,2,3,7,8-PeCDD	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
1,2,3,7,8-PeCDD	OID Lagoon	0-6 in	7	30	2.19	2.24	0.053	1.435	7
1,2,3,7,8-PeCDD	OID Lagoon	2 ft	6	21	1.45	2.74	0.047	0.334	9.31

TABLE 2-5

Summary Statistics for Dioxins/Furans in Sediments (ng/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
1,2,3,7,8-PeCDD	OID Lagoon	2 to 6	2	10	0.26	0.48	0.039	0.0965	1.6
1,2,3,7,8-PeCDD	Wetlands Beach	0-6 in	2	9	5.68	1.66	5	5	10
1,2,3,7,8-PeCDF	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
1,2,3,7,8-PeCDF	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
1,2,3,7,8-PeCDF	OID Lagoon	0-6 in	7	30	2.09	2.25	0.038	0.968	5.81
1,2,3,7,8-PeCDF	OID Lagoon	2 ft	8	21	7.22	18.66	0.042	0.26	71.7
1,2,3,7,8-PeCDF	OID Lagoon	2 to 6	1	10	0.52	1.13	0.042	0.1265	3.73
1,2,3,7,8-PeCDF	Wetlands Beach	0-6 in	3	9	8.59	7.13	5	5	25
2,3,4,6,7,8-HxCDF	NCL - East	0-6 in	1	7	5.06	0.15	5	5	5.4
2,3,4,6,7,8-HxCDF	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
2,3,4,6,7,8-HxCDF	OID Lagoon	0-6 in	11	30	3.81	5.33	0.033	2.785	24
2,3,4,6,7,8-HxCDF	OID Lagoon	2 ft	8	21	16.90	44.67	0.041	0.202	169
2,3,4,6,7,8-HxCDF	OID Lagoon	2 to 6	2	10	1.25	3.60	0.027	0.14	11.5
2,3,4,6,7,8-HxCDF	Wetlands Beach	0-6 in	3	9	21.44	31.04	5	5	94
2,3,4,7,8-PeCDF	NCL - East	0-6 in	0	7	5.00	0.00	5	5	5
2,3,4,7,8-PeCDF	NCL - North	0-6 in	0	3	5.00	0.00	5	5	5
2,3,4,7,8-PeCDF	OID Lagoon	0-6 in	12	30	3.18	4.08	0.036	1.895	18
2,3,4,7,8-PeCDF	OID Lagoon	2 ft	8	21	12.43	32.18	0.041	0.23	120
2,3,4,7,8-PeCDF	OID Lagoon	2 to 6	1	10	0.90	2.50	0.041	0.08	8.02
2,3,4,7,8-PeCDF	Wetlands Beach	0-6 in	3	9	14.44	17.21	5	5	52
2,3,7,8-TCDD	NCL - East	0-6 in	0	7	1.00	0.00	1	1	1
2,3,7,8-TCDD	NCL - North	0-6 in	0	3	1.00	0.00	1	1	1
2,3,7,8-TCDD	OID Lagoon	0-6 in	8	30	0.45	0.38	0.053	0.261	1
2,3,7,8-TCDD	OID Lagoon	2 ft	9	21	0.51	0.64	0.058	0.266	2.43
2,3,7,8-TCDD	OID Lagoon	2 to 6	3	10	0.14	0.08	0.048	0.13	0.27
2,3,7,8-TCDD	Wetlands Beach	0-6 in	2	9	1.21	0.48	1	1	2.4
2,3,7,8-TCDF	NCL - East	0-6 in	2	7	1.31	0.54	1	1	2.2
2,3,7,8-TCDF	NCL - North	0-6 in	0	3	1.00	0.00	1	1	1
2,3,7,8-TCDF	OID Lagoon	0-6 in	16	30	1.25	1.51	0.11	1	7.4
2,3,7,8-TCDF	OID Lagoon	2 ft	13	21	9.89	26.07	0.084	0.648	97
2,3,7,8-TCDF	OID Lagoon	2 to 6	2	10	0.50	0.97	0.064	0.2055	3.23
2,3,7,8-TCDF	Wetlands Beach	0-6 in	3	9	4.90	6.94	1	1	20
Eff Conc - Birds	NCL - East	0-6 in	7	7	0.79	1.27	0.0012	0.1029	2.9838
Eff Conc - Birds	NCL - North	0-6 in	3	3	0.12	0.09	0.0363	0.1116	0.2154
Eff Conc - Birds	OID Lagoon	0-6 in	28	28	5.63	9.77	0.0012	0.8399725	41.893
Eff Conc - Birds	OID Lagoon	2 ft	19	19	36.55	88.73	0.000205	1.009198	314.4153
Eff Conc - Birds	OID Lagoon	2 to 6	8	8	2.47	6.51	0.004735	0.1332096	18.57054
Eff Conc - Birds	Wetlands Beach	0-6 in	8	8	27.47	45.73	0.002	0.0815	121.521
Eff Conc - Fish	NCL - East	0-6 in	7	7	0.19	0.28	0.0012	0.1029	0.78402
Eff Conc - Fish	NCL - North	0-6 in	3	3	0.12	0.09	0.0363	0.1116	0.2154
Eff Conc - Fish	OID Lagoon	0-6 in	28	28	3.51	6.40	0.0012	0.29784985	27.23074
Eff Conc - Fish	OID Lagoon	2 ft	19	19	18.71	44.33	0.000205	0.4579471	156
Eff Conc - Fish	OID Lagoon	2 to 6	8	8	1.52	3.89	0.0229	0.1701946	11.144363
Eff Conc - Fish	Wetlands Beach	0-6 in	8	8	16.93	29.12	0.002	0.0815	78.413
Eff Conc - Mammals	NCL - East	0-6 in	7	7	0.38	0.49	0.0036	0.2827	1.3214
Eff Conc - Mammals	NCL - North	0-6 in	3	3	0.38	0.24	0.1999	0.2888	0.6522
Eff Conc - Mammals	OID Lagoon	0-6 in	28	28	4.31	6.53	0.0036	0.59163	25.909
Eff Conc - Mammals	OID Lagoon	2 ft	19	19	18.60	41.24	0.000615	0.764774	144.3589
Eff Conc - Mammals	OID Lagoon	2 to 6	8	8	1.41	3.60	0.00947	0.1371438	10.30542
Eff Conc - Mammals	Wetlands Beach	0-6 in	8	8	15.46	26.52	0.006	0.157	72.053
OCDD	NCL - East	0-6 in	7	7	101.71	96.34	12	70	230
OCDD	NCL - North	0-6 in	3	3	260.00	112.69	190	200	390
OCDD	OID Lagoon	0-6 in	27	30	625.60	857.39	0.63	98.35	3020
OCDD	OID Lagoon	2 ft	16	21	1006.04	1766.85	0.081	58.5	5770
OCDD	OID Lagoon	2 to 6	2	10	43.35	127.35	0.06	0.17	405
OCDD	Wetlands Beach	0-6 in	8	9	266.89	459.80	10	54	1400
OCDF	NCL - East	0-6 in	4	7	18.71	8.69	10	19	28
OCDF	NCL - North	0-6 in	3	3	61.00	20.95	43	56	84
OCDF	OID Lagoon	0-6 in	19	30	47.54	59.03	0.15	10	199

TABLE 2-5

Summary Statistics for Dioxins/Furans in Sediments (ng/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
OCDF	OID Lagoon	2 ft	12	21	102.13	204.55	0.088	2.58	763
OCDF	OID Lagoon	2 to 6	3	10	7.32	21.82	0.16	0.266	69.4
OCDF	Wetlands Beach	0-6 in	4	9	118.89	207.81	10	10	610

Notes:

N = sample size

ng/kg = nanograms per kilogram

TABLE 2-6

Summary Statistics for Inorganic Analytes in Soils (mg/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
Aluminum	NCL - East	0-6 in	93	93	21619.25	31044.71	2150	10600	159000
Aluminum	NCL - East	2 ft	58	58	10014.31	3547.25	5290	9195	22900
Aluminum	NCL - North	0-6 in	45	45	10559.78	4569.28	5920	8320	27800
Aluminum	NCL - North	2 ft	24	24	12460.00	5542.10	6360	10400	25700
Aluminum	Wetlands Beach	0-6 in	95	95	25989.67	42068.10	679	5330	225000
Aluminum	Wetlands Beach	2 ft	70	70	3395.07	4991.21	965	1770	37400
Aluminum	Wetlands Beach	2 to 6	20	20	5474.50	4974.89	1430	2670	16100
Antimony	NCL - East	0-6 in	93	90	1.76	3.37	0.16	0.44	20.1
Antimony	NCL - East	2 ft	58	58	0.27	0.18	0.079	0.24	1.4
Antimony	NCL - North	0-6 in	45	30	0.50	0.42	0.15	0.39	2.2
Antimony	NCL - North	2 ft	24	8	0.55	0.34	0.11	0.495	1.9
Antimony	Wetlands Beach	0-6 in	95	85	2.31	3.74	0.065	0.55	23.2
Antimony	Wetlands Beach	2 ft	70	46	0.36	0.31	0.059	0.275	2.2
Antimony	Wetlands Beach	2 to 6	20	20	0.28	0.24	0.074	0.19	1.1
Arsenic	NCL - East	0-6 in	93	93	4.10	3.59	0.83	3.3	33.7
Arsenic	NCL - East	2 ft	58	58	3.92	1.48	1.8	3.4	9.4
Arsenic	NCL - North	0-6 in	45	45	3.12	1.29	0.89	2.7	7.2
Arsenic	NCL - North	2 ft	24	23	3.70	1.12	0.91	3.5	5.5
Arsenic	Wetlands Beach	0-6 in	95	95	2.66	2.43	0.73	1.6	13.6
Arsenic	Wetlands Beach	2 ft	70	69	1.61	0.94	0.47	1.3	5.8
Arsenic	Wetlands Beach	2 to 6	20	20	2.61	1.52	1.1	1.95	6.2
Barium	NCL - East	0-6 in	93	93	474.55	809.80	49.9	171	5040
Barium	NCL - East	2 ft	58	58	137.55	38.57	89.9	125	277
Barium	NCL - North	0-6 in	45	45	263.89	737.28	89.1	122	5060
Barium	NCL - North	2 ft	24	24	193.34	281.52	68.6	132	1500
Barium	Wetlands Beach	0-6 in	95	91	428.70	735.20	14.1	91.8	3810
Barium	Wetlands Beach	2 ft	70	40	49.34	78.93	10.4	24.35	578
Barium	Wetlands Beach	2 to 6	20	15	104.66	152.57	14.3	55.8	706
Beryllium	NCL - East	0-6 in	93	72	1.73	2.85	0.14	0.71	16.8
Beryllium	NCL - East	2 ft	58	34	0.50	0.19	0.25	0.45	1.1
Beryllium	NCL - North	0-6 in	45	28	1.06	2.71	0.29	0.57	18.7
Beryllium	NCL - North	2 ft	24	19	0.97	1.15	0.4	0.705	6.2
Beryllium	Wetlands Beach	0-6 in	95	64	2.04	3.66	0.07	0.52	19.9
Beryllium	Wetlands Beach	2 ft	70	40	0.20	0.26	0.06	0.13	2
Beryllium	Wetlands Beach	2 to 6	20	7	0.36	0.43	0.081	0.155	1.9
Cadmium	NCL - East	0-6 in	93	93	1.21	1.20	0.098	0.9	6.7
Cadmium	NCL - East	2 ft	58	58	0.88	0.39	0.34	0.78	2.1
Cadmium	NCL - North	0-6 in	45	45	0.99	0.60	0.2	0.76	3.7
Cadmium	NCL - North	2 ft	24	24	1.04	0.49	0.35	0.91	2.7
Cadmium	Wetlands Beach	0-6 in	95	86	1.07	1.72	0.049	0.38	11.3
Cadmium	Wetlands Beach	2 ft	70	52	0.30	0.37	0.029	0.21	2.4
Cadmium	Wetlands Beach	2 to 6	20	20	0.38	0.34	0.046	0.21	1.1
Calcium	NCL - East	0-6 in	93	93	9762.26	5531.20	2190	8620	32100
Calcium	NCL - East	2 ft	58	58	21364.83	11222.87	8050	18500	66900
Calcium	NCL - North	0-6 in	45	45	15072.44	23003.55	3240	6100	111000
Calcium	NCL - North	2 ft	24	24	25997.92	23589.48	7590	19450	116000
Calcium	Wetlands Beach	0-6 in	95	95	9420.00	11853.41	1620	4950	53600
Calcium	Wetlands Beach	2 ft	70	70	4773.71	4231.90	1040	3405	23300
Calcium	Wetlands Beach	2 to 6	20	20	9730.00	8607.07	2960	5850	37600
Chromium	NCL - East	0-6 in	93	93	42.31	61.20	6.2	19.5	342
Chromium	NCL - East	2 ft	58	58	17.37	8.00	8.8	14.45	51.2
Chromium	NCL - North	0-6 in	45	45	17.30	7.56	10.9	14.8	51.3
Chromium	NCL - North	2 ft	24	24	17.83	6.06	7.5	17.05	35.6
Chromium	Wetlands Beach	0-6 in	95	95	51.43	84.84	2.6	18.1	472
Chromium	Wetlands Beach	2 ft	70	70	8.43	8.37	2.1	5.55	58
Chromium	Wetlands Beach	2 to 6	20	20	10.94	7.67	2.7	7.1	27
Cobalt	NCL - East	0-6 in	93	49	6.41	2.27	1.4	6.1	13.7
Cobalt	NCL - East	2 ft	58	33	7.07	2.25	3.5	6.7	15.9
Cobalt	NCL - North	0-6 in	45	30	6.52	1.81	2.9	5.9	11.5

TABLE 2-6

Summary Statistics for Inorganic Analytes in Soils (mg/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
Cobalt	NCL - North	2 ft	24	20	7.73	2.18	4.5	7.05	13.5
Cobalt	Wetlands Beach	0-6 in	95	36	2.96	2.49	0.62	1.6	13.8
Cobalt	Wetlands Beach	2 ft	70	34	1.59	1.69	0.68	1	8.6
Cobalt	Wetlands Beach	2 to 6	20	8	3.21	3.16	1	1.3	10.2
Copper	NCL - East	0-6 in	93	93	356.21	785.59	15.9	61.3	3950
Copper	NCL - East	2 ft	58	58	23.38	26.74	8.1	15.35	160
Copper	NCL - North	0-6 in	45	45	36.38	49.91	12.9	17	270
Copper	NCL - North	2 ft	24	24	22.98	19.73	7.9	16.8	97.4
Copper	Wetlands Beach	0-6 in	95	88	568.04	1026.52	1.9	68	5480
Copper	Wetlands Beach	2 ft	70	65	28.76	93.83	1.4	7.85	772
Copper	Wetlands Beach	2 to 6	20	17	26.24	43.53	1.8	15.45	191
Iron	NCL - East	0-6 in	93	93	16704.84	4669.95	5370	16900	36400
Iron	NCL - East	2 ft	58	58	19446.55	5765.72	10700	18050	40000
Iron	NCL - North	0-6 in	45	45	18365.78	5154.09	9060	16400	34500
Iron	NCL - North	2 ft	24	24	21308.33	6663.72	10700	19550	40400
Iron	Wetlands Beach	0-6 in	95	95	7191.37	4170.01	2370	5790	22800
Iron	Wetlands Beach	2 ft	70	70	5938.29	5142.96	2570	4175	26200
Iron	Wetlands Beach	2 to 6	20	20	10562.50	9475.89	3310	5520	32700
Lead	NCL - East	0-6 in	93	93	63.49	95.70	7.3	23.2	616
Lead	NCL - East	2 ft	58	58	8.51	6.51	4	6.15	41.8
Lead	NCL - North	0-6 in	45	45	34.46	55.66	6.1	11.3	306
Lead	NCL - North	2 ft	24	24	13.83	12.71	3	7.4	58
Lead	Wetlands Beach	0-6 in	95	95	66.93	116.55	1.6	15.5	641
Lead	Wetlands Beach	2 ft	70	70	6.67	11.15	0.92	2.6	69.7
Lead	Wetlands Beach	2 to 6	20	20	5.60	5.11	1.3	3.8	21.5
Magnesium	NCL - East	0-6 in	93	93	11860.00	10271.23	1490	8300	55600
Magnesium	NCL - East	2 ft	58	58	7174.14	2186.08	3480	6560	14300
Magnesium	NCL - North	0-6 in	45	45	6341.11	3259.55	3480	4800	22800
Magnesium	NCL - North	2 ft	24	24	8153.75	3114.10	3440	7395	16500
Magnesium	Wetlands Beach	0-6 in	95	95	6212.20	7886.15	811	2100	35300
Magnesium	Wetlands Beach	2 ft	70	70	1970.43	2458.34	643	1025	11300
Magnesium	Wetlands Beach	2 to 6	20	20	3753.50	3300.37	1040	1680	9810
Manganese	NCL - East	0-6 in	93	93	408.41	361.01	62.5	295	2100
Manganese	NCL - East	2 ft	58	58	329.19	93.26	202	308	606
Manganese	NCL - North	0-6 in	45	45	267.77	145.96	90.8	249	986
Manganese	NCL - North	2 ft	24	24	367.79	138.22	129	343.5	670
Manganese	Wetlands Beach	0-6 in	95	95	319.31	398.53	42.5	127	1870
Manganese	Wetlands Beach	2 ft	70	70	90.59	108.58	28.5	49.05	626
Manganese	Wetlands Beach	2 to 6	20	20	209.73	247.43	44.5	82.2	1060
Mercury	NCL - East	0-6 in	93	23	0.07	0.05	0.011	0.057	0.18
Mercury	NCL - East	2 ft	58	9	0.09	0.06	0.013	0.105	0.23
Mercury	NCL - North	0-6 in	45	9	0.10	0.06	0.014	0.1	0.23
Mercury	NCL - North	2 ft	24	6	0.10	0.05	0.018	0.12	0.2
Mercury	Wetlands Beach	0-6 in	93	10	0.12	0.15	0.011	0.1	1.3
Mercury	Wetlands Beach	2 ft	69	7	0.13	0.13	0.011	0.12	1.1
Mercury	Wetlands Beach	2 to 6	20	5	0.10	0.04	0.016	0.12	0.14
Nickel	NCL - East	0-6 in	93	92	31.82	32.62	5	19.7	179
Nickel	NCL - East	2 ft	58	58	18.26	6.85	9.2	16.7	46.3
Nickel	NCL - North	0-6 in	45	45	18.86	6.89	10.1	15.9	42.9
Nickel	NCL - North	2 ft	24	24	20.96	6.31	9.1	19.9	33.3
Nickel	Wetlands Beach	0-6 in	95	82	30.87	43.55	2.4	10.3	204
Nickel	Wetlands Beach	2 ft	70	54	5.69	7.11	2.3	3.35	50.4
Nickel	Wetlands Beach	2 to 6	20	16	9.64	8.19	2.8	4.75	28.8
Potassium	NCL - East	0-6 in	93	93	3857.84	1341.37	770	3750	7300
Potassium	NCL - East	2 ft	58	58	5134.14	2696.78	2320	4290	19900
Potassium	NCL - North	0-6 in	45	45	3887.33	1015.28	1930	3450	6690
Potassium	NCL - North	2 ft	24	24	4135.83	1322.82	1920	3905	6800
Potassium	Wetlands Beach	0-6 in	95	77	956.55	1003.60	267	517	5210

TABLE 2-6

Summary Statistics for Inorganic Analytes in Soils (mg/kg, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum
Potassium	Wetlands Beach	2 ft	70	48	879.37	1446.72	238	441.5	7540
Potassium	Wetlands Beach	2 to 6	20	13	2105.55	2851.52	330	550	11300
Selenium	NCL - East	0-6 in	93	85	1.28	1.03	0.3	0.93	5.6
Selenium	NCL - East	2 ft	58	58	0.69	0.25	0.36	0.62	1.8
Selenium	NCL - North	0-6 in	45	33	1.66	2.36	0.17	0.8	15.2
Selenium	NCL - North	2 ft	24	15	1.24	1.38	0.064	0.615	6
Selenium	Wetlands Beach	0-6 in	92	60	1.19	1.48	0.033	0.69	8.1
Selenium	Wetlands Beach	2 ft	64	34	0.70	0.34	0.029	0.65	2.2
Selenium	Wetlands Beach	2 to 6	20	12	0.60	0.17	0.27	0.63	0.86
Silver	NCL - East	0-6 in	93	52	0.79	0.99	0.1	0.51	4.9
Silver	NCL - East	2 ft	58	7	0.61	0.18	0.13	0.63	1.2
Silver	NCL - North	0-6 in	45	9	0.69	1.17	0.22	0.51	8.3
Silver	NCL - North	2 ft	24	2	0.59	0.18	0.35	0.585	1.3
Silver	Wetlands Beach	0-6 in	95	47	0.90	1.00	0.12	0.5	6.5
Silver	Wetlands Beach	2 ft	70	27	0.58	0.42	0.13	0.575	3.4
Silver	Wetlands Beach	2 to 6	20	8	0.55	0.14	0.22	0.605	0.67
Sodium	NCL - East	0-6 in	93	92	5619.81	6935.54	152	2620	42700
Sodium	NCL - East	2 ft	58	58	2964.79	2283.52	977	1840	9610
Sodium	NCL - North	0-6 in	45	32	1398.78	1296.75	139	1070	5120
Sodium	NCL - North	2 ft	24	24	1832.92	837.11	797	1600	3700
Sodium	Wetlands Beach	0-6 in	95	84	1530.52	2910.91	69.2	414	22900
Sodium	Wetlands Beach	2 ft	70	61	695.94	1171.05	54.9	471	9180
Sodium	Wetlands Beach	2 to 6	20	20	1327.10	1126.27	397	880.5	4110
Thallium	NCL - East	0-6 in	93	84	0.20	0.14	0.04	0.18	0.99
Thallium	NCL - East	2 ft	58	58	0.23	0.08	0.1	0.2	0.49
Thallium	NCL - North	0-6 in	45	23	0.32	0.18	0.048	0.31	0.67
Thallium	NCL - North	2 ft	24	5	0.47	0.17	0.18	0.485	0.74
Thallium	Wetlands Beach	0-6 in	95	66	0.20	0.24	0.018	0.069	1.4
Thallium	Wetlands Beach	2 ft	70	52	0.17	0.21	0.016	0.0335	0.97
Thallium	Wetlands Beach	2 to 6	20	20	0.14	0.18	0.022	0.0415	0.67
Vanadium	NCL - East	0-6 in	93	93	34.68	16.15	12.8	31.3	125
Vanadium	NCL - East	2 ft	58	58	31.61	11.23	16.6	28.05	70.4
Vanadium	NCL - North	0-6 in	45	45	33.06	13.01	16.2	27.4	62.7
Vanadium	NCL - North	2 ft	24	24	34.60	10.20	11.2	32.95	56.4
Vanadium	Wetlands Beach	0-6 in	95	95	28.90	19.76	4.2	25.9	74.7
Vanadium	Wetlands Beach	2 ft	70	70	20.93	18.07	3.4	10.25	67.1
Vanadium	Wetlands Beach	2 to 6	20	20	17.49	14.43	4.9	9.2	49.3
Zinc	NCL - East	0-6 in	93	93	396.47	752.37	30.8	114	4570
Zinc	NCL - East	2 ft	58	58	60.44	40.92	24.7	50.05	311
Zinc	NCL - North	0-6 in	45	45	133.51	144.34	52	66.5	790
Zinc	NCL - North	2 ft	24	24	79.50	48.72	32.2	64.45	253
Zinc	Wetlands Beach	0-6 in	95	95	494.70	799.83	9.4	98.8	3800
Zinc	Wetlands Beach	2 ft	70	67	306.21	2267.29	6	17.9	19000
Zinc	Wetlands Beach	2 to 6	20	20	51.61	94.92	7.8	25.75	441

Notes:

mg/kg = milligrams per kilogram

N = sample size

TABLE 2-7

Summary Statistics for Detected Concentrations of Analytes in Biota

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Analyte	Taxa	BiotaType	Common Names	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Inorganics - mg/kg, wet weight											
Sediment	Aluminum	Arthropods	Benthic Invertebrates	Crayfish	5	83	48	28	71	152	152
Sediment	Aluminum	Arthropods	Benthic Invertebrates	Mixed insects	3	37	13	22	44	45	45
Sediment	Aluminum	Arthropods	Benthic Invertebrates	Waterboatmen	4	949	1416	45	358.5	3034	3034
Sediment	Aluminum	Arthropods	Benthic Invertebrates		12	360	858	22	63.5	634	3034
Sediment	Aluminum	Arthropods			12	360	858	22	63.5	634	3034
Sediment	Aluminum	Fish	Bottom Fish	Carp/goldfish	2	34	18	21	34	47	47
Sediment	Aluminum	Fish	Bottom Fish	Gobies	7	50	21	26	54	74	74
Sediment	Aluminum	Fish	Bottom Fish		9	46	21	21	47	74	74
Sediment	Aluminum	Fish			9	46	21	21	47	74	74
Soil	Aluminum	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	474	148	369	473.5	578	578
Soil	Aluminum	Arthropods	Terrestrial Invertebrates	Mixed insects	2	1746	1505	682	1746	2810	2810
Soil	Aluminum	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	688		688	688	688	688
Soil	Aluminum	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	982	1086	214	982	1750	1750
Soil	Aluminum	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	3110		3110	3110	3110	3110
Soil	Aluminum	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	1960		1960	1960	1960	1960
Soil	Aluminum	Arthropods	Terrestrial Invertebrates		9	1351	1089	214	688	3110	3110
Soil	Aluminum	Arthropods			9	1351	1089	214	688	3110	3110
Soil	Aluminum	Mollusc	Terrestrial Invertebrates	Snails	3	165	98	76	149	270	270
Soil	Aluminum	Mollusc	Terrestrial Invertebrates		3	165	98	76	149	270	270
Soil	Aluminum	Mollusc			3	165	98	76	149	270	270
Sediment	Barium	Arthropods	Benthic Invertebrates	Crayfish	5	11.4	7.4	4	9	23	23
Sediment	Barium	Arthropods	Benthic Invertebrates	Mixed insects	1	11.0		11	11	11	11
Sediment	Barium	Arthropods	Benthic Invertebrates	Waterboatmen	4	20.5	21.1	7	11.5	52	52
Sediment	Barium	Arthropods	Benthic Invertebrates		10	15.0	14.0	4	10.5	37.5	52
Sediment	Barium	Arthropods			10	15.0	14.0	4	10.5	37.5	52
Sediment	Barium	Fish	Bottom Fish	Carp/goldfish	1	7.0		7	7	7	7
Sediment	Barium	Fish	Bottom Fish	Gobies	3	3.0	1.0	2	3	4	4
Sediment	Barium	Fish	Bottom Fish		4	4.0	2.2	2	3.5	7	7
Sediment	Barium	Fish			4	4.0	2.2	2	3.5	7	7
Soil	Barium	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	17.5	0.7	17	17.5	18	18
Soil	Barium	Arthropods	Terrestrial Invertebrates	Mixed insects	2	81.5	54.4	43	81.5	120	120
Soil	Barium	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	30.0		30	30	30	30
Soil	Barium	Arthropods	Terrestrial Invertebrates	Spiders/beetles	1	50.0		50	50	50	50
Soil	Barium	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	72.0		72	72	72	72
Soil	Barium	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	28.0		28	28	28	28
Soil	Barium	Arthropods	Terrestrial Invertebrates		8	47.3	34.6	17	36.5	120	120
Soil	Barium	Arthropods			8	47.3	34.6	17	36.5	120	120
Soil	Barium	Mollusc	Terrestrial Invertebrates	Snails	3	26.7	15.8	13	23	44	44
Soil	Barium	Mollusc	Terrestrial Invertebrates		3	26.7	15.8	13	23	44	44
Soil	Barium	Mollusc			3	26.7	15.8	13	23	44	44

TABLE 2-7

Summary Statistics for Detected Concentrations of Analytes in Biota

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Analyte	Taxa	BiotaType	Common Names	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Sediment	Beryllium	Arthropods	Benthic Invertebrates	Waterboatmen	1	0.3		0.32	0.32	0.32	0.32
Sediment	Beryllium	Arthropods	Benthic Invertebrates		1	0.3		0.32	0.32	0.32	0.32
Sediment	Beryllium	Arthropods			1	0.3		0.32	0.32	0.32	0.32
Soil	Cadmium	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	1		1	1	1	1
Soil	Cadmium	Arthropods	Terrestrial Invertebrates		1	1		1	1	1	1
Soil	Cadmium	Arthropods			1	1		1	1	1	1
Soil	Cadmium	Mollusc	Terrestrial Invertebrates	Snails	3	1	0	1	1	1	1
Soil	Cadmium	Mollusc	Terrestrial Invertebrates		3	1	0	1	1	1	1
Soil	Cadmium	Mollusc			3	1	0	1	1	1	1
Sediment	Calcium	Arthropods	Benthic Invertebrates	Crayfish	5	37388	22342	21735	25300	73639	73639
Sediment	Calcium	Arthropods	Benthic Invertebrates	Dragonflies/damselflies	1	271		271	271	271	271
Sediment	Calcium	Arthropods	Benthic Invertebrates	Mixed insects	3	2511	3682	279	493	6760	6760
Sediment	Calcium	Arthropods	Benthic Invertebrates	Waterboatmen	4	1872	382	1473	1829.5	2354	2354
Sediment	Calcium	Arthropods	Benthic Invertebrates		13	15556	22175	271	2354	44431	73639
Sediment	Calcium	Arthropods			13	15556	22175	271	2354	44431	73639
Sediment	Calcium	Fish	Bottom Fish	Carp/goldfish	4	7488	3872	2320	8190	11250	11250
Sediment	Calcium	Fish	Bottom Fish	Gobies	13	7474	2195	4680	7100	9030	13200
Sediment	Calcium	Fish	Bottom Fish	Long-jawed mudsuckers	1	4483		4483	4483	4483	4483
Sediment	Calcium	Fish	Bottom Fish	Staghorn sculpin	1	8700		8700	8700	8700	8700
Sediment	Calcium	Fish	Bottom Fish		19	7384	2506	2320	7100	11250	13200
Sediment	Calcium	Fish	Water Column Fish	Topsmelt	10	6390	1389	3323	6725.5	7808.5	8032
Sediment	Calcium	Fish	Water Column Fish		10	6390	1389	3323	6725.5	7808.5	8032
Sediment	Calcium	Fish			29	7041	2211	2320	6940	9440	13200
Soil	Calcium	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	16083	3936	13300	16083	18866	18866
Soil	Calcium	Arthropods	Terrestrial Invertebrates	Mixed insects	2	31150	25951	12800	31150	49500	49500
Soil	Calcium	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	28400		28400	28400	28400	28400
Soil	Calcium	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	3580	3281	1260	3580	5900	5900
Soil	Calcium	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	27300		27300	27300	27300	27300
Soil	Calcium	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	5590		5590	5590	5590	5590
Soil	Calcium	Arthropods	Terrestrial Invertebrates		9	18102	15072	1260	13300	49500	49500
Soil	Calcium	Arthropods			9	18102	15072	1260	13300	49500	49500
Soil	Calcium	Mollusc	Terrestrial Invertebrates	Snails	3	4718	3128	2850	2975	8330	8330
Soil	Calcium	Mollusc	Terrestrial Invertebrates		3	4718	3128	2850	2975	8330	8330
Soil	Calcium	Mollusc			3	4718	3128	2850	2975	8330	8330
Sediment	Chromium	Arthropods	Benthic Invertebrates	Crayfish	1	1.0		1	1	1	1
Sediment	Chromium	Arthropods	Benthic Invertebrates	Waterboatmen	3	2.3	1.5	1	2	4	4
Sediment	Chromium	Arthropods	Benthic Invertebrates		4	2.0	1.4	1	1.5	4	4
Sediment	Chromium	Arthropods			4	2.0	1.4	1	1.5	4	4
Sediment	Chromium	Fish	Bottom Fish	Carp/goldfish	2	1.5	0.7	1	1.5	2	2
Sediment	Chromium	Fish	Bottom Fish	Gobies	4	1.5	0.6	1	1.5	2	2
Sediment	Chromium	Fish	Bottom Fish		6	1.5	0.5	1	1.5	2	2
Sediment	Chromium	Fish			6	1.5	0.5	1	1.5	2	2

TABLE 2-7

Summary Statistics for Detected Concentrations of Analytes in Biota

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Analyte	Taxa	BiotaType	Common Names	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Soil	Chromium	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	1.0	0.0	1	1	1	1
Soil	Chromium	Arthropods	Terrestrial Invertebrates	Mixed insects	2	6.5	6.4	2	6.5	11	11
Soil	Chromium	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	7.0		7	7	7	7
Soil	Chromium	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	4.0		4	4	4	4
Soil	Chromium	Arthropods	Terrestrial Invertebrates		6	4.3	4.0	1	3	11	11
Soil	Chromium	Arthropods			6	4.3	4.0	1	3	11	11
Sediment	Copper	Arthropods	Benthic Invertebrates	Crayfish	5	57.6	32.1	19	49	95	95
Sediment	Copper	Arthropods	Benthic Invertebrates	Dragonflies/damselflies	1	4.0		4	4	4	4
Sediment	Copper	Arthropods	Benthic Invertebrates	Mixed insects	3	11.3	6.4	4	14	16	16
Sediment	Copper	Arthropods	Benthic Invertebrates	Waterboatmen	4	24.3	18.8	12	16.5	52	52
Sediment	Copper	Arthropods	Benthic Invertebrates		13	32.5	30.1	4	19	86	95
Sediment	Copper	Arthropods			13	32.5	30.1	4	19	86	95
Sediment	Copper	Fish	Bottom Fish	Carp/goldfish	1	2.0		2	2	2	2
Sediment	Copper	Fish	Bottom Fish	Gobies	2	2.5	0.7	2	2.5	3	3
Sediment	Copper	Fish	Bottom Fish	Staghorn sculpin	1	2.0		2	2	2	2
Sediment	Copper	Fish	Bottom Fish		4	2.3	0.5	2	2	3	3
Sediment	Copper	Fish	Water Column Fish	Topsmelt	1	3.0		3	3	3	3
Sediment	Copper	Fish	Water Column Fish		1	3.0		3	3	3	3
Sediment	Copper	Fish			5	2.4	0.5	2	2	3	3
Soil	Copper	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	17.0	1.4	16	17	18	18
Soil	Copper	Arthropods	Terrestrial Invertebrates	Mixed insects	2	97.0	12.7	88	97	106	106
Soil	Copper	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	40.0		40	40	40	40
Soil	Copper	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	83.0	73.5	31	83	135	135
Soil	Copper	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	230.0		230	230	230	230
Soil	Copper	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	97.0		97	97	97	97
Soil	Copper	Arthropods	Terrestrial Invertebrates		9	84.6	69.2	16	88	230	230
Soil	Copper	Arthropods			9	84.6	69.2	16	88	230	230
Soil	Copper	Mollusc	Terrestrial Invertebrates	Snails	3	22.3	15.9	9	18	40	40
Soil	Copper	Mollusc	Terrestrial Invertebrates		3	22.3	15.9	9	18	40	40
Soil	Copper	Mollusc			3	22.3	15.9	9	18	40	40
Sediment	Iron	Arthropods	Benthic Invertebrates	Crayfish	5	78	39	32	65	132	132
Sediment	Iron	Arthropods	Benthic Invertebrates	Dragonflies/damselflies	1	27		27	27	27	27
Sediment	Iron	Arthropods	Benthic Invertebrates	Mixed insects	3	45	23	23	44	69	69
Sediment	Iron	Arthropods	Benthic Invertebrates	Waterboatmen	4	166	112	97	117.5	332	332
Sediment	Iron	Arthropods	Benthic Invertebrates		13	94	81	23	69	133	332
Sediment	Iron	Arthropods			13	94	81	23	69	133	332
Sediment	Iron	Fish	Bottom Fish	Carp/goldfish	4	45	25	23	38	79	79
Sediment	Iron	Fish	Bottom Fish	Gobies	13	44	19	17	41	68	74
Sediment	Iron	Fish	Bottom Fish	Long-jawed mudsuckers	1	24		24	24	24	24
Sediment	Iron	Fish	Bottom Fish	Staghorn sculpin	1	25		25	25	25	25
Sediment	Iron	Fish	Bottom Fish		19	42	20	17	34	74	79
Sediment	Iron	Fish	Water Column Fish	Topsmelt	10	33	16	21	27	59.5	75

TABLE 2-7

Summary Statistics for Detected Concentrations of Analytes in Biota

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Analyte	Taxa	BiotaType	Common Names	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Sediment	Iron	Fish	Water Column Fish		10	33	16	21	27	59.5	75
Sediment	Iron	Fish			29	39	19	17	29	74	79
Soil	Iron	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	903	32	880	902.5	925	925
Soil	Iron	Arthropods	Terrestrial Invertebrates	Mixed insects	2	864	547	477	863.5	1250	1250
Soil	Iron	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	1170		1170	1170	1170	1170
Soil	Iron	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	389	366	130	388.5	647	647
Soil	Iron	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	1040		1040	1040	1040	1040
Soil	Iron	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	336		336	336	336	336
Soil	Iron	Arthropods	Terrestrial Invertebrates		9	762	387	130	880	1250	1250
Soil	Iron	Arthropods			9	762	387	130	880	1250	1250
Soil	Iron	Mollusc	Terrestrial Invertebrates	Snails	3	343	183	192	290	546	546
Soil	Iron	Mollusc	Terrestrial Invertebrates		3	343	183	192	290	546	546
Soil	Iron	Mollusc			3	343	183	192	290	546	546
Sediment	Lead	Arthropods	Benthic Invertebrates	Waterboatmen	3	2.3	1.5	1	2	4	4
Sediment	Lead	Arthropods	Benthic Invertebrates		3	2.3	1.5	1	2	4	4
Sediment	Lead	Arthropods			3	2.3	1.5	1	2	4	4
Soil	Lead	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	2.0	0.0	2	2	2	2
Soil	Lead	Arthropods	Terrestrial Invertebrates	Mixed insects	2	4.0	2.8	2	4	6	6
Soil	Lead	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	3.0		3	3	3	3
Soil	Lead	Arthropods	Terrestrial Invertebrates	Spiders/beetles	1	5.0		5	5	5	5
Soil	Lead	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	9.0		9	9	9	9
Soil	Lead	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	6.0		6	6	6	6
Soil	Lead	Arthropods	Terrestrial Invertebrates		8	4.4	2.6	2	4	9	9
Soil	Lead	Arthropods			8	4.4	2.6	2	4	9	9
Soil	Lead	Mollusc	Terrestrial Invertebrates	Snails	1	1		1	1	1	1
Soil	Lead	Mollusc	Terrestrial Invertebrates		1	1		1	1	1	1
Soil	Lead	Mollusc			1	1.0		1	1	1	1
Sediment	Magnesium	Arthropods	Benthic Invertebrates	Crayfish	5	1258	817	638	919	2670	2670
Sediment	Magnesium	Arthropods	Benthic Invertebrates	Dragonflies/damselflies	1	169		169	169	169	169
Sediment	Magnesium	Arthropods	Benthic Invertebrates	Mixed insects	3	260	92	180	240	361	361
Sediment	Magnesium	Arthropods	Benthic Invertebrates	Waterboatmen	4	515	360	231	394.5	1040	1040
Sediment	Magnesium	Arthropods	Benthic Invertebrates		13	715	685	169	441	1223	2670
Sediment	Magnesium	Arthropods			13	715	685	169	441	1223	2670
Sediment	Magnesium	Fish	Bottom Fish	Carp/goldfish	4	337	150	123	385.5	455	455
Sediment	Magnesium	Fish	Bottom Fish	Gobies	13	346	66	272	342	398	524
Sediment	Magnesium	Fish	Bottom Fish	Long-jawed mudsuckers	1	197		197	197	197	197
Sediment	Magnesium	Fish	Bottom Fish	Staghorn sculpin	1	350		350	350	350	350
Sediment	Magnesium	Fish	Bottom Fish		19	337	88	123	349	455	524
Sediment	Magnesium	Fish	Water Column Fish	Topsmelt	10	323	50	220	326	384	419
Sediment	Magnesium	Fish	Water Column Fish		10	323	50	220	326	384	419
Sediment	Magnesium	Fish			29	332	77	123	338	422	524
Soil	Magnesium	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	1188	127	1098	1187.5	1277	1277

TABLE 2-7

Summary Statistics for Detected Concentrations of Analytes in Biota

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Analyte	Taxa	BiotaType	Common Names	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Soil	Magnesium	Arthropods	Terrestrial Invertebrates	Mixed insects	2	1570	438	1260	1570	1880	1880
Soil	Magnesium	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	1390		1390	1390	1390	1390
Soil	Magnesium	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	1049	525	677	1048.5	1420	1420
Soil	Magnesium	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	1790		1790	1790	1790	1790
Soil	Magnesium	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	973		973	973	973	973
Soil	Magnesium	Arthropods	Terrestrial Invertebrates		9	1307	377	677	1277	1880	1880
Soil	Magnesium	Arthropods			9	1307	377	677	1277	1880	1880
Soil	Magnesium	Mollusc	Terrestrial Invertebrates	Snails	3	835	69	773	823	909	909
Soil	Magnesium	Mollusc	Terrestrial Invertebrates		3	835	69	773	823	909	909
Soil	Magnesium	Mollusc			3	835	69	773	823	909	909
Sediment	Manganese	Arthropods	Benthic Invertebrates	Crayfish	5	152.0	104.3	54	121	310	310
Sediment	Manganese	Arthropods	Benthic Invertebrates	Dragonflies/damselflies	1	21.0		21	21	21	21
Sediment	Manganese	Arthropods	Benthic Invertebrates	Mixed insects	3	29.3	14.6	14	31	43	43
Sediment	Manganese	Arthropods	Benthic Invertebrates	Waterboatmen	4	34.5	29.5	11	25.5	76	76
Sediment	Manganese	Arthropods	Benthic Invertebrates		13	77.5	87.5	11	43	199	310
Sediment	Manganese	Arthropods			13	77.5	87.5	11	43	199	310
Sediment	Manganese	Fish	Bottom Fish	Carp/goldfish	4	8.8	2.5	6	8.5	12	12
Sediment	Manganese	Fish	Bottom Fish	Gobies	13	10.5	6.3	6	9	13	30
Sediment	Manganese	Fish	Bottom Fish	Long-jawed mudsuckers	1	3.0		3	3	3	3
Sediment	Manganese	Fish	Bottom Fish	Staghorn sculpin	1	4.0		4	4	4	4
Sediment	Manganese	Fish	Bottom Fish		19	9.4	5.7	3	8	13	30
Sediment	Manganese	Fish	Water Column Fish	Topsmelt	10	7.0	1.2	5	7	8.5	9
Sediment	Manganese	Fish	Water Column Fish		10	7.0	1.2	5	7	8.5	9
Sediment	Manganese	Fish			29	8.6	4.8	3	8	13	30
Soil	Manganese	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	20.0	1.4	19	20	21	21
Soil	Manganese	Arthropods	Terrestrial Invertebrates	Mixed insects	2	36.0	15.6	25	36	47	47
Soil	Manganese	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	22.0		22	22	22	22
Soil	Manganese	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	29.5	14.8	19	29.5	40	40
Soil	Manganese	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	60.0		60	60	60	60
Soil	Manganese	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	30.0		30	30	30	30
Soil	Manganese	Arthropods	Terrestrial Invertebrates		9	31.4	14.5	19	25	60	60
Soil	Manganese	Arthropods			9	31.4	14.5	19	25	60	60
Soil	Manganese	Mollusc	Terrestrial Invertebrates	Snails	3	13.3	4.5	9	13	18	18
Soil	Manganese	Mollusc	Terrestrial Invertebrates		3	13.3	4.5	9	13	18	18
Soil	Manganese	Mollusc			3	13.3	4.5	9	13	18	18
Sediment	Mercury	Arthropods	Benthic Invertebrates	Crayfish	1	0.008		0.008	0.008	0.008	0.008
Sediment	Mercury	Arthropods	Benthic Invertebrates	Mixed insects	1	0.009		0.009	0.009	0.009	0.009
Sediment	Mercury	Arthropods	Benthic Invertebrates		2	0.009	0.001	0.008	0.0085	0.009	0.009
Sediment	Mercury	Arthropods			2	0.009	0.001	0.008	0.0085	0.009	0.009
Sediment	Mercury	Fish	Bottom Fish	Carp/goldfish	1	0.003		0.003	0.003	0.003	0.003
Sediment	Mercury	Fish	Bottom Fish	Gobies	4	0.004	0.001	0.003	0.004	0.005	0.005
Sediment	Mercury	Fish	Bottom Fish	Long-jawed mudsuckers	1	0.004		0.004	0.004	0.004	0.004

TABLE 2-7

Summary Statistics for Detected Concentrations of Analytes in Biota

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Analyte	Taxa	BiotaType	Common Names	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Sediment	Mercury	Fish	Bottom Fish	Staghorn sculpin	1	0.002		0.002	0.002	0.002	0.002
Sediment	Mercury	Fish	Bottom Fish		7	0.004	0.001	0.002	0.004	0.005	0.005
Sediment	Mercury	Fish	Water Column Fish	Topsmelt	9	0.003	0.001	0.003	0.003	0.004	0.004
Sediment	Mercury	Fish	Water Column Fish		9	0.003	0.001	0.003	0.003	0.004	0.004
Sediment	Mercury	Fish			16	0.004	0.001	0.002	0.0035	0.004	0.005
Soil	Mercury	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	0.018	0.001	0.017	0.0175	0.018	0.018
Soil	Mercury	Arthropods	Terrestrial Invertebrates	Mixed insects	2	0.032	0.023	0.015	0.0315	0.048	0.048
Soil	Mercury	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	0.017		0.017	0.017	0.017	0.017
Soil	Mercury	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	0.034	0.027	0.015	0.034	0.053	0.053
Soil	Mercury	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	0.030		0.03	0.03	0.03	0.03
Soil	Mercury	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	0.030		0.03	0.03	0.03	0.03
Soil	Mercury	Arthropods	Terrestrial Invertebrates		9	0.027	0.015	0.015	0.018	0.053	0.053
Soil	Mercury	Arthropods			9	0.027	0.015	0.015	0.018	0.053	0.053
Soil	Mercury	Mollusc	Terrestrial Invertebrates	Snails	2	0.013	0.007	0.008	0.013	0.018	0.018
Soil	Mercury	Mollusc	Terrestrial Invertebrates		2	0.013	0.007	0.008	0.013	0.018	0.018
Soil	Mercury	Mollusc			2	0.013	0.007	0.008	0.013	0.018	0.018
Sediment	Nickel	Arthropods	Benthic Invertebrates	Waterboatmen	1	3		3	3	3	3
Sediment	Nickel	Arthropods	Benthic Invertebrates		1	3		3	3	3	3
Sediment	Nickel	Arthropods			1	3		3	3	3	3
Soil	Nickel	Arthropods	Terrestrial Invertebrates	Mixed insects	1	6		6	6	6	6
Soil	Nickel	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	4		4	4	4	4
Soil	Nickel	Arthropods	Terrestrial Invertebrates		2	5	1.4	4	5	6	6
Soil	Nickel	Arthropods			2	5	1.4	4	5	6	6
Sediment	Potassium	Arthropods	Benthic Invertebrates	Crayfish	5	2109.40	419.16	1520	2205	2552	2552
Sediment	Potassium	Arthropods	Benthic Invertebrates	Dragonflies/damselflies	1	1320		1320	1320	1320	1320
Sediment	Potassium	Arthropods	Benthic Invertebrates	Mixed insects	3	1390	512	1070	1120	1980	1980
Sediment	Potassium	Arthropods	Benthic Invertebrates	Waterboatmen	4	1137	230	903	1121	1404	1404
Sediment	Potassium	Arthropods	Benthic Invertebrates		13	1584	559	903	1404	2408	2552
Sediment	Potassium	Arthropods			13	1584	559	903	1404	2408	2552
Sediment	Potassium	Fish	Bottom Fish	Carp/goldfish	4	2128	1016	645	2460	2948	2948
Sediment	Potassium	Fish	Bottom Fish	Gobies	13	2540	564	1650	2660	3010	3770
Sediment	Potassium	Fish	Bottom Fish	Long-jawed mudsuckers	1	2362		2362	2362	2362	2362
Sediment	Potassium	Fish	Bottom Fish	Staghorn sculpin	1	2190		2190	2190	2190	2190
Sediment	Potassium	Fish	Bottom Fish		19	2426	646	645	2420	3010	3770
Sediment	Potassium	Fish	Water Column Fish	Topsmelt	10	1629	543	722	1808	2205	2342
Sediment	Potassium	Fish	Water Column Fish		10	1629	543	722	1808	2205	2342
Sediment	Potassium	Fish			29	2151	715	645	2190	2948	3770
Soil	Potassium	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	1434	23	1418	1434	1450	1450
Soil	Potassium	Arthropods	Terrestrial Invertebrates	Mixed insects	2	2790	933	2130	2790	3450	3450
Soil	Potassium	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	2700		2700	2700	2700	2700
Soil	Potassium	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	3225	672	2750	3225	3700	3700
Soil	Potassium	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	2070		2070	2070	2070	2070

TABLE 2-7

Summary Statistics for Detected Concentrations of Analytes in Biota

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Analyte	Taxa	BiotaType	Common Names	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Soil	Potassium	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	2450		2450	2450	2450	2450
Soil	Potassium	Arthropods	Terrestrial Invertebrates		9	2458	793	1418	2450	3700	3700
Soil	Potassium	Arthropods			9	2458	793	1418	2450	3700	3700
Soil	Potassium	Mollusc	Terrestrial Invertebrates	Snails	3	1044	161	889	1033	1210	1210
Soil	Potassium	Mollusc	Terrestrial Invertebrates		3	1044	161	889	1033	1210	1210
Soil	Potassium	Mollusc			3	1044	161	889	1033	1210	1210
Sediment	Selenium	Arthropods	Benthic Invertebrates	Crayfish	3	1.3	0.6	1	1	2	2
Sediment	Selenium	Arthropods	Benthic Invertebrates	Mixed insects	1	2.0		2	2	2	2
Sediment	Selenium	Arthropods	Benthic Invertebrates		4	1.5	0.6	1	1.5	2	2
Sediment	Selenium	Arthropods			4	1.5	0.6	1	1.5	2	2
Sediment	Selenium	Fish	Bottom Fish	Carp/goldfish	3	2.0	0.0	2	2	2	2
Sediment	Selenium	Fish	Bottom Fish	Gobies	11	1.5	0.5	1	1	2	2
Sediment	Selenium	Fish	Bottom Fish	Staghorn sculpin	1	1.0		1	1	1	1
Sediment	Selenium	Fish	Bottom Fish		15	1.5	0.5	1	2	2	2
Sediment	Selenium	Fish	Water Column Fish	Topsmelt	6	1.2	0.4	1	1	2	2
Sediment	Selenium	Fish	Water Column Fish		6	1.2	0.4	1	1	2	2
Sediment	Selenium	Fish			21	1.4	0.5	1	1	2	2
Soil	Selenium	Arthropods	Terrestrial Invertebrates	Mixed insects	1	1.0		1	1	1	1
Soil	Selenium	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	2.0		2	2	2	2
Soil	Selenium	Arthropods	Terrestrial Invertebrates		2	1.5	0.7	1	1.5	2	2
Soil	Selenium	Arthropods			2	1.5	0.7	1	1.5	2	2
Sediment	Sodium	Arthropods	Benthic Invertebrates	Crayfish	5	2035	481	1280	2184	2456	2456
Sediment	Sodium	Arthropods	Benthic Invertebrates	Dragonflies/damselflies	1	979		979	979	979	979
Sediment	Sodium	Arthropods	Benthic Invertebrates	Mixed insects	3	985	300	790	835	1330	1330
Sediment	Sodium	Arthropods	Benthic Invertebrates	Waterboatmen	4	782	323	511	687	1244	1244
Sediment	Sodium	Arthropods	Benthic Invertebrates		13	1326	682	511	1244	2391	2456
Sediment	Sodium	Arthropods			13	1326	682	511	1244	2391	2456
Sediment	Sodium	Fish	Bottom Fish	Carp/goldfish	4	747	351	224	897.5	970	970
Sediment	Sodium	Fish	Bottom Fish	Gobies	13	789	143	539	773	947	1090
Sediment	Sodium	Fish	Bottom Fish	Long-jawed mudsuckers	1	969		969	969	969	969
Sediment	Sodium	Fish	Bottom Fish	Staghorn sculpin	1	789		789	789	789	789
Sediment	Sodium	Fish	Bottom Fish		19	790	191	224	803	970	1090
Sediment	Sodium	Fish	Water Column Fish	Topsmelt	10	591	113	387	615.5	709	720
Sediment	Sodium	Fish	Water Column Fish		10	591	113	387	615.5	709	720
Sediment	Sodium	Fish			29	721	192	224	720	969	1090
Soil	Sodium	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	2878	357	2625	2877.5	3130	3130
Soil	Sodium	Arthropods	Terrestrial Invertebrates	Mixed insects	2	2690	707	2190	2690	3190	3190
Soil	Sodium	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	1670		1670	1670	1670	1670
Soil	Sodium	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	1445	332	1210	1445	1680	1680
Soil	Sodium	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	2930		2930	2930	2930	2930
Soil	Sodium	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	1380		1380	1380	1380	1380
Soil	Sodium	Arthropods	Terrestrial Invertebrates		9	2223	771	1210	2190	3190	3190

TABLE 2-7

Summary Statistics for Detected Concentrations of Analytes in Biota

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Analyte	Taxa	BiotaType	Common Names	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Soil	Sodium	Arthropods			9	2223	771	1210	2190	3190	3190
Soil	Sodium	Mollusc	Terrestrial Invertebrates	Snails	3	1133	289	808	1230	1360	1360
Soil	Sodium	Mollusc	Terrestrial Invertebrates		3	1133	289	808	1230	1360	1360
Soil	Sodium	Mollusc			3	1133	289	808	1230	1360	1360
Sediment	Vanadium	Arthropods	Benthic Invertebrates	Waterboatmen	1	1		1	1	1	1
Sediment	Vanadium	Arthropods	Benthic Invertebrates		1	1		1	1	1	1
Sediment	Vanadium	Arthropods			1	1		1	1	1	1
Soil	Vanadium	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	2	0.7	1	1.5	2	2
Soil	Vanadium	Arthropods	Terrestrial Invertebrates	Mixed insects	2	3	0.7	2	2.5	3	3
Soil	Vanadium	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	2		2	2	2	2
Soil	Vanadium	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	2		2	2	2	2
Soil	Vanadium	Arthropods	Terrestrial Invertebrates		6	2	0.6	1	2	3	3
Soil	Vanadium	Arthropods			6	2	0.6	1	2	3	3
Soil	Vanadium	Mollusc	Terrestrial Invertebrates	Snails	1	1		1	1	1	1
Soil	Vanadium	Mollusc	Terrestrial Invertebrates		1	1		1	1	1	1
Soil	Vanadium	Mollusc			1	1		1	1	1	1
Sediment	Zinc	Arthropods	Benthic Invertebrates	Crayfish	5	27.8	13.7	14	22	49	49
Sediment	Zinc	Arthropods	Benthic Invertebrates	Dragonflies/damselflies	1	14.0		14	14	14	14
Sediment	Zinc	Arthropods	Benthic Invertebrates	Mixed insects	3	33.3	16.5	15	38	47	47
Sediment	Zinc	Arthropods	Benthic Invertebrates	Waterboatmen	4	54.8	18.0	36	55	73	73
Sediment	Zinc	Arthropods	Benthic Invertebrates		13	36.3	19.4	14	36	67	73
Sediment	Zinc	Arthropods			13	36.3	19.4	14	36	67	73
Sediment	Zinc	Fish	Bottom Fish	Carp/goldfish	4	53.8	26.9	17	58.5	81	81
Sediment	Zinc	Fish	Bottom Fish	Gobies	13	26.7	5.3	20	26	34	34
Sediment	Zinc	Fish	Bottom Fish	Long-jawed mudsuckers	1	25.0		25	25	25	25
Sediment	Zinc	Fish	Bottom Fish	Staghorn sculpin	1	17.0		17	17	17	17
Sediment	Zinc	Fish	Bottom Fish		19	31.8	16.7	17	26	63	81
Sediment	Zinc	Fish	Water Column Fish	Topsmelt	10	26.2	6.4	16	26.5	34.5	41
Sediment	Zinc	Fish	Water Column Fish		10	26.2	6.4	16	26.5	34.5	41
Sediment	Zinc	Fish			29	29.9	14.2	16	26	54	81
Soil	Zinc	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	26.0	2.8	24	26	28	28
Soil	Zinc	Arthropods	Terrestrial Invertebrates	Mixed insects	2	84.5	0.7	84	84.5	85	85
Soil	Zinc	Arthropods	Terrestrial Invertebrates	Sow bugs/mixed insects	1	52.0		52	52	52	52
Soil	Zinc	Arthropods	Terrestrial Invertebrates	Spiders/beetles	2	94.0	15.6	83	94	105	105
Soil	Zinc	Arthropods	Terrestrial Invertebrates	Spiders/beetles/beach hoppers	1	115.0		115	115	115	115
Soil	Zinc	Arthropods	Terrestrial Invertebrates	Spiders/cricket	1	96.0		96	96	96	96
Soil	Zinc	Arthropods	Terrestrial Invertebrates		9	74.7	32.6	24	84	115	115
Soil	Zinc	Arthropods			9	74.7	32.6	24	84	115	115
Soil	Zinc	Mollusc	Terrestrial Invertebrates	Snails	3	30.3	1.5	29	30	32	32
Soil	Zinc	Mollusc	Terrestrial Invertebrates		3	30.3	1.5	29	30	32	32
Soil	Zinc	Mollusc			3	30.3	1.5	29	30	32	32

TABLE 2-7

Summary Statistics for Detected Concentrations of Analytes in Biota

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Analyte	Taxa	BiotaType	Common Names	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Dioxins/Furans - ng/kg, wet weight											
Sediment	OCDD	Arthropods	Benthic Invertebrates	Waterboatmen	2	14.2	12.5	5.3	14.2	21.2	23
Sediment	Total TCDD	Arthropods	Benthic Invertebrates	Waterboatmen	3	2.2	1.1	1.1	2.3	3.1	3.3
Sediment	Total TCDF	Arthropods	Benthic Invertebrates	Waterboatmen	3	12.7	14.2	3.3	5.8	24.4	29
Soil	1,2,3,4,6,7,8-HpCDD		Terrestrial Invertebrates	Snails	1			11	11	11	11
Soil	OCDD	Arthropods	Terrestrial Invertebrates	Beach hoppers, sow bugs, beetles	2	65.5	77.1	11	65.5	109	120
Soil	Total HpCDD		Terrestrial Invertebrates	Snails	1			18	18	18	18

Notes:

mg/kg = milligrams per kilogram

ng/kg = nanograms per kilogram

N = sample size

P90 = 90th percentile

TABLE 2-8

Summary Statistics and Results of Rank ANOVA for Responses of *Hyalella azteca* Exposed to Sediment

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Sample ID	Area	Bioassay Response	N	Mean	Standard Deviation	Minimum	Median	Maximum	Results of Rank ANOVA*
Lab Control 1	Lab Control	42-day Survival (percent)	8	92.50	8.86	80	95	100	AB
Lab Control 2	Lab Control	42-day Survival (percent)	8	90.00	10.69	70	90	100	AB
DSA-001	WMU Ditch	42-day Survival (percent)	8	86.25	9.16	70	90	100	ABC
DSA-003	WMU Ditch	42-day Survival (percent)	8	95.00	7.56	80	100	100	A
DSA-006	WMU Ditch	42-day Survival (percent)	8	88.75	8.35	70	90	100	ABC
LGF-001	NE Lagoon Finger	42-day Survival (percent)	8	92.50	7.07	80	90	100	AB
LGF-003	NE Lagoon Finger	42-day Survival (percent)	8	78.75	16.42	50	80	100	BCD
LGF-007	NW Lagoon Finger	42-day Survival (percent)	8	67.50	12.82	50	65	90	DEF
LGF-008	NW Lagoon Finger	42-day Survival (percent)	8	56.25	21.34	30	60	90	DEFG
LGF-009	NW Lagoon Finger	42-day Survival (percent)	8	10.00	10.69	0	10	30	H
LGF-010	SE Lagoon Finger	42-day Survival (percent)	8	46.25	22.00	0	50	80	FGH
LGF-012	SE Lagoon Finger	42-day Survival (percent)	8	55.00	16.04	30	55	80	EFG
LGF-112	SE Lagoon Finger	42-day Survival (percent)	8	72.50	16.69	50	80	90	CDE
LGM-001	Lagoon Main	42-day Survival (percent)	8	63.75	15.98	40	70	90	DEF
LGM-003	Lagoon Main	42-day Survival (percent)	8	70.00	10.69	50	70	80	DEF
NEL-007	NCL East	42-day Survival (percent)	8	26.25	14.08	10	25	50	GH
NEL-009	NCL East	42-day Survival (percent)	8	78.75	16.42	50	80	100	BCD
NEL-021	NCL East	42-day Survival (percent)	8	77.50	17.53	40	85	90	BCD
Lab Control 1	Lab Control	42-Day Growth (mg/animal)	8	0.27	0.06	0.16	0.27	0.37	B
Lab Control 2	Lab Control	42-Day Growth (mg/animal)	8	0.29	0.03	0.24	0.29	0.33	AB
DSA-001	WMU Ditch	42-Day Growth (mg/animal)	8	0.34	0.04	0.27	0.345	0.37	AB
DSA-003	WMU Ditch	42-Day Growth (mg/animal)	8	0.24	0.11	0.12	0.21	0.43	B
DSA-006	WMU Ditch	42-Day Growth (mg/animal)	8	0.27	0.06	0.18	0.27	0.37	B
LGF-001	NE Lagoon Finger	42-Day Growth (mg/animal)	8	0.31	0.04	0.25	0.31	0.36	AB
LGF-003	NE Lagoon Finger	42-Day Growth (mg/animal)	8	0.31	0.06	0.25	0.3	0.43	AB
LGF-007	NW Lagoon Finger	42-Day Growth (mg/animal)	8	0.36	0.08	0.29	0.325	0.47	AB
LGF-008	NW Lagoon Finger	42-Day Growth (mg/animal)	8	0.48	0.29	0.13	0.45	0.93	AB
LGF-009	NW Lagoon Finger	42-Day Growth (mg/animal)	5	0.42	0.07	0.33	0.45	0.48	A
LGF-010	SE Lagoon Finger	42-Day Growth (mg/animal)	8	0.34	0.07	0.24	0.32	0.47	AB
LGF-012	SE Lagoon Finger	42-Day Growth (mg/animal)	8	0.46	0.11	0.3	0.455	0.68	A
LGF-112	SE Lagoon Finger	42-Day Growth (mg/animal)	8	0.41	0.15	0.17	0.395	0.68	AB
LGM-001	Lagoon Main	42-Day Growth (mg/animal)	8	0.49	0.20	0.17	0.45	0.87	A
LGM-003	Lagoon Main	42-Day Growth (mg/animal)	8	0.39	0.06	0.29	0.38	0.47	AB
NEL-007	NCL East	42-Day Growth (mg/animal)	8	0.32	0.16	0.04	0.35	0.52	AB
NEL-009	NCL East	42-Day Growth (mg/animal)	8	0.33	0.13	0.16	0.285	0.55	AB
NEL-021	NCL East	42-Day Growth (mg/animal)	8	0.32	0.16	0.18	0.29	0.68	AB
Lab Control 1	Lab Control	Reproduction (young/female)	8	3.52	1.39	1.625	3.63	5.5	AB
Lab Control 2	Lab Control	Reproduction (young/female)	8	5.50	2.38	2.75	5.46	8.75	A

TABLE 2-8

Summary Statistics and Results of Rank ANOVA for Responses of *Hyalella azteca* Exposed to Sediment

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Sample ID	Area	Bioassay Response	N	Mean	Standard Deviation	Minimum	Median	Maximum	Results of Rank ANOVA*
DSA-001	WMU Ditch	Reproduction (young/female)	8	4.59	2.33	3	3.52	9.75	A
DSA-003	WMU Ditch	Reproduction (young/female)	8	5.88	2.16	2.625	6	8.4	A
DSA-006	WMU Ditch	Reproduction (young/female)	8	2.91	1.71	1	2.7	6.43	AB
LGF-001	NE Lagoon Finger	Reproduction (young/female)	8	3.44	1.11	1.67	4	4.4	AB
LGF-003	NE Lagoon Finger	Reproduction (young/female)	8	2.78	0.95	1.4	3.08	4	AB
LGF-007	NW Lagoon Finger	Reproduction (young/female)	8	4.94	2.75	1.33	5.25	9	A
LGF-008	NW Lagoon Finger	Reproduction (young/female)	8	5.56	4.46	0.25	4.625	14	A
LGF-009	NW Lagoon Finger	Reproduction (young/female)	8	0.00	0.00	0	0	0	C
LGF-010	SE Lagoon Finger	Reproduction (young/female)	8	2.53	2.60	0	1.54	6.33	AB
LGF-012	SE Lagoon Finger	Reproduction (young/female)	8	1.02	1.10	0	0.67	2.5	BC
LGF-112	SE Lagoon Finger	Reproduction (young/female)	8	6.89	4.23	0.67	6.01	14	A
LGM-001	Lagoon Main	Reproduction (young/female)	8	4.11	2.75	0	5.47	6.5	A
LGM-003	Lagoon Main	Reproduction (young/female)	8	4.45	2.50	0	5	8.33	A
NEL-007	NCL East	Reproduction (young/female)	8	0.00	0.00	0	0	0	C
NEL-009	NCL East	Reproduction (young/female)	8	5.61	2.95	2.67	4.31	10.5	A
NEL-021	NCL East	Reproduction (young/female)	8	4.94	3.94	0.5	4.875	12	A

Notes:

*Samples with the same letter do not differ significantly from each other.

Shading indicates samples that were statistically significantly reduced relative to controls.

TABLE 2-9

Site-Specific Sediment LOECs (mg/kg) for the Halaco Superfund Site[1]

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	LOEC
Aluminum	159000
Antimony	11.4
Barium	2480
Beryllium	10.3
Cadmium	5.8
Chromium	342
Cobalt	11
Copper	3190
Lead	274
Magnesium	42200
Manganese	2100
Nickel	158
Silver	4.9
Vanadium	125
Zinc	2560

Notes:

LOEC = lowest observed effect concentration

PEC = probable effects concentration

[1] LOECs represent concentration in sample NEL-007 that displayed significantly reduced survival and reproduction relative to controls. All concentrations were maximum for any bioassay sample. Many also exceeded PEC values.

TABLE 2-10

Summary of Biota Samples Collected for the Site-Specific Bioaccumulation Study

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Media	Taxa	BiotaType	Taxa2	Number of Samples
Sediment	Arthropods	Benthic Invertebrates	Crayfish	5
Sediment	Arthropods	Benthic Invertebrates	Dragonflies/damselflies	1
Sediment	Arthropods	Benthic Invertebrates	Mixed insects	3
Sediment	Arthropods	Benthic Invertebrates	Waterboatmen	4
Sediment	Arthropods	Benthic Invertebrates		13
Sediment	Fish	Bottom Fish	Carp/goldfish	4
Sediment	Fish	Bottom Fish	Gobies	13
Sediment	Fish	Bottom Fish	Long-jawed mudsuckers	1
Sediment	Fish	Bottom Fish	Staghorn sculpin	1
Sediment	Fish	Bottom Fish		19
Sediment	Fish	Water Column Fish	Topsmelt	10
Sediment	Fish	Water Column Fish		10
Sediment	Fish			29
Soil	Arthropods	Terrestrial Inverts	Beach hoppers, sow bugs, beetles	2
Soil	Arthropods	Terrestrial Inverts	Mixed insects	2
Soil	Arthropods	Terrestrial Inverts	Sow bugs/mixed insects	1
Soil	Arthropods	Terrestrial Inverts	Spiders/beetles	2
Soil	Arthropods	Terrestrial Inverts	Spiders/beetles/beach hoppers	1
Soil	Arthropods	Terrestrial Inverts	Spiders/cricket	1
Soil	Arthropods	Terrestrial Inverts		9
Soil	Mollusc	Terrestrial Inverts	Snails	3
Soil	Mollusc	Terrestrial Inverts		3
Soil	Mollusc			3

TABLE 2-11

Summary of Site-Specific Bioaccumulation Factors for Inorganics

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

BiotaType	Taxa	Analyte	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Sediment									
Benthic Invertebrates	Arthropods	Aluminum	12	0.023	0.034	0.001	0.011	0.041	0.121
Benthic Invertebrates	Arthropods	Barium	10	0.122	0.124	0.023	0.086	0.344	0.349
Benthic Invertebrates	Arthropods	Beryllium	1	0.194		0.194	0.194	0.194	0.194
Benthic Invertebrates	Arthropods	Calcium	13	4.239	6.851	0.012	1.220	17.881	20.721
Benthic Invertebrates	Arthropods	Chromium	4	0.128	0.175	0.012	0.057	0.388	0.388
Benthic Invertebrates	Arthropods	Copper	13	0.397	0.504	0.012	0.105	1.161	1.510
Benthic Invertebrates	Arthropods	Iron	13	0.037	0.036	0.007	0.030	0.080	0.133
Benthic Invertebrates	Arthropods	Lead	3	0.104	0.076	0.040	0.084	0.189	0.189
Benthic Invertebrates	Arthropods	Magnesium	13	0.246	0.208	0.039	0.181	0.503	0.802
Benthic Invertebrates	Arthropods	Manganese	13	0.722	1.401	0.049	0.328	0.905	5.307
Benthic Invertebrates	Arthropods	Nickel	1	0.139		0.139	0.139	0.139	0.139
Benthic Invertebrates	Arthropods	Potassium	13	3.851	3.657	1.322	2.420	5.099	15.169
Benthic Invertebrates	Arthropods	Selenium	2	3.607	2.980	1.500	3.607	5.714	5.714
Benthic Invertebrates	Arthropods	Sodium	13	2.881	1.942	0.887	2.304	6.303	7.036
Benthic Invertebrates	Arthropods	Vanadium	1	0.056		0.056	0.056	0.056	0.056
Benthic Invertebrates	Arthropods	Zinc	13	0.497	0.848	0.036	0.181	1.735	2.896
Fish	Fish	Aluminum	9	0.022	0.023	0.002	0.020	0.061	0.061
Fish	Fish	Barium	4	0.538	0.959	0.004	0.086	1.975	1.975
Fish	Fish	Calcium	29	3.069	3.213	0.201	1.516	8.117	10.643
Fish	Fish	Chromium	6	1.286	0.623	0.074	1.401	1.778	1.778
Fish	Fish	Copper	5	1.420	2.934	0.007	0.127	6.667	6.667
Fish	Fish	Iron	29	0.023	0.018	0.005	0.016	0.062	0.075
Fish	Fish	Magnesium	29	0.639	0.608	0.030	0.306	1.616	2.077
Fish	Fish	Manganese	29	0.281	0.266	0.023	0.139	0.647	0.902
Fish	Fish	Mercury	1	0.633		0.633	0.633	0.633	0.633
Fish	Fish	Potassium	20	5.936	5.518	1.415	3.370	14.401	22.009
Fish	Fish	Selenium	7	3.140	1.663	0.962	2.917	5.714	5.714
Fish	Fish	Sodium	29	2.019	1.255	0.165	2.347	3.549	4.215
Fish	Fish	Zinc	29	3.660	4.935	0.037	0.842	9.662	19.617
Soil									
Terrestrial Invertebrates	Arthropods	Aluminum	9	0.560	0.563	0.074	0.308	1.759	1.759
Terrestrial Invertebrates	Arthropods	Barium	8	1.821	2.026	0.060	1.148	5.989	5.989
Terrestrial Invertebrates	Arthropods	Cadmium	1	3.371		3.371	3.371	3.371	3.371
Terrestrial Invertebrates	Arthropods	Calcium	9	12.844	12.336	0.592	7.288	35.948	35.948
Terrestrial Invertebrates	Arthropods	Chromium	6	0.640	0.640	0.063	0.440	1.834	1.834

TABLE 2-11

Summary of Site-Specific Bioaccumulation Factors for Inorganics

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

BiotaType	Taxa	Analyte	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum
Terrestrial Invertebrates	Arthropods	Copper	9	10.058	19.359	0.151	2.113	59.200	59.200
Terrestrial Invertebrates	Arthropods	Iron	9	0.377	0.322	0.080	0.280	1.113	1.113
Terrestrial Invertebrates	Arthropods	Lead	8	0.945	0.963	0.073	0.613	3.103	3.103
Terrestrial Invertebrates	Arthropods	Magnesium	9	1.667	1.629	0.135	1.340	5.693	5.693
Terrestrial Invertebrates	Arthropods	Manganese	9	0.601	0.493	0.071	0.361	1.593	1.593
Terrestrial Invertebrates	Arthropods	Nickel	2	1.189	0.970	0.503	1.189	1.875	1.875
Terrestrial Invertebrates	Arthropods	Potassium	7	12.685	11.022	1.378	9.789	27.432	27.432
Terrestrial Invertebrates	Arthropods	Sodium	9	21.950	20.858	1.631	13.271	54.121	54.121
Terrestrial Invertebrates	Arthropods	Vanadium	6	0.200	0.078	0.111	0.187	0.327	0.327
Terrestrial Invertebrates	Arthropods	Zinc	9	2.593	3.286	0.194	1.195	10.778	10.778
Terrestrial Invertebrates	Mollusc	Aluminum	3	0.201	0.074	0.120	0.219	0.264	0.264
Terrestrial Invertebrates	Mollusc	Barium	3	2.998	2.316	0.765	2.840	5.388	5.388
Terrestrial Invertebrates	Mollusc	Cadmium	2	6.837	1.045	6.098	6.837	7.576	7.576
Terrestrial Invertebrates	Mollusc	Calcium	3	6.508	5.526	3.011	3.635	12.879	12.879
Terrestrial Invertebrates	Mollusc	Copper	3	22.597	29.082	4.000	7.681	56.111	56.111
Terrestrial Invertebrates	Mollusc	Iron	3	0.158	0.051	0.117	0.143	0.215	0.215
Terrestrial Invertebrates	Mollusc	Lead	1	0.500		0.500	0.500	0.500	0.500
Terrestrial Invertebrates	Mollusc	Magnesium	3	2.697	2.553	1.188	1.259	5.645	5.645
Terrestrial Invertebrates	Mollusc	Manganese	3	0.517	0.258	0.321	0.421	0.810	0.810
Terrestrial Invertebrates	Mollusc	Mercury	1	2.250		2.250	2.250	2.250	2.250
Terrestrial Invertebrates	Mollusc	Potassium	2	2.145	0.430	1.841	2.145	2.449	2.449
Terrestrial Invertebrates	Mollusc	Sodium	3	27.653	12.786	14.779	27.831	40.349	40.349
Terrestrial Invertebrates	Mollusc	Vanadium	1	0.317		0.317	0.317	0.317	0.317
Terrestrial Invertebrates	Mollusc	Zinc	3	5.878	5.090	2.760	3.122	11.752	11.752

Notes:

Bioaccumulation factors calculated using dry weight media and dry weight tissue concentrations.

N = sample size

P90 = 90th percentile

TABLE 2-12

Summary of Site-Specific Bioaccumulation Factors for Dioxins and Furans

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Biota Type	Analyte	N	Mean	Standard Deviation	Minimum	Maximum
Sediment						
Benthic Invertebrates	OCDD	2	1.18	1.04	0.44	1.92
Benthic Invertebrates	Total TCDD	3	0.68	0.47	0.16	1.10
Benthic Invertebrates	Total TCDF	3	1.12	0.70	0.32	1.61
Soil						
Terrestrial Invertebrates	1,2,3,4,6,7,8-HpCDD	1	0.85		0.85	0.85
Terrestrial Invertebrates	OCDD	2	0.46	0.21	0.31	0.61
Terrestrial Invertebrates	Total HpCDD	1	0.24		0.24	0.24

Notes:

Bioaccumulation factors calculated using dry weight media and wet weight tissue concentrations.

N = sample size

TABLE 2-13

Background Comparison of Inorganic Analytes in Sediment by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison: Background UTL (mg/kg)	Background Comparison: Background to Maximum	Result
NCL - East	Aluminum	0-6 in	50	50	31294.60	39810.37	2150	12200	159000	12100	**13.14**	**Fail**
NCL - East	Aluminum	2 ft	44	44	10325.23	3959.42	5290	9445	22900	12100	**1.89**	**Fail**
NCL - East	Antimony	0-6 in	50	50	2.85	4.30	0.24	0.735	20.1	0.37	**54.32**	**Fail**
NCL - East	Antimony	2 ft	44	44	0.30	0.20	0.11	0.265	1.4	0.37	**3.78**	**Fail**
NCL - East	Arsenic	0-6 in	50	50	4.74	4.66	0.83	3.65	33.7	4.0	**8.43**	**Fail**
NCL - East	Arsenic	2 ft	44	44	4.16	1.60	1.8	3.7	9.4	4.0	**2.35**	**Fail**
NCL - East	Barium	0-6 in	50	50	672.19	1048.73	49.9	200	5040	149	**33.83**	**Fail**
NCL - East	Barium	2 ft	44	44	144.96	40.73	94.2	132.5	277	149	**1.86**	**Fail**
NCL - East	Beryllium	0-6 in	41	50	2.51	3.67	0.14	0.815	16.8	0.6	**28.00**	**Fail**
NCL - East	Beryllium	2 ft	31	44	0.51	0.22	0.25	0.445	1.1	0.6	**1.83**	**Fail**
NCL - East	Cadmium	0-6 in	50	50	1.46	1.55	0.098	0.98	6.7	0.9	**7.70**	**Fail**
NCL - East	Cadmium	2 ft	44	44	0.92	0.43	0.34	0.795	2.1	0.9	**2.41**	**Fail**
NCL - East	Calcium	0-6 in	50	50	10326.20	6709.13	2190	8690	32100	27200	**1.18**	**Fail**
NCL - East	Calcium	2 ft	44	44	23388.18	12061.91	8050	22250	66900	27200	**2.46**	**Fail**
NCL - East	Chromium	0-6 in	50	50	61.10	78.53	6.2	24.85	342	17	**20.12**	**Fail**
NCL - East	Chromium (total)	2 ft	44	44	18.63	8.79	8.8	15.55	51.2	17	**3.01**	**Fail**
NCL - East	Cobalt	0-6 in	27	50	7.06	2.60	1.4	6.7	13.7	8.1	**1.69**	**Fail**
NCL - East	Cobalt	2 ft	22	44	7.23	2.51	3.5	6.65	15.9	8.1	**1.96**	**Fail**
NCL - East	Copper	0-6 in	50	50	591.73	1014.51	15.9	86.15	3950	20.2	**195.54**	**Fail**
NCL - East	Copper	2 ft	44	44	26.09	30.26	8.1	15.85	160	20.2	**7.92**	**Fail**
NCL - East	Iron	0-6 in	50	50	17015.00	4687.91	5370	18300	24400	22300	**1.09**	**Fail**
NCL - East	Iron	2 ft	44	44	19859.09	6461.53	10700	18250	40000	22300	**1.79**	**Fail**
NCL - East	Lead	0-6 in	50	50	89.89	119.56	7.3	28.95	616	14.4	**42.78**	**Fail**
NCL - East	Lead	2 ft	44	44	8.72	6.40	4	6.3	41.8	14.4	**2.90**	**Fail**
NCL - East	Magnesium	0-6 in	50	50	13752.80	12983.54	1490	8455	55600	8430	**6.60**	**Fail**
NCL - East	Magnesium	2 ft	44	44	7353.64	2447.39	3480	6815	14300	8430	**1.70**	**Fail**
NCL - East	Manganese	0-6 in	50	50	473.50	460.36	62.5	282.5	2100	399	**5.26**	**Fail**
NCL - East	Manganese	2 ft	44	44	338.25	102.93	202	321.5	606	399	**1.52**	**Fail**
NCL - East	Mercury	0-6 in	18	50	0.09	0.05	0.014	0.0755	0.18	0.05	**3.60**	**Fail**
NCL - East	Mercury	2 ft	8	44	0.10	0.06	0.013	0.12	0.23	0.05	**4.60**	**Fail**
NCL - East	Nickel	0-6 in	49	50	41.96	41.56	5	20.85	179	21.2	**8.44**	**Fail**
NCL - East	Nickel	2 ft	44	44	18.76	7.71	9.2	16.7	46.3	21.2	**2.18**	**Fail**
NCL - East	Potassium	0-6 in	50	50	4321.60	1458.04	770	4480	7300	3910	**1.87**	**Fail**
NCL - East	Potassium	2 ft	44	44	5599.55	2941.75	2320	4880	19900	3910	**5.09**	**Fail**
NCL - East	Selenium	0-6 in	47	50	1.62	1.26	0.53	1.05	5.6	0.8	**7.00**	**Fail**
NCL - East	Selenium	2 ft	44	44	0.72	0.27	0.36	0.66	1.8	0.8	**2.25**	**Fail**
NCL - East	Silver	0-6 in	29	50	1.14	1.24	0.13	0.65	4.9	--	**--**	--
NCL - East	Silver	2 ft	5	44	0.63	0.19	0.13	0.635	1.2	--	**--**	--
NCL - East	Sodium	0-6 in	50	50	2574.82	1304.70	861	2225	6220	9550	0.65	Pass
NCL - East	Sodium	2 ft	44	44	2903.11	2148.52	977	1875	8990	9550	0.94	Pass
NCL - East	Thallium	0-6 in	47	50	0.21	0.12	0.04	0.21	0.71	0.27	**2.63**	**Fail**

TABLE 2-13

Background Comparison of Inorganic Analytes in Sediment by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison: Background UTL (mg/kg)	Background Comparison: Background to Maximum	Result
NCL - East	Thallium	2 ft	44	44	0.24	0.09	0.1	0.205	0.49	0.27	**1.81**	**Fail**
NCL - East	Vanadium	0-6 in	50	50	41.81	18.51	12.8	36.6	125	32.5	**3.85**	**Fail**
NCL - East	Vanadium	2 ft	44	44	33.50	12.21	16.6	29.2	70.4	32.5	**2.17**	**Fail**
NCL - East	Zinc	0-6 in	50	50	567.28	943.95	30.8	131	4570	69.7	**65.57**	**Fail**
NCL - East	Zinc	2 ft	44	44	63.29	46.66	24.7	47.75	311	69.7	**4.46**	**Fail**
NCL - North	Aluminum	0-6 in	22	22	13884.55	4525.83	5920	13450	27800	12100	**2.30**	**Fail**
NCL - North	Aluminum	2 ft	16	16	14351.25	5925.23	6360	12650	25700	12100	**2.12**	**Fail**
NCL - North	Antimony	0-6 in	13	22	0.73	0.50	0.21	0.535	2.2	0.37	**5.95**	**Fail**
NCL - North	Antimony	2 ft	3	16	0.67	0.35	0.46	0.59	1.9	0.37	**5.14**	**Fail**
NCL - North	Arsenic	0-6 in	22	22	3.65	1.68	0.89	3.35	7.2	4.0	**1.80**	**Fail**
NCL - North	Arsenic	2 ft	15	16	3.83	1.34	0.91	4.05	5.5	4.0	**1.38**	**Fail**
NCL - North	Barium	0-6 in	22	22	423.73	1042.31	103	166.5	5060	149	**33.96**	**Fail**
NCL - North	Barium	2 ft	16	16	230.83	341.86	68.6	146.5	1500	149	**10.07**	**Fail**
NCL - North	Beryllium	0-6 in	22	22	1.70	3.81	0.29	0.86	18.7	0.6	**31.17**	**Fail**
NCL - North	Beryllium	2 ft	16	16	1.19	1.36	0.4	0.86	6.2	0.6	**10.33**	**Fail**
NCL - North	Cadmium	0-6 in	22	22	1.30	0.74	0.2	1.15	3.7	0.9	**4.25**	**Fail**
NCL - North	Cadmium	2 ft	16	16	1.16	0.56	0.35	1	2.7	0.9	**3.10**	**Fail**
NCL - North	Calcium	0-6 in	22	22	25030.91	30067.45	3240	14800	111000	27200	**4.08**	**Fail**
NCL - North	Calcium	2 ft	16	16	30561.25	27591.20	7590	22650	116000	27200	**4.26**	**Fail**
NCL - North	Chromium (total)	0-6 in	22	22	21.61	8.93	13.6	18.4	51.3	17	**3.02**	**Fail**
NCL - North	Chromium (total)	2 ft	16	16	19.14	7.06	7.5	19.2	35.6	17	**2.09**	**Fail**
NCL - North	Cobalt	0-6 in	17	22	7.75	1.88	2.9	7.45	11.5	8.1	**1.42**	**Fail**
NCL - North	Cobalt	2 ft	13	16	8.31	2.41	4.5	8.45	13.5	8.1	**1.67**	**Fail**
NCL - North	Copper	0-6 in	22	22	58.34	65.03	14.5	35.25	270	20.2	**13.37**	**Fail**
NCL - North	Copper	2 ft	16	16	27.40	23.09	7.9	19.8	97.4	20.2	**4.82**	**Fail**
NCL - North	Iron	0-6 in	22	22	22007.27	5185.57	9060	21800	34500	22300	**1.55**	**Fail**
NCL - North	Iron	2 ft	16	16	23131.25	7495.66	10700	23100	40400	22300	**1.81**	**Fail**
NCL - North	Lead	0-6 in	22	22	59.51	72.09	6.1	34	306	14.4	**21.25**	**Fail**
NCL - North	Lead	2 ft	16	16	17.57	14.24	3	15.5	58	14.4	**4.03**	**Fail**
NCL - North	Magnesium	0-6 in	22	22	8445.00	3614.11	3480	7700	22800	8430	**2.70**	**Fail**
NCL - North	Magnesium	2 ft	16	16	9217.50	3309.73	3440	8895	16500	8430	**1.96**	**Fail**
NCL - North	Manganese	0-6 in	22	22	317.35	191.52	90.8	269	986	399	**2.47**	**Fail**
NCL - North	Manganese	2 ft	16	16	400.06	157.56	129	408	670	399	**1.68**	**Fail**
NCL - North	Mercury	0-6 in	3	22	0.14	0.05	0.03	0.135	0.23	0.05	**4.60**	**Fail**
NCL - North	Mercury	2 ft	4	16	0.11	0.05	0.02	0.13	0.2	0.05	**4.00**	**Fail**
NCL - North	Nickel	0-6 in	22	22	23.64	7.12	10.1	22.35	42.9	21.2	**2.02**	**Fail**
NCL - North	Nickel	2 ft	16	16	22.84	6.86	9.1	23.05	33.3	21.2	**1.57**	**Fail**
NCL - North	Potassium	0-6 in	22	22	4585.00	1054.06	1930	4560	6690	3910	**1.71**	**Fail**
NCL - North	Potassium	2 ft	16	16	4569.38	1427.51	1920	4440	6800	3910	**1.74**	**Fail**
NCL - North	Selenium	0-6 in	13	22	2.74	3.02	0.17	2.1	15.2	0.8	**19.00**	**Fail**
NCL - North	Selenium	2 ft	7	16	1.60	1.58	0.064	1.185	6	0.8	**7.50**	**Fail**

TABLE 2-13

Background Comparison of Inorganic Analytes in Sediment by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison: Background UTL (mg/kg)	Background Comparison: Background to Maximum	Result
NCL - North	Silver	0-6 in	8	22	0.53	0.19	0.22	0.52	1.2	--	**--**	--
NCL - North	Silver	2 ft	2	16	0.60	0.21	0.35	0.555	1.3	--	**--**	--
NCL - North	Sodium	0-6 in	22	22	2344.59	1240.87	567	1920	5120	9550	0.54	Pass
NCL - North	Sodium	2 ft	16	16	2105.44	883.19	797	2030	3700	9550	0.39	Pass
NCL - North	Thallium	0-6 in	6	22	0.42	0.17	0.048	0.39	0.67	0.27	**2.48**	**Fail**
NCL - North	Thallium	2 ft		16	0.55	0.12	0.35	0.515	0.74	0.27	**2.74**	**Fail**
NCL - North	Vanadium	0-6 in	22	22	38.60	13.21	16.2	34.55	62.7	32.5	**1.93**	**Fail**
NCL - North	Vanadium	2 ft	16	16	36.33	9.96	11.2	35.1	53	32.5	**1.63**	**Fail**
NCL - North	Zinc	0-6 in	22	22	196.83	182.32	57.2	107.5	790	69.7	**11.33**	**Fail**
NCL - North	Zinc	2 ft	16	16	93.68	54.61	32.2	77.05	253	69.7	**3.63**	**Fail**
OID Lagoon	Aluminum	0-6 in	49	49	5582.24	5665.33	1110	3500	23900	12100	**1.98**	**Fail**
OID Lagoon	Aluminum	2 ft	39	39	8754.87	8724.06	1330	5840	34100	12100	**2.82**	**Fail**
OID Lagoon	Aluminum	2 to 6	18	18	7023.89	6577.47	1220	3735	20600	12100	**1.70**	**Fail**
OID Lagoon	Antimony	0-6 in	43	49	0.50	0.35	0.077	0.43	1.7	0.37	**4.59**	**Fail**
OID Lagoon	Antimony	2 ft	39	39	0.99	1.69	0.056	0.29	7.7	0.37	**20.81**	**Fail**
OID Lagoon	Antimony	2 to 6	18	18	0.27	0.15	0.11	0.2	0.61	0.37	**1.65**	**Fail**
OID Lagoon	Arsenic	0-6 in	49	49	2.66	1.96	0.61	1.9	7.5	4.0	**1.88**	**Fail**
OID Lagoon	Arsenic	2 ft	39	39	4.03	3.80	0.73	2.4	18.2	4.0	**4.55**	**Fail**
OID Lagoon	Arsenic	2 to 6	18	18	3.11	2.46	0.81	2.35	9.3	4.0	**2.33**	**Fail**
OID Lagoon	Barium	0-6 in	42	49	99.26	92.80	12.2	76.6	410	149	**2.75**	**Fail**
OID Lagoon	Barium	2 ft	37	39	1024.40	2236.40	24	116	9100	149	**61.07**	**Fail**
OID Lagoon	Barium	2 to 6	15	18	380.88	1244.65	12.7	84.1	5360	149	**35.97**	**Fail**
OID Lagoon	Beryllium	0-6 in	24	49	0.44	0.41	0.051	0.29	1.4	0.6	**2.33**	**Fail**
OID Lagoon	Beryllium	2 ft	18	39	2.99	7.71	0.073	0.32	39.6	0.6	**66.00**	**Fail**
OID Lagoon	Beryllium	2 to 6	7	18	0.41	0.37	0.08	0.255	1.1	0.6	**1.83**	**Fail**
OID Lagoon	Cadmium	0-6 in	42	49	0.68	0.60	0.049	0.47	3.5	0.9	**4.02**	**Fail**
OID Lagoon	Cadmium	2 ft	36	39	0.70	0.93	0.038	0.45	5	0.9	**5.75**	**Fail**
OID Lagoon	Cadmium	2 to 6	18	18	0.57	0.48	0.086	0.485	1.6	0.9	**1.84**	**Fail**
OID Lagoon	Calcium	0-6 in	49	49	43032.86	47531.77	3890	16400	178000	27200	**6.54**	**Fail**
OID Lagoon	Calcium	2 ft	39	39	36826.41	46439.48	2090	11400	179000	27200	**6.58**	**Fail**
OID Lagoon	Calcium	2 to 6	18	18	18115.00	28716.01	4070	7990	126000	27200	**4.63**	**Fail**
OID Lagoon	Chromium (total)	0-6 in	49	49	12.79	9.77	0.64	9.8	41.2	17	**2.42**	**Fail**
OID Lagoon	Chromium (total)	2 ft	39	39	20.44	23.15	3	9.1	86.4	17	**5.08**	**Fail**
OID Lagoon	Chromium (total)	2 to 6	18	18	16.02	14.89	3.6	12	57.9	17	**3.41**	**Fail**
OID Lagoon	Cobalt	0-6 in	7	49	4.10	3.80	0.76	3.2	18.8	8.1	**2.32**	**Fail**
OID Lagoon	Cobalt	2 ft	3	39	3.95	3.32	0.98	3.7	14.9	8.1	**1.84**	**Fail**
OID Lagoon	Cobalt	2 to 6	4	18	4.62	4.19	0.93	2.15	12.6	8.1	**1.56**	**Fail**
OID Lagoon	Copper	0-6 in	44	49	31.72	30.50	1.3	25.5	119	20.2	**5.89**	**Fail**
OID Lagoon	Copper	2 ft	32	39	101.63	200.54	1.1	23.6	803	20.2	**39.75**	**Fail**
OID Lagoon	Copper	2 to 6	14	18	20.02	22.30	1.8	11.85	91.2	20.2	**4.51**	**Fail**
OID Lagoon	Iron	0-6 in	49	49	11186.73	10007.77	2420	8230	43200	22300	**1.94**	**Fail**

TABLE 2-13

Background Comparison of Inorganic Analytes in Sediment by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison: Background UTL (mg/kg)	Background Comparison: Background to Maximum	Result
OID Lagoon	Iron	2 ft	39	39	12244.10	10947.78	3130	8520	48200	22300	**2.16**	**Fail**
OID Lagoon	Iron	2 to 6	18	18	14940.56	13883.66	3130	6395	40700	22300	**1.83**	**Fail**
OID Lagoon	Lead	0-6 in	48	49	12.85	12.17	0.89	10.3	46.8	14.4	**3.25**	**Fail**
OID Lagoon	Lead	2 ft	39	39	26.78	35.95	1.5	8.5	128	14.4	**8.89**	**Fail**
OID Lagoon	Lead	2 to 6	18	18	6.22	4.70	1.7	4.55	15.1	14.4	**1.05**	**Fail**
OID Lagoon	Magnesium	0-6 in	49	49	4243.63	3611.16	934	3070	14500	8430	**1.72**	**Fail**
OID Lagoon	Magnesium	2 ft	39	39	15658.46	27073.67	1050	4070	116000	8430	**13.76**	**Fail**
OID Lagoon	Magnesium	2 to 6	18	18	5174.44	4637.22	1050	2690	12800	8430	**1.52**	**Fail**
OID Lagoon	Manganese	0-6 in	49	49	272.16	230.20	46.5	189	989	399	**2.48**	**Fail**
OID Lagoon	Manganese	2 ft	39	39	405.13	451.39	51.4	252	1660	399	**4.16**	**Fail**
OID Lagoon	Manganese	2 to 6	18	18	280.40	316.39	48.3	155.5	1270	399	**3.18**	**Fail**
OID Lagoon	Mercury	0-6 in	14	49	0.12	0.10	0.015	0.12	0.58	0.05	**11.60**	**Fail**
OID Lagoon	Mercury	2 ft	18	39	0.07	0.06	0.015	0.04	0.24	0.05	**4.80**	**Fail**
OID Lagoon	Mercury	2 to 6	5	18	0.10	0.05	0.027	0.12	0.18	0.05	**3.60**	**Fail**
OID Lagoon	Nickel	0-6 in	36	49	11.44	10.53	2.4	8.7	49.5	21.2	**2.33**	**Fail**
OID Lagoon	Nickel	2 ft	30	39	15.30	12.74	3.2	11.8	49.6	21.2	**2.34**	**Fail**
OID Lagoon	Nickel	2 to 6	13	18	13.01	11.42	2.6	6.45	34.8	21.2	**1.64**	**Fail**
OID Lagoon	Potassium	0-6 in	43	49	1981.80	2269.38	335	999	10100	3910	**2.58**	**Fail**
OID Lagoon	Potassium	2 ft	39	39	2334.44	2360.65	357	1070	8710	3910	**2.23**	**Fail**
OID Lagoon	Potassium	2 to 6	18	18	3289.56	3616.70	362	963.5	10700	3910	**2.74**	**Fail**
OID Lagoon	Selenium	0-6 in	35	49	1.36	1.25	0.3	0.9	6.8	0.8	**8.50**	**Fail**
OID Lagoon	Selenium	2 ft	28	39	0.98	0.61	0.31	0.7	2.5	0.8	**3.13**	**Fail**
OID Lagoon	Selenium	2 to 6	14	18	0.78	0.39	0.26	0.68	1.6	0.8	**2.00**	**Fail**
OID Lagoon	Silver	0-6 in	12	49	0.78	0.45	0.23	0.65	2.8	--	**--**	--
OID Lagoon	Silver	2 ft	19	39	1.06	1.08	0.13	0.67	5	--	**--**	--
OID Lagoon	Silver	2 to 6	9	18	0.61	0.18	0.16	0.65	0.85	--	**--**	--
OID Lagoon	Sodium	0-6 in	49	49	4406.22	4204.09	975	2730	20800	9550	**2.18**	**Fail**
OID Lagoon	Sodium	2 ft	39	39	3837.77	3207.34	358	3100	13000	9550	**1.36**	**Fail**
OID Lagoon	Sodium	2 to 6	18	18	3619.06	3104.67	742	2060	9840	9550	**1.03**	**Fail**
OID Lagoon	Thallium	0-6 in	39	49	0.22	0.20	0.028	0.16	0.69	0.27	**2.56**	**Fail**
OID Lagoon	Thallium	2 ft	39	39	0.13	0.12	0.027	0.083	0.49	0.27	**1.81**	**Fail**
OID Lagoon	Thallium	2 to 6	18	18	0.16	0.13	0.029	0.092	0.39	0.27	**1.44**	**Fail**
OID Lagoon	Vanadium	0-6 in	49	49	22.98	18.04	2.6	18.2	72.1	32.5	**2.22**	**Fail**
OID Lagoon	Vanadium	2 ft	39	39	21.39	16.31	4.7	15.5	63.6	32.5	**1.96**	**Fail**
OID Lagoon	Vanadium	2 to 6	18	18	22.75	19.76	5.6	11.4	64.6	32.5	**1.99**	**Fail**
OID Lagoon	Zinc	0-6 in	49	49	106.61	98.81	9.4	70	427	69.7	**6.13**	**Fail**
OID Lagoon	Zinc	2 ft	39	39	166.32	282.89	8.5	60	1250	69.7	**17.93**	**Fail**
OID Lagoon	Zinc	2 to 6	18	18	43.94	34.19	8.9	41.7	104	69.7	**1.49**	**Fail**
Wetlands Beach	Aluminum	0-6 in	21	21	61695.24	39621.94	3760	54500	166000	12100	**13.72**	**Fail**
Wetlands Beach	Aluminum	2 ft	18	18	6233.89	8526.85	1620	2790	37400	12100	**3.09**	**Fail**
Wetlands Beach	Aluminum	2 to 6	9	9	5852.22	5170.05	1480	3590	16100	12100	**1.33**	**Fail**

TABLE 2-13

Background Comparison of Inorganic Analytes in Sediment by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison: Background UTL (mg/kg)	Background Comparison: Background to Maximum	Result
Wetlands Beach	Antimony	0-6 in	21	21	5.08	3.28	0.34	4.9	10.4	0.37	**28.11**	**Fail**
Wetlands Beach	Antimony	2 ft	18	18	0.36	0.48	0.12	0.215	2.2	0.37	**5.95**	**Fail**
Wetlands Beach	Antimony	2 to 6	9	9	0.34	0.32	0.084	0.2	1.1	0.37	**2.97**	**Fail**
Wetlands Beach	Arsenic	0-6 in	21	21	5.24	2.91	1.1	5	10.7	4.0	**2.68**	**Fail**
Wetlands Beach	Arsenic	2 ft	18	18	1.59	0.72	0.79	1.4	3.3	4.0	0.83	Pass
Wetlands Beach	Arsenic	2 to 6	9	9	2.23	1.61	1.1	1.5	6.2	4.0	**1.55**	**Fail**
Wetlands Beach	Barium	0-6 in	21	21	1142.00	873.42	67.4	927	3110	149	**20.87**	**Fail**
Wetlands Beach	Barium	2 ft	15	18	88.19	131.32	13.9	44.3	578	149	**3.88**	**Fail**
Wetlands Beach	Barium	2 to 6	8	9	139.03	219.24	16.3	53.3	706	149	**4.74**	**Fail**
Wetlands Beach	Beryllium	0-6 in	21	21	5.15	4.54	0.26	4.2	19.9	0.6	**33.17**	**Fail**
Wetlands Beach	Beryllium	2 ft	13	18	0.33	0.45	0.09	0.145	2	0.6	**3.33**	**Fail**
Wetlands Beach	Beryllium	2 to 6	5	9	0.48	0.58	0.086	0.25	1.9	0.6	**3.17**	**Fail**
Wetlands Beach	Cadmium	0-6 in	21	21	1.97	1.35	0.049	1.7	4.1	0.9	**4.71**	**Fail**
Wetlands Beach	Cadmium	2 ft	18	18	0.38	0.38	0.084	0.24	1.4	0.9	**1.61**	**Fail**
Wetlands Beach	Cadmium	2 to 6	9	9	0.33	0.21	0.13	0.24	0.69	0.9	0.79	Pass
Wetlands Beach	Calcium	0-6 in	21	21	18191.43	17360.47	1620	8180	52500	27200	**1.93**	**Fail**
Wetlands Beach	Calcium	2 ft	18	18	6698.33	6239.13	1420	3890	23300	27200	0.86	Pass
Wetlands Beach	Calcium	2 to 6	9	9	7646.67	3957.99	2960	5850	15400	27200	0.57	Pass
Wetlands Beach	Chromium (total)	0-6 in	21	21	114.44	103.10	5.4	83.7	472	17	**27.76**	**Fail**
Wetlands Beach	Chromium (total)	2 ft	18	18	12.09	12.61	3.6	8.25	58	17	3.41	**Fail**
Wetlands Beach	Chromium (total)	2 to 6	9	9	11.89	6.91	5.4	9.4	24.2	17	1.42	**Fail**
Wetlands Beach	Cobalt	0-6 in	10	21	5.06	2.34	1.1	5.2	9.2	8.1	1.14	**Fail**
Wetlands Beach	Cobalt	2 ft	9	18	2.01	1.93	0.87	1.25	6.9	8.1	0.85	Pass
Wetlands Beach	Cobalt	2 to 6	5	9	2.91	3.08	1.1	1.4	10.2	8.1	**1.26**	**Fail**
Wetlands Beach	Copper	0-6 in	21	21	1423.25	1025.16	55.6	1260	3970	20.2	**196.53**	**Fail**
Wetlands Beach	Copper	2 ft	18	18	80.83	176.85	6.1	24.35	772	20.2	**38.22**	**Fail**
Wetlands Beach	Copper	2 to 6	9	9	47.61	58.69	3	34.4	191	20.2	**9.46**	**Fail**
Wetlands Beach	Iron	0-6 in	21	21	9985.24	3741.06	3690	10900	16900	22300	0.76	Pass
Wetlands Beach	Iron	2 ft	18	18	6921.11	6254.82	3130	4350	24400	22300	**1.09**	**Fail**
Wetlands Beach	Iron	2 to 6	9	9	9727.78	9329.16	3310	5780	32700	22300	**1.47**	**Fail**
Wetlands Beach	Lead	0-6 in	21	21	159.58	144.21	13.7	122	641	14.4	**44.51**	**Fail**
Wetlands Beach	Lead	2 ft	18	18	10.71	15.75	2.1	4.8	69.7	14.4	**4.84**	**Fail**
Wetlands Beach	Lead	2 to 6	9	9	7.59	6.29	2.1	5	21.5	14.4	**1.49**	**Fail**
Wetlands Beach	Magnesium	0-6 in	21	21	13250.00	8159.41	1250	11900	31200	8430	**3.70**	**Fail**
Wetlands Beach	Magnesium	2 ft	18	18	3035.39	3543.58	837	1470	11300	8430	**1.34**	**Fail**
Wetlands Beach	Magnesium	2 to 6	9	9	3812.22	3226.31	1080	2470	9810	8430	**1.16**	**Fail**
Wetlands Beach	Manganese	0-6 in	21	21	644.80	385.22	57.1	599	1470	399	**3.68**	**Fail**
Wetlands Beach	Manganese	2 ft	18	18	127.31	147.77	33.8	61.95	626	399	**1.57**	**Fail**
Wetlands Beach	Manganese	2 to 6	9	9	248.62	322.66	51.3	121	1060	399	**2.66**	**Fail**
Wetlands Beach	Mercury	0-6 in	3	21	0.19	0.13	0.019	0.17	0.6	0.05	**12.00**	**Fail**
Wetlands Beach	Mercury	2 ft		18	0.12	0.04	0.02	0.125	0.18	0.05	**3.60**	**Fail**

TABLE 2-13

Background Comparison of Inorganic Analytes in Sediment by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison		Result
										Background UTL (mg/kg)	Background to Maximum	
Wetlands Beach	Mercury	2 to 6	1	9	0.12	0.03	0.028	0.12	0.14	0.05	**2.80**	**Fail**
Wetlands Beach	Nickel	0-6 in	21	21	67.93	41.07	6	61.6	154	21.2	**7.26**	**Fail**
Wetlands Beach	Nickel	2 ft	18	18	9.04	11.56	2.7	4.1	50.4	21.2	**2.38**	**Fail**
Wetlands Beach	Nickel	2 to 6	9	9	9.99	8.60	2.8	5.8	28.8	21.2	**1.36**	**Fail**
Wetlands Beach	Potassium	0-6 in	21	21	1631.57	951.30	360	1460	3500	3910	0.90	Pass
Wetlands Beach	Potassium	2 ft	15	18	1256.61	2128.23	340	418	7540	3910	**1.93**	**Fail**
Wetlands Beach	Potassium	2 to 6	6	9	2322.44	3732.58	330	584	11300	3910	**2.89**	**Fail**
Wetlands Beach	Selenium	0-6 in	19	21	2.60	2.16	0.3	2.1	8.1	0.8	**10.13**	**Fail**
Wetlands Beach	Selenium	2 ft	13	18	0.57	0.26	0.3	0.525	1.2	0.8	**1.50**	**Fail**
Wetlands Beach	Selenium	2 to 6	7	9	0.51	0.21	0.27	0.48	0.82	0.8	**1.03**	**Fail**
Wetlands Beach	Silver	0-6 in	19	21	1.52	0.97	0.26	1.2	3.6	--	**--**	--
Wetlands Beach	Silver	2 ft	9	18	0.47	0.23	0.13	0.61	0.83	--	**--**	--
Wetlands Beach	Silver	2 to 6	3	9	0.56	0.14	0.22	0.62	0.67	--	**--**	--
Wetlands Beach	Sodium	0-6 in	21	21	3147.81	2317.83	757	2600	10700	9550	**1.12**	**Fail**
Wetlands Beach	Sodium	2 ft	18	18	887.61	609.43	446	631.5	2510	9550	0.26	Pass
Wetlands Beach	Sodium	2 to 6	9	9	1034.56	715.64	587	800	2900	9550	0.30	Pass
Wetlands Beach	Thallium	0-6 in	18	21	0.20	0.33	0.023	0.078	1.4	0.27	**5.19**	**Fail**
Wetlands Beach	Thallium	2 ft	18	18	0.06	0.07	0.019	0.024	0.27	0.27	**1.00**	**Fail**
Wetlands Beach	Thallium	2 to 6	9	9	0.09	0.11	0.025	0.041	0.36	0.27	**1.33**	**Fail**
Wetlands Beach	Vanadium	0-6 in	21	21	34.60	17.91	6.6	29	74.7	32.5	**2.30**	**Fail**
Wetlands Beach	Vanadium	2 ft	18	18	12.86	9.57	5	9.25	36.3	32.5	**1.12**	**Fail**
Wetlands Beach	Vanadium	2 to 6	9	9	16.81	12.82	7.3	10.2	45.9	32.5	**1.41**	**Fail**
Wetlands Beach	Zinc	0-6 in	21	21	1193.70	827.90	81.3	981	3670	69.7	**52.65**	**Fail**
Wetlands Beach	Zinc	2 ft	18	18	1098.54	4467.75	13.8	30.25	19000	69.7	**272.60**	**Fail**
Wetlands Beach	Zinc	2 to 6	9	9	80.74	137.26	7.8	36.7	441	69.7	**6.33**	**Fail**

Notes:

-- = background value not available

Fail = site maximum is greater than the background UTL

mg/kg = milligrams per kilogram

Pass = site maximum is less than the background UTL

UTL = upper tolerance limit

Bold indicates exceedance of the UTL

Shading indicates the site maximum is greater than background.

TABLE 2-14

Background Comparison of Inorganic Analytes in Soil by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison: Background UTL (mg/kg)	Background Comparison: Background to Maximum	Result
Aluminum	NCL - East	0-6 in	93	93	21619.25	31044.71	2150	10600	159000	12100	**13.14**	**Fail**
Aluminum	NCL - East	2 ft	58	58	10014.31	3547.25	5290	9195	22900	12100	**1.89**	**Fail**
Aluminum	NCL - North	0-6 in	45	45	10559.78	4569.28	5920	8320	27800	12100	**2.30**	**Fail**
Aluminum	NCL - North	2 ft	24	24	12460.00	5542.10	6360	10400	25700	12100	**2.12**	**Fail**
Aluminum	Wetlands Beach	0-6 in	95	95	25989.67	42068.10	679	5330	225000	12100	**18.60**	**Fail**
Aluminum	Wetlands Beach	2 ft	70	70	3395.07	4991.21	965	1770	37400	12100	**3.09**	**Fail**
Aluminum	Wetlands Beach	2 to 6	20	20	5474.50	4974.89	1430	2670	16100	12100	**1.33**	**Fail**
Antimony	NCL - East	0-6 in	90	93	1.76	3.37	0.16	0.44	20.1	0.37	**54.32**	**Fail**
Antimony	NCL - East	2 ft	58	58	0.27	0.18	0.079	0.24	1.4	0.37	**3.78**	**Fail**
Antimony	NCL - North	0-6 in	30	45	0.50	0.42	0.15	0.39	2.2	0.37	**5.95**	**Fail**
Antimony	NCL - North	2 ft	8	24	0.55	0.34	0.11	0.495	1.9	0.37	**5.14**	**Fail**
Antimony	Wetlands Beach	0-6 in	85	95	2.31	3.74	0.065	0.55	23.2	0.37	**62.70**	**Fail**
Antimony	Wetlands Beach	2 ft	46	70	0.36	0.31	0.059	0.275	2.2	0.37	**5.95**	**Fail**
Antimony	Wetlands Beach	2 to 6	20	20	0.28	0.24	0.074	0.19	1.1	0.37	**2.97**	**Fail**
Arsenic	NCL - East	0-6 in	93	93	4.10	3.59	0.83	3.3	33.7	4	**8.43**	**Fail**
Arsenic	NCL - East	2 ft	58	58	3.92	1.48	1.8	3.4	9.4	4	**2.35**	**Fail**
Arsenic	NCL - North	0-6 in	45	45	3.12	1.29	0.89	2.7	7.2	4	**1.80**	**Fail**
Arsenic	NCL - North	2 ft	23	24	3.70	1.12	0.91	3.5	5.5	4	**1.38**	**Fail**
Arsenic	Wetlands Beach	0-6 in	95	95	2.66	2.43	0.73	1.6	13.6	4	**3.40**	**Fail**
Arsenic	Wetlands Beach	2 ft	69	70	1.61	0.94	0.47	1.3	5.8	4	**1.45**	**Fail**
Arsenic	Wetlands Beach	2 to 6	20	20	2.61	1.52	1.1	1.95	6.2	4	**1.55**	**Fail**
Barium	NCL - East	0-6 in	93	93	474.55	809.80	49.9	171	5040	149	**33.83**	**Fail**
Barium	NCL - East	2 ft	58	58	137.55	38.57	89.9	125	277	149	**1.86**	**Fail**
Barium	NCL - North	0-6 in	45	45	263.89	737.28	89.1	122	5060	149	**33.96**	**Fail**
Barium	NCL - North	2 ft	24	24	193.34	281.52	68.6	132	1500	149	**10.07**	**Fail**
Barium	Wetlands Beach	0-6 in	91	95	428.70	735.20	14.1	91.8	3810	149	**25.57**	**Fail**
Barium	Wetlands Beach	2 ft	40	70	49.34	78.93	10.4	24.35	578	149	**3.88**	**Fail**
Barium	Wetlands Beach	2 to 6	15	20	104.66	152.57	14.3	55.8	706	149	**4.74**	**Fail**
Beryllium	NCL - East	0-6 in	72	93	1.73	2.85	0.14	0.71	16.8	0.6	**28.00**	**Fail**
Beryllium	NCL - East	2 ft	34	58	0.50	0.19	0.25	0.45	1.1	0.6	**1.83**	**Fail**
Beryllium	NCL - North	0-6 in	28	45	1.06	2.71	0.29	0.57	18.7	0.6	**31.17**	**Fail**
Beryllium	NCL - North	2 ft	19	24	0.97	1.15	0.4	0.705	6.2	0.6	**10.33**	**Fail**
Beryllium	Wetlands Beach	0-6 in	64	95	2.04	3.66	0.07	0.52	19.9	0.6	**33.17**	**Fail**
Beryllium	Wetlands Beach	2 ft	40	70	0.20	0.26	0.06	0.13	2	0.6	**3.33**	**Fail**
Beryllium	Wetlands Beach	2 to 6	7	20	0.36	0.43	0.081	0.155	1.9	0.6	**3.17**	**Fail**
Cadmium	NCL - East	0-6 in	93	93	1.21	1.20	0.098	0.9	6.7	0.87	**7.70**	**Fail**
Cadmium	NCL - East	2 ft	58	58	0.88	0.39	0.34	0.78	2.1	0.87	**2.41**	**Fail**
Cadmium	NCL - North	0-6 in	45	45	0.99	0.60	0.2	0.76	3.7	0.87	**4.25**	**Fail**
Cadmium	NCL - North	2 ft	24	24	1.04	0.49	0.35	0.91	2.7	0.87	**3.10**	**Fail**
Cadmium	Wetlands Beach	0-6 in	86	95	1.07	1.72	0.049	0.38	11.3	0.87	**12.99**	**Fail**

TABLE 2-14

Background Comparison of Inorganic Analytes in Soil by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison: Background UTL (mg/kg)	Background Comparison: Background to Maximum	Result
Cadmium	Wetlands Beach	2 ft	52	70	0.30	0.37	0.029	0.21	2.4	0.87	**2.76**	**Fail**
Cadmium	Wetlands Beach	2 to 6	20	20	0.38	0.34	0.046	0.21	1.1	0.87	**1.26**	**Fail**
Calcium	NCL - East	0-6 in	93	93	9762.26	5531.20	2190	8620	32100	27200	**1.18**	**Fail**
Calcium	NCL - East	2 ft	58	58	21364.83	11222.87	8050	18500	66900	27200	**2.46**	**Fail**
Calcium	NCL - North	0-6 in	45	45	15072.44	23003.55	3240	6100	111000	27200	**4.08**	**Fail**
Calcium	NCL - North	2 ft	24	24	25997.92	23589.48	7590	19450	116000	27200	**4.26**	**Fail**
Calcium	Wetlands Beach	0-6 in	95	95	9420.00	11853.41	1620	4950	53600	27200	**1.97**	**Fail**
Calcium	Wetlands Beach	2 ft	70	70	4773.71	4231.90	1040	3405	23300	27200	0.86	**Pass**
Calcium	Wetlands Beach	2 to 6	20	20	9730.00	8607.07	2960	5850	37600	27200	**1.38**	**Fail**
Chromium	NCL - East	0-6 in	93	93	42.31	61.20	6.2	19.5	342	17	**20.12**	**Fail**
Chromium	NCL - East	2 ft	58	58	17.37	8.00	8.8	14.45	51.2	17	**3.01**	**Fail**
Chromium	NCL - North	0-6 in	45	45	17.30	7.56	10.9	14.8	51.3	17	**3.02**	**Fail**
Chromium	NCL - North	2 ft	24	24	17.83	6.06	7.5	17.05	35.6	17	**2.09**	**Fail**
Chromium	Wetlands Beach	0-6 in	95	95	51.43	84.84	2.6	18.1	472	17	**27.76**	**Fail**
Chromium	Wetlands Beach	2 ft	70	70	8.43	8.37	2.1	5.55	58	17	**3.41**	**Fail**
Chromium	Wetlands Beach	2 to 6	20	20	10.94	7.67	2.7	7.1	27	17	**1.59**	**Fail**
Cobalt	NCL - East	0-6 in	49	93	6.41	2.27	1.4	6.1	13.7	8.1	**1.69**	**Fail**
Cobalt	NCL - East	2 ft	33	58	7.07	2.25	3.5	6.7	15.9	8.1	**1.96**	**Fail**
Cobalt	NCL - North	0-6 in	30	45	6.52	1.81	2.9	5.9	11.5	8.1	**1.42**	**Fail**
Cobalt	NCL - North	2 ft	20	24	7.73	2.18	4.5	7.05	13.5	8.1	**1.67**	**Fail**
Cobalt	Wetlands Beach	0-6 in	36	95	2.96	2.49	0.62	1.6	13.8	8.1	**1.70**	**Fail**
Cobalt	Wetlands Beach	2 ft	34	70	1.59	1.69	0.68	1	8.6	8.1	**1.06**	**Fail**
Cobalt	Wetlands Beach	2 to 6	8	20	3.21	3.16	1	1.3	10.2	8.1	**1.26**	**Fail**
Copper	NCL - East	0-6 in	93	93	356.21	785.59	15.9	61.3	3950	20.2	**195.54**	**Fail**
Copper	NCL - East	2 ft	58	58	23.38	26.74	8.1	15.35	160	20.2	**7.92**	**Fail**
Copper	NCL - North	0-6 in	45	45	36.38	49.91	12.9	17	270	20.2	**13.37**	**Fail**
Copper	NCL - North	2 ft	24	24	22.98	19.73	7.9	16.8	97.4	20.2	**4.82**	**Fail**
Copper	Wetlands Beach	0-6 in	88	95	568.04	1026.52	1.9	68	5480	20.2	**271.29**	**Fail**
Copper	Wetlands Beach	2 ft	65	70	28.76	93.83	1.4	7.85	772	20.2	**38.22**	**Fail**
Copper	Wetlands Beach	2 to 6	17	20	26.24	43.53	1.8	15.45	191	20.2	**9.46**	**Fail**
Iron	NCL - East	0-6 in	93	93	16704.84	4669.95	5370	16900	36400	22300	**1.63**	**Fail**
Iron	NCL - East	2 ft	58	58	19446.55	5765.72	10700	18050	40000	22300	**1.79**	**Fail**
Iron	NCL - North	0-6 in	45	45	18365.78	5154.09	9060	16400	34500	22300	**1.55**	**Fail**
Iron	NCL - North	2 ft	24	24	21308.33	6663.72	10700	19550	40400	22300	**1.81**	**Fail**
Iron	Wetlands Beach	0-6 in	95	95	7191.37	4170.01	2370	5790	22800	22300	**1.02**	**Fail**
Iron	Wetlands Beach	2 ft	70	70	5938.29	5142.96	2570	4175	26200	22300	**1.17**	**Fail**
Iron	Wetlands Beach	2 to 6	20	20	10562.50	9475.89	3310	5520	32700	22300	**1.47**	**Fail**
Lead	NCL - East	0-6 in	93	93	63.49	95.70	7.3	23.2	616	14.4	**42.78**	**Fail**
Lead	NCL - East	2 ft	58	58	8.51	6.51	4	6.15	41.8	14.4	**2.90**	**Fail**
Lead	NCL - North	0-6 in	45	45	34.46	55.66	6.1	11.3	306	14.4	**21.25**	**Fail**

TABLE 2-14

Background Comparison of Inorganic Analytes in Soil by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison: Background UTL (mg/kg)	Background Comparison: Background to Maximum	Result
Lead	NCL - North	2 ft	24	24	13.83	12.71	3	7.4	58	14.4	**4.03**	**Fail**
Lead	Wetlands Beach	0-6 in	95	95	66.93	116.55	1.6	15.5	641	14.4	**44.51**	**Fail**
Lead	Wetlands Beach	2 ft	70	70	6.67	11.15	0.92	2.6	69.7	14.4	**4.84**	**Fail**
Lead	Wetlands Beach	2 to 6	20	20	5.60	5.11	1.3	3.8	21.5	14.4	**1.49**	**Fail**
Magnesium	NCL - East	0-6 in	93	93	11860.00	10271.23	1490	8300	55600	8430	**6.60**	**Fail**
Magnesium	NCL - East	2 ft	58	58	7174.14	2186.08	3480	6560	14300	8430	**1.70**	**Fail**
Magnesium	NCL - North	0-6 in	45	45	6341.11	3259.55	3480	4800	22800	8430	**2.70**	**Fail**
Magnesium	NCL - North	2 ft	24	24	8153.75	3114.10	3440	7395	16500	8430	**1.96**	**Fail**
Magnesium	Wetlands Beach	0-6 in	95	95	6212.20	7886.15	811	2100	35300	8430	**4.19**	**Fail**
Magnesium	Wetlands Beach	2 ft	70	70	1970.43	2458.34	643	1025	11300	8430	**1.34**	**Fail**
Magnesium	Wetlands Beach	2 to 6	20	20	3753.50	3300.37	1040	1680	9810	8430	**1.16**	**Fail**
Manganese	NCL - East	0-6 in	93	93	408.41	361.01	62.5	295	2100	399	**5.26**	**Fail**
Manganese	NCL - East	2 ft	58	58	329.19	93.26	202	308	606	399	**1.52**	**Fail**
Manganese	NCL - North	0-6 in	45	45	267.77	145.96	90.8	249	986	399	**2.47**	**Fail**
Manganese	NCL - North	2 ft	24	24	367.79	138.22	129	343.5	670	399	**1.68**	**Fail**
Manganese	Wetlands Beach	0-6 in	95	95	319.31	398.53	42.5	127	1870	399	**4.69**	**Fail**
Manganese	Wetlands Beach	2 ft	70	70	90.59	108.58	28.5	49.05	626	399	**1.57**	**Fail**
Manganese	Wetlands Beach	2 to 6	20	20	209.73	247.43	44.5	82.2	1060	399	**2.66**	**Fail**
Mercury	NCL - East	0-6 in	23	93	0.07	0.05	0.011	0.057	0.18	0.05	**3.60**	**Fail**
Mercury	NCL - East	2 ft	9	58	0.09	0.06	0.013	0.105	0.23	0.05	**4.60**	**Fail**
Mercury	NCL - North	0-6 in	9	45	0.10	0.06	0.014	0.1	0.23	0.05	**4.60**	**Fail**
Mercury	NCL - North	2 ft	6	24	0.10	0.05	0.018	0.12	0.2	0.05	**4.00**	**Fail**
Mercury	Wetlands Beach	0-6 in	10	95	0.12	0.16	0.011	0.1	1.3	0.05	**26.00**	**Fail**
Mercury	Wetlands Beach	2 ft	7	69	0.13	0.13	0.011	0.12	1.1	0.05	**22.00**	**Fail**
Mercury	Wetlands Beach	2 to 6	5	20	0.10	0.04	0.016	0.12	0.14	0.05	**2.80**	**Fail**
Nickel	NCL - East	0-6 in	92	93	31.82	32.62	5	19.7	179	21.2	**8.44**	**Fail**
Nickel	NCL - East	2 ft	58	58	18.26	6.85	9.2	16.7	46.3	21.2	**2.18**	**Fail**
Nickel	NCL - North	0-6 in	45	45	18.86	6.89	10.1	15.9	42.9	21.2	**2.02**	**Fail**
Nickel	NCL - North	2 ft	24	24	20.96	6.31	9.1	19.9	33.3	21.2	**1.57**	**Fail**
Nickel	Wetlands Beach	0-6 in	82	95	30.87	43.55	2.4	10.3	204	21.2	**9.62**	**Fail**
Nickel	Wetlands Beach	2 ft	54	70	5.69	7.11	2.3	3.35	50.4	21.2	**2.38**	**Fail**
Nickel	Wetlands Beach	2 to 6	16	20	9.64	8.19	2.8	4.75	28.8	21.2	**1.36**	**Fail**
Potassium	NCL - East	0-6 in	93	93	3857.84	1341.37	770	3750	7300	3910	**1.87**	**Fail**
Potassium	NCL - East	2 ft	58	58	5134.14	2696.78	2320	4290	19900	3910	**5.09**	**Fail**
Potassium	NCL - North	0-6 in	45	45	3887.33	1015.28	1930	3450	6690	3910	**1.71**	**Fail**
Potassium	NCL - North	2 ft	24	24	4135.83	1322.82	1920	3905	6800	3910	**1.74**	**Fail**
Potassium	Wetlands Beach	0-6 in	77	95	956.55	1003.60	267	517	5210	3910	**1.33**	**Fail**
Potassium	Wetlands Beach	2 ft	48	70	879.37	1446.72	238	441.5	7540	3910	**1.93**	**Fail**
Potassium	Wetlands Beach	2 to 6	13	20	2105.55	2851.52	330	550	11300	3910	**2.89**	**Fail**

TABLE 2-14

Background Comparison of Inorganic Analytes in Soil by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Area	Depth	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Background Comparison: Background UTL (mg/kg)	Background Comparison: Background to Maximum	Result
Selenium	NCL - East	0-6 in	85	93	1.28	1.03	0.3	0.93	5.6	0.8	**7.00**	**Fail**
Selenium	NCL - East	2 ft	58	58	0.69	0.25	0.36	0.62	1.8	0.8	**2.25**	**Fail**
Selenium	NCL - North	0-6 in	33	45	1.66	2.36	0.17	0.8	15.2	0.8	**19.00**	**Fail**
Selenium	NCL - North	2 ft	15	24	1.24	1.38	0.064	0.615	6	0.8	**7.50**	**Fail**
Selenium	Wetlands Beach	0-6 in	60	95	1.17	1.46	0.033	0.66	8.1	0.8	**10.13**	**Fail**
Selenium	Wetlands Beach	2 ft	34	70	0.70	0.32	0.029	0.65	2.2	0.8	**2.75**	**Fail**
Selenium	Wetlands Beach	2 to 6	12	20	0.60	0.17	0.27	0.63	0.86	0.8	**1.08**	**Fail**
Silver	NCL - East	0-6 in	52	93	0.79	0.99	0.1	0.51	4.9	NA	**--**	**Fail**
Silver	NCL - East	2 ft	7	58	0.61	0.18	0.13	0.63	1.2	NA	**--**	**Fail**
Silver	NCL - North	0-6 in	9	45	0.69	1.17	0.22	0.51	8.3	NA	**--**	**Fail**
Silver	NCL - North	2 ft	2	24	0.59	0.18	0.35	0.585	1.3	NA	**--**	**Fail**
Silver	Wetlands Beach	0-6 in	47	95	0.90	1.00	0.12	0.5	6.5	NA	**--**	**Fail**
Silver	Wetlands Beach	2 ft	27	70	0.58	0.42	0.13	0.575	3.4	NA	**--**	**Fail**
Silver	Wetlands Beach	2 to 6	8	20	0.55	0.14	0.22	0.605	0.67	NA	**--**	**Fail**
Sodium	NCL - East	0-6 in	92	93	5619.81	6935.54	152	2620	42700	9550	**4.47**	**Fail**
Sodium	NCL - East	2 ft	58	58	2964.79	2283.52	977	1840	9610	9550	**1.01**	**Fail**
Sodium	NCL - North	0-6 in	32	45	1398.78	1296.75	139	1070	5120	9550	0.54	**Pass**
Sodium	NCL - North	2 ft	24	24	1832.92	837.11	797	1600	3700	9550	0.39	**Pass**
Sodium	Wetlands Beach	0-6 in	84	95	1530.52	2910.91	69.2	414	22900	9550	**2.40**	**Fail**
Sodium	Wetlands Beach	2 ft	61	70	695.94	1171.05	54.9	471	9180	9550	0.96	**Pass**
Sodium	Wetlands Beach	2 to 6	20	20	1327.10	1126.27	397	880.5	4110	9550	0.43	**Pass**
Thallium	NCL - East	0-6 in	84	93	0.20	0.14	0.04	0.18	0.99	0.27	**3.67**	**Fail**
Thallium	NCL - East	2 ft	58	58	0.23	0.08	0.1	0.2	0.49	0.27	**1.81**	**Fail**
Thallium	NCL - North	0-6 in	23	45	0.32	0.18	0.048	0.31	0.67	0.27	**2.48**	**Fail**
Thallium	NCL - North	2 ft	5	24	0.47	0.17	0.18	0.485	0.74	0.27	**2.74**	**Fail**
Thallium	Wetlands Beach	0-6 in	66	95	0.20	0.24	0.018	0.069	1.4	0.27	**5.19**	**Fail**
Thallium	Wetlands Beach	2 ft	52	70	0.17	0.21	0.016	0.0335	0.97	0.27	**3.59**	**Fail**
Thallium	Wetlands Beach	2 to 6	20	20	0.14	0.18	0.022	0.0415	0.67	0.27	**2.48**	**Fail**
Vanadium	NCL - East	0-6 in	93	93	34.68	16.15	12.8	31.3	125	32.5	**3.85**	**Fail**
Vanadium	NCL - East	2 ft	58	58	31.61	11.23	16.6	28.05	70.4	32.5	**2.17**	**Fail**
Vanadium	NCL - North	0-6 in	45	45	33.06	13.01	16.2	27.4	62.7	32.5	**1.93**	**Fail**
Vanadium	NCL - North	2 ft	24	24	34.60	10.20	11.2	32.95	56.4	32.5	**1.74**	**Fail**
Vanadium	Wetlands Beach	0-6 in	95	95	28.90	19.76	4.2	25.9	74.7	32.5	**2.30**	**Fail**
Vanadium	Wetlands Beach	2 ft	70	70	20.93	18.07	3.4	10.25	67.1	32.5	**2.06**	**Fail**
Vanadium	Wetlands Beach	2 to 6	20	20	17.49	14.43	4.9	9.2	49.3	32.5	**1.52**	**Fail**
Zinc	NCL - East	0-6 in	93	93	396.47	752.37	30.8	114	4570	69.7	**65.57**	**Fail**
Zinc	NCL - East	2 ft	58	58	60.44	40.92	24.7	50.05	311	69.7	**4.46**	**Fail**
Zinc	NCL - North	0-6 in	45	45	133.51	144.34	52	66.5	790	69.7	**11.33**	**Fail**
Zinc	NCL - North	2 ft	24	24	79.50	48.72	32.2	64.45	253	69.7	**3.63**	**Fail**
Zinc	Wetlands Beach	0-6 in	95	95	494.70	799.83	9.4	98.8	3800	69.7	**54.52**	**Fail**

TABLE 2-14

Background Comparison of Inorganic Analytes in Soil by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										Background Comparison		
Analyte	**Area**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Background UTL (mg/kg)**	**Background to Maximum**	**Result**
Zinc	Wetlands Beach	2 ft	67	70	306.21	2267.29	6	17.9	19000	69.7	**272.60**	**Fail**
Zinc	Wetlands Beach	2 to 6	20	20	51.61	94.92	7.8	25.75	441	69.7	**6.33**	**Fail**

Notes:

-- = background value not available

Fail = site maximum is greater than the background UTL

mg/kg = milligrams per kilogram

Pass = site maximum is less than the background UTL

UTL = upper tolerance limit

Bold indicates exceedance of the UTL

Shading indicates the site maximum is greater than background.

TABLE 2-15

Summary of Reproductive Success Observations for California Least Terns in the Vicinity of the Halaco Site (Ormond Beach) and for All Colonies in California

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Year	Location	Estimated Number of Breeding Pairs		Number of Nests	Estimated Number of Fledglings		Fledglings/pair			Reference
		Minimum	Maximum		Minimum	Maximum	Minimum	Median	Maximum	
2011	Ormond Beach	49	51	60	12	12	0.24	0.24	0.24	Marschalek (2012)
2011	Totals	4826	6108	6435	1038	1195	0.17	0.21	0.25	Marschalek (2012)
2010	Ormond Beach	48	48	48	16	16	0.33	0.33	0.33	Marschalek (2011)
2010	Totals	6437	6699+	6968+	1971	2245+	0.29	0.32	0.35	Marschalek (2011)
2009	Ormond Beach	43	44	44	24	24	0.55	0.555	0.56	Marschalek (2010)
2009	Totals	7130	7352+	8037-8045+	1734	2132	0.24	0.27	0.3	Marschalek (2010)
2007	Ormond Beach	49	50	52	35	35	0.7	0.705	0.71	Marschalek (2008)
2007	Totals	6744	6989	7667	2293	2639	0.33	0.36	0.39	Marschalek (2008)
2000	Ormond Beach	73	73	73	60	65	0.82	0.855	0.89	Patton (2002)
2000	Totals	4521	4790	5301	3710	4013	0.77	0.83	0.89	Patton (2002)

TABLE 3-1

Literature-Based Ecological Benchmarks for Water, Sediment, and Soil

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Freshwater NRWQC (unless otherwise noted) µg/L			Marine NRWQC (unless otherwise noted) µg/L			Freshwater Sediment mg/kg (MacDonald et al., 2000)		Freshwater Sediment mg/kg (Buchmann, 2008)	Marine Sediment mg/kg (Field et al., 2002)		Marine Sediment mg/kg (Buchmann, 2008)	Soil (mg/kg) EcoSSLs (unless otherwise noted)			
	CMC	**CCC**		**CMC**	**CCC**		**TEC**	**PEC**	**UET**	**T20**	**T50**	**AET**	**Plant**	**Invert**	**Bird**	**Mammal**
Aluminum	750	87	T									18000	50[b]	--	--	--
Antimony	180[a]	30[a]	D		500[e]				3	0.63	2.4	9.3	5[b]	78	--	0.27
Arsenic	340	150	D	69	36	D	9.79	33	17	7.4	20	35	18	60[c]	43	46
Barium	110[a]	4[a]	T									48	500[b]	330	--	2000
Beryllium	35[a]	0.66[a]	T										10[b]	40	--	21
Boron	30[a]	1.6[a]	T		1000[g]	T							0.5[b]			
Cadmium	27.5*	1.6*	T	40	8.8	D	0.99	4.98	3	0.38	1.4	3	32	140	0.77	0.36
Calcium		116000[d]	T													
Chromium III	5189*	675*	D										--	--	26	34
Chromium VI	16	11	D	1100	50	D							--	--	--	81
Chromium (Total)					103[e]	T	43.4	111	95	49	141	62	1[b]	0.4[c]	--	--
Cobalt	1500[a]	23[a]	T									10	13	--	120	230
Copper	171*	89.8*	D	4.8	3.1	D	31.6	149	86	32	94	390	70	80	28	49
Iron		1000	T						40000			22000				
Lead	1007*	39.3*	D	210	8.1	D	35.5	128	127	30	94	400	120	1700	11	56
Magnesium		82000[d]	T										--	--	--	--
Manganese	2300[a]	120[a]	T						1100			260	220	450	4300	4000
Mercury	1.4	0.77	T	1.8	0.94	D	0.18	1.06	0.56	0.14	0.48	0.41	0.3[b]	0.1[c]		
Molybdenum	16000[a]	370[a]	T										2[b]			
Nickel	4587*	509*	D	74	8.2	D	22.7	48.6	43	15	47	110	38	280	210	130
Potassium		53000[d]	T													
Selenium	--	5	T	290	71	D						1	0.52	4.1	1.2	0.63
Silver	333*	0.36[a]	D/T		2.3[f]	D			4.5	0.23	1.1	3.1	560	--	4.2	14
Sodium		680000[d]	T													
Thallium	110[a]	12[a]	T		21.3[e]	T							1[b]			
Vanadium	280[a]	20[a]	T									57	2[b]	--	7.8	280
Zinc	333*	1161*	D	90	81	D	121	459	520	94	247	410	160	120	46	79

TABLE 3-1

Literature-Based Ecological Benchmarks for Water, Sediment, and Soil

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Freshwater NRWQC (unless otherwise noted) µg/L		Marine NRWQC (unless otherwise noted) µg/L		Freshwater Sediment mg/kg (MacDonald et al., 2000)		Freshwater Sediment mg/kg (Buchmann, 2008)	Marine Sediment mg/kg (Field et al., 2002)		Marine Sediment mg/kg (Buchmann, 2008)	Soil (mg/kg) EcoSSLs (unless otherwise noted)			
	CMC	**CCC**	**CMC**	**CCC**	**TEC**	**PEC**	**UET**	**T20**	**T50**	**AET**	**Plant**	**Invert**	**Bird**	**Mammal**

Notes:

AET = Apparent Effects Threshold

CCC = Criterion Continuous Concentration

CMC = Criterion Maximum Concentration

D = based on dissolved metals concentration

EcoSSL = Ecological Soil Screening Levels (EPA various years)

EPA = U.S. Environmental Protection Agency

µg/L = micrograms per liter

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

NRWQC = National Recommended Water Quality Criteria (EPA, 2012)

PEC = Probable Effects Concentration

SAV = Secondary Acute Values

SCV = Secondary Chronic Values

T = based on total metals concentration

T20 = 20 percent probability of observing toxicity

T50 = 50 percent probability of observing toxicity

TEC = Threshold Effects Concentration

UET = Upper Effects Threshold

* Value is hardness dependent; NRWQC based on mean site hardness of 1484 mg/L.

[a] SAV and SCV from Suter and Tsao 1996

[b] from Efroymson et al. (1997a)

[c] from Efroymson et al. (1997b)

[d] Lowest chronic value for Daphnids from Suter and Tsao (1996)

[e] Texas Natural Resource Conservation Commission. 2001. Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas. Toxicology and Risk Assessment Section, Texas Natural Resource

[f] EPA Region 4 - Chronic - Saltwater

[g] from EPA (2015) - EPA Region 3 Biological Technical Assistance Group Marine Screening Benchmarks. http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/marine/screenbench.htm.

TABLE 3-2

Literature-Based Fish Tissue Benchmarks (wet weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			NOEC			LOEC			
Analyte	**Form**	**Units**	**NOEC**	**Test Species**	**Test Endpoint**	**LOEC**	**Test Species**	**Effect**	**Source**
Aluminum	Aluminum chloride	mg/kg	1	Atlantic salmon	Survival	8	Atlantic salmon	20% reduction in survival	Peterson et al., 1989
Antimony	Antimony potassium tartrate	mg/kg	5	Rainbow trout	Survival	9	Rainbow trout	50% reduction in survival	Doe et al., 1987
Arsenic	Sodium arsenate	mg/kg	1.5	Rainbow trout	Growth	2	Rainbow trout	Significantly lowered body weight	McGeachy and Dixon, 1990
Cadmium		mg/kg	0.13[a]	Brook trout	Growth	0.252[a]	Brook trout	Significantly lowered mean body weight in juveniles	Benoit et al., 1976
Copper		mg/kg	1.17[a]	Rainbow trout	Growth	1.71[a]	Rainbow trout	Significant decrease in body weight and length	Marr et al., 1996
Lead		mg/kg	2.54[a]	Brook trout	Growth	4.02[a]	Brook trout	Significantly lowered body weight	Holcombe et al., 1976
Mercury	Methyl-mercuric chloride	mg/kg	0.2	Mummichog	Survival	0.47	Mummichog	Survival	Matta et al., 2001
Selenium	Sodium selenate and Sodium selenite	mg/kg	0.6[a]	Bluegill	Survival	0.68[a]	Bluegill	20% reduction in survival	Cleveland et al., 1993
Silver		mg/kg	0.06[a]	Bluegill	Survival, growth	--	--	--	Coleman and Clearley, 1974
Vanadium	Vanadium pentoxide	mg/kg	0.57	Flagfish	Reproduction	2.22	Flagfish	Reduced growth	Jarvinen and Ankley, 1999*
Zinc		mg/kg	41.4[a]	Guppies	Reproduction	88.8[a]	Guppies	Delayed onset of sexual maturity	Pierson, 1981
2,3,7,8-TCDD		ng/kg	72	Rainbow trout	Growth	150	Rainbow trout	Significantly lowered body weight	Fisk et al., 1997

Notes:

*For reference, see Jarvinen and Ankley (1999)

-- = no data available

LOEC = lowest observed effect concentration

NOEC = no observed effect concentration

TABLE 3-3

Maximum Concentrations of Inorganics in Surface Water Compared to Literature-Derived Surface Water Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Number of Detects	N	Maximum (µg/L)	Surface Water Benchmark (µg/L)[a]	Basis[b]	Hazard Quotient	Result
Lagoon	Aluminum	2	4	161	87	T	**1.85**	**Retain**
Lagoon	Antimony	2	4	0.96	30	D	0.03	Pass
Lagoon	Arsenic	4	4	13.2	150	D	0.09	Pass
Lagoon	Barium	4	4	46	4	T	**11.50**	**Retain**
Lagoon	Beryllium	0	4	0.66	0.66	T	**1.00**	**Retain**
Lagoon	Cadmium	0	4	0.5	1.6	T	0.31	Pass
Lagoon	Calcium	4	4	320000	116000	T	**2.76**	**Retain**
Lagoon	Chromium	0	4	10	675	D	0.01	Pass
Lagoon	Cobalt	1	4	1.1	23	T	0.05	Pass
Lagoon	Copper	4	4	6.7	89.8	D	0.07	Pass
Lagoon	Iron	3	4	468	1000	T	0.47	Pass
Lagoon	Lead	2	4	0.62	39.3	D	0.02	Pass
Lagoon	Magnesium	4	4	380000	82000	T	**4.63**	**Retain**
Lagoon	Manganese	4	4	325	120	T	**2.71**	**Retain**
Lagoon	Mercury	0	4	0.2	0.77	T	0.26	Pass
Lagoon	Nickel	4	4	10.7	509	D	0.02	Pass
Lagoon	Potassium	4	4	101000	53000	T	**1.91**	**Retain**
Lagoon	Selenium	3	4	35	5	T	**7.00**	**Retain**
Lagoon	Silver	0	4	0.36	0.36	T	**1.00**	**Retain**
Lagoon	Sodium	4	4	2310000	680000	T	**3.40**	**Retain**
Lagoon	Thallium	0	4	1	12	T	0.08	Pass
Lagoon	Vanadium	4	4	3.2	20	T	0.16	Pass
Lagoon	Zinc	0	4	60	1161	D	0.05	Pass
NCL - East	Aluminum	3	4	559	87	T	**6.43**	**Retain**
NCL - East	Antimony	0	4	0.84	30	D	0.03	Pass
NCL - East	Arsenic	4	4	9.8	150	D	0.07	Pass
NCL - East	Barium	4	4	83.8	4	T	**20.95**	**Retain**
NCL - East	Beryllium	0	4	0.66	0.66	T	**1.00**	**Retain**
NCL - East	Cadmium	0	4	0.5	1.6	T	0.31	Pass
NCL - East	Calcium	4	4	244000	116000	T	**2.10**	**Retain**
NCL - East	Chromium	0	4	10	675	D	0.01	Pass
NCL - East	Cobalt	3	4	0.95	23	T	0.04	Pass
NCL - East	Copper	4	4	12.5	89.8	D	0.14	Pass
NCL - East	Iron	2	4	465	1000	T	0.47	Pass
NCL - East	Lead	0	4	1	39.3	D	0.03	Pass
NCL - East	Magnesium	4	4	267000	82000	T	**3.26**	**Retain**
NCL - East	Manganese	4	4	210	120	T	**1.75**	**Retain**
NCL - East	Mercury	1	4	0.2	0.77	T	0.26	Pass
NCL - East	Nickel	4	4	8.8	509	D	0.02	Pass
NCL - East	Potassium	4	4	87500	53000	T	**1.65**	**Retain**
NCL - East	Selenium	0	4	35	5	T	**7.00**	**Retain**
NCL - East	Silver	0	4	0.36	0.36	T	**1.00**	**Retain**
NCL - East	Sodium	4	4	1780000	680000	T	**2.62**	**Retain**
NCL - East	Thallium	0	4	1	12	T	0.08	Pass
NCL - East	Vanadium	3	4	2.9	20	T	0.15	Pass
NCL - East	Zinc	2	4	12.9	1161	D	0.01	Pass
OID	Aluminum	6	20	214	87	T	**2.46**	**Retain**
OID	Antimony	9	20	1.1	30	D	0.04	Pass
OID	Arsenic	20	20	12.3	150	D	0.08	Pass
OID	Barium	20	20	48.7	4	T	**12.18**	**Retain**
OID	Beryllium	1	20	0.66	0.66	T	**1.00**	**Retain**
OID	Cadmium	1	20	0.5	1.6	T	0.31	Pass
OID	Calcium	20	20	384000	116000	T	**3.31**	**Retain**
OID	Chromium	0	20	10	675	D	0.01	Pass
OID	Cobalt	12	20	1.3	23	T	0.06	Pass
OID	Copper	20	20	10.7	89.8	D	0.12	Pass
OID	Iron	20	20	696	1000	T	0.70	Pass

TABLE 3-3

Maximum Concentrations of Inorganics in Surface Water Compared to Literature-Derived Surface Water Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Number of Detects	N	Maximum (µg/L)	Surface Water Benchmark (µg/L)[a]	Basis[b]	Hazard Quotient	Result
OID	Lead	19	20	0.7	39.3	D	0.02	Pass
OID	Magnesium	20	20	358000	82000	T	**4.37**	**Retain**
OID	Manganese	21	21	378	120	T	**3.15**	**Retain**
OID	Mercury	0	20	0.2	0.77	T	0.26	Pass
OID	Nickel	20	20	12.9	509	D	0.03	Pass
OID	Potassium	20	20	95200	53000	T	**1.80**	**Retain**
OID	Selenium	7	20	35	5	T	**7.00**	**Retain**
OID	Silver	2	20	0.36	0.36	T	**1.00**	**Retain**
OID	Sodium	20	20	2190000	680000	T	**3.22**	**Retain**
OID	Thallium	0	20	1	12	T	0.08	Pass
OID	Vanadium	19	20	3.6	20	T	0.18	Pass
OID	Zinc	0	20	60	1161	D	0.05	Pass
Other drains	Aluminum	1	4	167	87	T	**1.92**	**Retain**
Other drains	Antimony	1	4	2	30	D	0.07	Pass
Other drains	Arsenic	4	4	16.9	150	D	0.11	Pass
Other drains	Barium	4	4	68.8	4	T	**17.20**	**Retain**
Other drains	Beryllium	0	4	2.6	0.66	T	**3.94**	**Retain**
Other drains	Cadmium	0	4	1	1.6	T	0.63	Pass
Other drains	Calcium	4	4	265000	116000	T	**2.28**	**Retain**
Other drains	Chromium	0	4	10	675	D	0.01	Pass
Other drains	Cobalt	0	4	0.7	23	T	0.03	Pass
Other drains	Copper	4	4	3.9	89.8	D	0.04	Pass
Other drains	Iron	4	4	1810	1000	T	**1.81**	**Retain**
Other drains	Lead	0	4	2	39.3	D	0.05	Pass
Other drains	Magnesium	4	4	535000	82000	T	**6.52**	**Retain**
Other drains	Manganese	4	4	527	120	T	**4.39**	**Retain**
Other drains	Mercury	0	4	0.2	0.77	T	0.26	Pass
Other drains	Nickel	4	4	7.6	509	D	0.01	Pass
Other drains	Potassium	4	4	173000	53000	T	**3.26**	**Retain**
Other drains	Selenium	0	4	35	5	T	**7.00**	**Retain**
Other drains	Silver	0	4	0.72	0.36	T	**2.00**	**Retain**
Other drains	Sodium	4	4	4410000	680000	T	**6.49**	**Retain**
Other drains	Thallium	0	4	2	12	T	0.17	Pass
Other drains	Vanadium	3	4	1.8	20	T	0.09	Pass
Other drains	Zinc	0	4	60	1161	D	0.05	Pass
Seawater	Aluminum	2	4	110	--	--	--	Uncertainty
Seawater	Antimony	0	4	10	500	D	0.02	Pass
Seawater	Arsenic	4	4	39.5	36	D	**1.10**	**Retain**
Seawater	Barium	2	4	9.1	--	--	--	Uncertainty
Seawater	Beryllium	0	4	3.3	--	--	--	Uncertainty
Seawater	Cadmium	0	4	2.5	8.8	T	0.28	Pass
Seawater	Calcium	4	4	332000	--	--	--	Uncertainty
Seawater	Chromium	0	4	10	103	T	0.10	Pass
Seawater	Cobalt	2	4	1.2	--	--	--	Uncertainty
Seawater	Copper	2	4	4	3.1	D	**1.29**	**Retain**
Seawater	Iron	0	4	158	--	--		Uncertainty
Seawater	Lead	0	4	5	8.1	D	0.62	Pass
Seawater	Magnesium	4	4	1280000	--	--	--	Uncertainty
Seawater	Manganese	2	4	6.1	--	--	--	Uncertainty
Seawater	Mercury	0	4	0.2	0.94	T	0.21	Pass
Seawater	Nickel	4	4	7.7	8.2	D	0.94	Pass
Seawater	Potassium	4	4	498000	--	--	--	Uncertainty
Seawater	Selenium	0	4	35	71	T	0.49	Pass
Seawater	Silver	0	4	1.8	2.3	T	0.78	Pass
Seawater	Sodium	4	4	10600000	--	--	--	Uncertainty
Seawater	Thallium	0	4	5	21.3	T	0.23	Pass
Seawater	Vanadium	2	4	6.3	--	--	--	Uncertainty

TABLE 3-3

Maximum Concentrations of Inorganics in Surface Water Compared to Literature-Derived Surface Water Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Number of Detects	N	Maximum (µg/L)	Surface Water Benchmark (µg/L)[a]	Basis[b]	Hazard Quotient	Result
Seawater	Zinc	0	4	60	81	D	0.74	Pass
WMU ditch	Aluminum	0	2	107	87	T	**1.23**	**Retain**
WMU ditch	Antimony	2	2	0.56	30	D	0.02	Pass
WMU ditch	Arsenic	2	2	5	150	D	0.03	Pass
WMU ditch	Barium	2	2	46.2	4	T	**11.55**	**Retain**
WMU ditch	Beryllium	0	2	0.66	0.66	T	**1.00**	**Retain**
WMU ditch	Cadmium	0	2	0.5	1.6	T	0.31	Pass
WMU ditch	Calcium	2	2	224000	116000	T	**1.93**	**Retain**
WMU ditch	Chromium	0	2	10	675	D	0.01	Pass
WMU ditch	Cobalt	0	2	0.63	23	T	0.03	Pass
WMU ditch	Copper	2	2	2.6	89.8	D	0.03	Pass
WMU ditch	Iron	1	2	149	1000	T	0.15	Pass
WMU ditch	Lead	0	2	0.19	39.3	D	0.005	Pass
WMU ditch	Magnesium	2	2	117000	82000	T	**1.43**	**Retain**
WMU ditch	Manganese	2	2	188	120	T	**1.57**	**Retain**
WMU ditch	Mercury	0	2	0.2	0.77	T	0.26	Pass
WMU ditch	Nickel	2	2	8	509	D	0.02	Pass
WMU ditch	Potassium	2	2	23500	53000	T	0.44	Pass
WMU ditch	Selenium	0	2	35	5	T	**7.00**	**Retain**
WMU ditch	Silver	0	2	0.36	0.36	T	**1.00**	**Retain**
WMU ditch	Sodium	2	2	522000	680000	T	0.77	Pass
WMU ditch	Thallium	0	2	1	12	T	0.08	Pass
WMU ditch	Vanadium	2	2	1.9	20	T	0.10	Pass
WMU ditch	Zinc	0	2	60	1161	D	0.05	Pass

Notes:

-- = benchmark value not available

D = dissolved

Pass = maximum concentration was less than the surface water benchmark; therefore, there are no risks to the aquatic biota community and no further evaluation was necessary.

N = number of samples

Retain = maximum concentration exceeded the surface water benchmark; therefore, this analyte was retained for further evaluation.

T = total

.Uncertainty = benchmark value not available; therefore, this analyte was retained as an uncertainty

[a] All surface water screened using chronic freshwater values with the exception of seawater which was screened using chronic marine values (see Table 3-1) details.

[b] If benchmark is based on the dissolved contaminant concentration, dissolved data are used to calculate the HQ. If benchmark is based on total contaminant concentration, total data are used to calculate the HQ.

Bold and shading indicates analyte-area combination retained for further evaluation by subarea.

TABLE 3-4

Maximum Concentrations of Inorganic Analytes in Fish Tissue (whole body - mg/kg, wet weight) Compared to Literature-Derived Fish Tissue Benchmarks by Biota Type

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										Fish Tissue Benchmarks		Hazard Quotients		
Analyte	**Biota Type**	**Taxa**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**P90**	**Maximum**	**NOEC**	**LOEC**	**NOEC**	**LOEC**	**Result**
Aluminum	Bottom Fish	Carp/goldfish	2	34	18.38	21	34	47	47	1	8	**47.0**	**5.9**	**Retain**
Aluminum	Bottom Fish	Gobies	7	50.00	21.17	26	54	74	74	1	8	**74.0**	**9.3**	**Retain**
Aluminum	Bottom Fish		9	46.44	20.69	21	47	74	74	1	8	**74.0**	**9.3**	**Retain**
Aluminum			9	46.44	20.69	21	47	74	74	1	8	**74.0**	**9.3**	**Retain**
Barium	Bottom Fish	Carp/goldfish	1	7		7	7	7	7	--	--	**--**	**--**	Uncertainty
Barium	Bottom Fish	Gobies	3	3.00	1.00	2	3	4	4	--	--	**--**	**--**	Uncertainty
Barium	Bottom Fish		4	4	2.16	2	3.5	7	7	--	--	**--**	**--**	Uncertainty
Barium			4	4	2.16	2	3.5	7	7	--	--	**--**	**--**	Uncertainty
Calcium	Bottom Fish	Carp/goldfish	4	7488	3872	2320	8190	11250	11250	--	--	**--**	**--**	Uncertainty
Calcium	Bottom Fish	Gobies	13	7474	2195	4680	7100	9030	13200	--	--	**--**	**--**	Uncertainty
Calcium	Bottom Fish	Long-jawed mudsuckers	1	4483		4483	4483	4483	4483	--	--	**--**	**--**	Uncertainty
Calcium	Bottom Fish	Staghorn sculpin	1	8700		8700	8700	8700	8700	--	--	**--**	**--**	Uncertainty
Calcium	Bottom Fish		19	7384	2506	2320	7100	11250	13200	--	--	**--**	**--**	Uncertainty
Calcium	Water Column Fish	Topsmelt	10	6390	1389	3323	6725.5	7808.5	8032	--	--	**--**	**--**	Uncertainty
Calcium	Water Column Fish		10	6390	1389	3323	6725.5	7808.5	8032	--	--	**--**	**--**	Uncertainty
Calcium			29	7041	2211	2320	6940	9440	13200	--	--	**--**	**--**	Uncertainty
Chromium	Bottom Fish	Carp/goldfish	2	1.5	0.71	1	1.5	2	2	--	--	**--**	**--**	Uncertainty
Chromium	Bottom Fish	Gobies	4	1.5	0.58	1	1.5	2	2	--	--	**--**	**--**	Uncertainty
Chromium	Bottom Fish		6	1.5	0.55	1	1.5	2	2	--	--	**--**	**--**	Uncertainty
Chromium			6	1.5	0.55	1	1.5	2	2	--	--	**--**	**--**	Uncertainty
Copper	Bottom Fish	Carp/goldfish	1	2		2	2	2	2	1.17	1.71	**1.7**	**1.2**	**Retain**
Copper	Bottom Fish	Gobies	2	2.5	0.71	2	2.5	3	3	1.17	1.71	**2.6**	**1.8**	**Retain**
Copper	Bottom Fish	Staghorn sculpin	1	2		2	2	2	2	1.17	1.71	**1.7**	**1.2**	**Retain**
Copper	Bottom Fish		4	2.25	0.50	2	2	3	3	1.17	1.71	**2.6**	**1.8**	**Retain**
Copper	Water Column Fish	Topsmelt	1	3		3	3	3	3	1.17	1.71	**2.6**	**1.8**	**Retain**
Copper	Water Column Fish		1	3		3	3	3	3	1.17	1.71	**2.6**	**1.8**	**Retain**
Copper			5	2.4	0.55	2	2	3	3	1.17	1.71	**2.6**	**1.8**	**Retain**
Iron	Bottom Fish	Carp/goldfish	4	44.5	25.16	23	38	79	79	--	--	**--**	**--**	Uncertainty
Iron	Bottom Fish	Gobies	13	44.00	19.40	17	41	68	74	--	--	**--**	**--**	Uncertainty
Iron	Bottom Fish	Long-jawed mudsuckers	1	24		24	24	24	24	--	--	**--**	**--**	Uncertainty
Iron	Bottom Fish	Staghorn sculpin	1	25		25	25	25	25	--	--	**--**	**--**	Uncertainty
Iron	Bottom Fish		19	42.05	19.86	17	34	74	79	--	--	**--**	**--**	Uncertainty
Iron	Water Column Fish	Topsmelt	10	32.5	16.39	21	27	59.5	75	--	--	**--**	**--**	Uncertainty
Iron	Water Column Fish		10	32.5	16.39	21	27	59.5	75	--	--	**--**	**--**	Uncertainty
Iron			29	38.76	19.01	17	29	74	79	--	--	**--**	**--**	Uncertainty
Magnesium	Bottom Fish	Carp/goldfish	4	337.25	149.54	123	385.5	455	455	--	--	**--**	**--**	Uncertainty
Magnesium	Bottom Fish	Gobies	13	346.38	66.06	272	342	398	524	--	--	**--**	**--**	Uncertainty
Magnesium	Bottom Fish	Long-jawed mudsuckers	1	197		197	197	197	197	--	--	**--**	**--**	Uncertainty
Magnesium	Bottom Fish	Staghorn sculpin	1	350		350	350	350	350	--	--	**--**	**--**	Uncertainty
Magnesium	Bottom Fish		19	336.79	88.31	123	349	455	524	--	--	**--**	**--**	Uncertainty
Magnesium	Water Column Fish	Topsmelt	10	323	50.17	220	326	384	419	--	--	**--**	**--**	Uncertainty
Magnesium	Water Column Fish		10	323	50.17	220	326	384	419	--	--	**--**	**--**	Uncertainty
Magnesium			29	332.03	76.59	123	338	422	524	--	--	**--**	**--**	Uncertainty

TABLE 3-4

Maximum Concentrations of Inorganic Analytes in Fish Tissue (whole body - mg/kg, wet weight) Compared to Literature-Derived Fish Tissue Benchmarks by Biota Type

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										Fish Tissue Benchmarks		Hazard Quotients		
Analyte	**Biota Type**	**Taxa**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**P90**	**Maximum**	**NOEC**	**LOEC**	**NOEC**	**LOEC**	**Result**
Manganese	Bottom Fish	Carp/goldfish	4	8.75	2.50	6	8.5	12	12	--	--	**--**	**--**	Uncertainty
Manganese	Bottom Fish	Gobies	13	10.46	6.33	6	9	13	30	--	--	**--**	**--**	Uncertainty
Manganese	Bottom Fish	Long-jawed mudsuckers	1	3		3	3	3	3	--	--	**--**	**--**	Uncertainty
Manganese	Bottom Fish	Staghorn sculpin	1	4		4	4	4	4	--	--	**--**	**--**	Uncertainty
Manganese	Bottom Fish		19	9.37	5.71	3	8	13	30	--	--	**--**	**--**	Uncertainty
Manganese	Water Column Fish	Topsmelt	10	7	1.15	5	7	8.5	9	--	--	**--**	**--**	Uncertainty
Manganese	Water Column Fish		10	7	1.15	5	7	8.5	9	--	--	**--**	**--**	Uncertainty
Manganese			29	8.55	4.76	3	8	13	30	--	--	**--**	**--**	Uncertainty
Mercury	Bottom Fish	Carp/goldfish	1	0.003		0.003	0.003	0.003	0.003	0.2	0.47	0.015	0.006	Pass
Mercury	Bottom Fish	Gobies	4	0.004	0.001	0.003	0.004	0.005	0.005	0.2	0.47	0.025	0.011	Pass
Mercury	Bottom Fish	Long-jawed mudsuckers	1	0.004		0.004	0.004	0.004	0.004	0.2	0.47	0.020	0.009	Pass
Mercury	Bottom Fish	Staghorn sculpin	1	0.002		0.002	0.002	0.002	0.002	0.2	0.47	0.010	0.004	Pass
Mercury	Bottom Fish		7	0.004	0.001	0.002	0.004	0.005	0.005	0.2	0.47	0.025	0.011	Pass
Mercury	Water Column Fish	Topsmelt	9	0.003	0.001	0.003	0.003	0.004	0.004	0.2	0.47	0.020	0.009	Pass
Mercury	Water Column Fish		9	0.003	0.001	0.003	0.003	0.004	0.004	0.2	0.47	0.020	0.009	Pass
Mercury			16	0.004	0.001	0.002	0.0035	0.004	0.005	0.2	0.47	0.025	0.011	Pass
Potassium	Bottom Fish	Carp/goldfish	4	2128	1016	645	2460	2948	2948	--	--	**--**	**--**	Uncertainty
Potassium	Bottom Fish	Gobies	13	2540	564	1650	2660	3010	3770	--	--	**--**	**--**	Uncertainty
Potassium	Bottom Fish	Long-jawed mudsuckers	1	2362		2362	2362	2362	2362	--	--	**--**	**--**	Uncertainty
Potassium	Bottom Fish	Staghorn sculpin	1	2190		2190	2190	2190	2190	--	--	**--**	**--**	Uncertainty
Potassium	Bottom Fish		19	2426	646	645	2420	3010	3770	--	--	**--**	**--**	Uncertainty
Potassium	Water Column Fish	Topsmelt	10	1629	543	722	1808	2205	2342	--	--	**--**	**--**	Uncertainty
Potassium	Water Column Fish		10	1629	543	722	1808	2205	2342	--	--	**--**	**--**	Uncertainty
Potassium			29	2151	715	645	2190	2948	3770	--	--	**--**	**--**	Uncertainty
Selenium	Bottom Fish	Carp/goldfish	3	2.00	0.00	2	2	2	2	0.6	0.68	**3.3**	**2.9**	**Retain**
Selenium	Bottom Fish	Gobies	11	1.45	0.52	1	1	2	2	0.6	0.68	**3.3**	**2.9**	**Retain**
Selenium	Bottom Fish	Staghorn sculpin	1	1		1	1	1	1	0.6	0.68	**1.7**	**1.5**	**Retain**
Selenium	Bottom Fish		15	1.53	0.52	1	2	2	2	0.6	0.68	**3.3**	**2.9**	**Retain**
Selenium	Water Column Fish	Topsmelt	6	1.17	0.41	1	1	2	2	0.6	0.68	**3.3**	**2.9**	**Retain**
Selenium	Water Column Fish		6	1.17	0.41	1	1	2	2	0.6	0.68	**3.3**	**2.9**	**Retain**
Selenium			21	1.43	0.51	1	1	2	2	0.6	0.68	**3.3**	**2.9**	**Retain**
Sodium	Bottom Fish	Carp/goldfish	4	747	351	224	897.5	970	970	--	--	**--**	**--**	Uncertainty
Sodium	Bottom Fish	Gobies	13	789	143	539	773	947	1090	--	--	**--**	**--**	Uncertainty
Sodium	Bottom Fish	Long-jawed mudsuckers	1	969		969	969	969	969	--	--	**--**	**--**	Uncertainty
Sodium	Bottom Fish	Staghorn sculpin	1	789		789	789	789	789	--	--	**--**	**--**	Uncertainty
Sodium	Bottom Fish		19	790	191	224	803	970	1090	--	--	**--**	**--**	Uncertainty
Sodium	Water Column Fish	Topsmelt	10	591	113	387	615.5	709	720	--	--	**--**	**--**	Uncertainty
Sodium	Water Column Fish		10	591	113	387	615.5	709	720	--	--	**--**	**--**	Uncertainty
Sodium			29	721	192	224	720	969	1090	--	--	**--**	**--**	Uncertainty
Zinc	Bottom Fish	Carp/goldfish	4	53.75	26.95	17	58.5	81	81	41.4	88.8	**2.0**	0.9	Pass
Zinc	Bottom Fish	Gobies	13	26.69	5.31	20	26	34	34	41.4	88.8	0.8	0.4	Pass
Zinc	Bottom Fish	Long-jawed mudsuckers	1	25		25	25	25	25	41.4	88.8	0.6	0.3	Pass
Zinc	Bottom Fish	Staghorn sculpin	1	17		17	17	17	17	41.4	88.8	0.4	0.2	Pass

TABLE 3-4

Maximum Concentrations of Inorganic Analytes in Fish Tissue (whole body - mg/kg, wet weight) Compared to Literature-Derived Fish Tissue Benchmarks by Biota Type

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										Fish Tissue Benchmarks		Hazard Quotients		
Analyte	**Biota Type**	**Taxa**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**P90**	**Maximum**	**NOEC**	**LOEC**	**NOEC**	**LOEC**	**Result**
Zinc	Bottom Fish		19	31.79	16.75	17	26	63	81	41.4	88.8	**2.0**	0.9	Pass
Zinc	Water Column Fish	Topsmelt	10	26.2	6.39	16	26.5	34.5	41	41.4	88.8	1.0	0.5	Pass
Zinc	Water Column Fish		10	26.2	6.39	16	26.5	34.5	41	41.4	88.8	1.0	0.5	Pass
Zinc			29	29.86	14.17	16	26	54	81	41.4	88.8	**2.0**	0.9	Pass

Notes:

-- benchmark not available

LOEC = lowest observed effect concentration

NOEC = no observed effect concentration

Pass = maximum concentration was less than the fish tissue benchmark; therefore, there are no risks to the fish population and no further evaluation was necessary

P90 = 90th percentile

Retain = maximum concentration exceeded the fish tissue benchmark; therefore, this analyte was retained for further evaluation

Uncertainty = benchmark value not available; therefore, this analyte was retained as an uncertainty

Bold and shading indicates analyte-area combination retained for further evaluation by subarea.

TABLE 3-5

Mean Concentrations of Inorganics in Surface Water Compared to Literature-Derived Surface Water Benchmarks by Area and Water Level

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Number of Detects	N	Mean (µg/L)	Surface Water Benchmark (µg/L)[a]	Basis[b]	Hazard Quotient	Result
High Water Level Conditions (Intact Berm)								
Lagoon	Aluminum	2	2	80.10	87	T	0.92	Pass
Lagoon	Barium	2	2	45.2	4	T	**11.30**	**Fail**
Lagoon	Beryllium	0	2	0.33	0.66	T	0.50	Pass
Lagoon	Calcium	2	2	218500	116000	T	**1.88**	**Fail**
Lagoon	Magnesium	2	2	118000	82000	T	**1.44**	**Fail**
Lagoon	Manganese	2	2	129	120	T	**1.08**	**Fail**
Lagoon	Potassium	2	2	24500	53000	T	0.46	Pass
Lagoon	Selenium	1	2	10.25	5	T	**2.05**	**Fail**
Lagoon	Silver	0	2	0.18	0.36	T	0.50	Pass
Lagoon	Sodium	2	2	539500	680000	T	0.79	Pass
OID	Aluminum	6	11	65.27	87	T	0.75	Pass
OID	Barium	11	11	41.4	4	T	**10.35**	**Fail**
OID	Beryllium	1	11	0.30	0.66	T	0.46	Pass
OID	Calcium	11	11	249000	116000	T	**2.15**	**Fail**
OID	Magnesium	11	11	104673	82000	T	**1.28**	**Fail**
OID	Manganese	11	11	173	120	T	**1.44**	**Fail**
OID	Potassium	11	11	14690	53000	T	0.28	Pass
OID	Selenium	3	11	13.40	5	T	**2.68**	**Fail**
OID	Silver	0	11	0.180	0.36	T	0.50	Pass
OID	Sodium	11	11	341273	680000	T	0.50	Pass
Other drains	Aluminum	1	2	105	87	T	**1.20**	**Fail**
Other drains	Barium	2	2	60.1	4	T	**15.03**	**Fail**
Other drains	Beryllium	0	2	0.33	0.66	T	0.50	Pass
Other drains	Calcium	2	2	235500	116000	T	**2.03**	**Fail**
Other drains	Iron	2	2	967	1000	T	0.97	Pass
Other drains	Magnesium	2	2	195500	82000	T	**2.38**	**Fail**
Other drains	Manganese	2	2	343	120	T	**2.86**	**Fail**
Other drains	Potassium	2	2	56650	53000	T	**1.07**	**Fail**
Other drains	Selenium	0	2	17.5	5	T	**3.50**	**Fail**
Other drains	Silver	0	2	0.18	0.36	T	0.50	Pass
Other drains	Sodium	2	2	1330000	680000	T	**1.96**	**Fail**
Seawater	Arsenic	2	2	36.9	36	D	**1.02**	**Fail**
Seawater	Copper	0	2	1.63	3.1	D	0.52	Pass
WMU ditch	Aluminum	2	2	94.9	87	T	**1.09**	**Fail**
WMU ditch	Barium	2	2	46.2	4	T	**11.55**	**Fail**
WMU ditch	Beryllium	0	2	0.33	0.66	T	0.50	Pass
WMU ditch	Calcium	2	2	223500	116000	T	**1.93**	**Fail**
WMU ditch	Magnesium	2	2	115500	82000	T	**1.41**	**Fail**
WMU ditch	Manganese	2	2	175	120	T	**1.46**	**Fail**
WMU ditch	Selenium	0	2	17.5	5	T	**3.50**	**Fail**
WMU ditch	Silver	0	2	0.18	0.36	T	0.50	Pass
Low Water Level Conditions (Breached Berm)								
Lagoon	Aluminum	2	2	102.30	87	T	**1.18**	**Fail**
Lagoon	Barium	2	2	25.3	4	T	**6.31**	**Fail**
Lagoon	Beryllium	0	2	0.33	0.66	T	0.50	Pass
Lagoon	Calcium	2	2	261500	116000	T	**2.25**	**Fail**
Lagoon	Magnesium	2	2	337000	82000	T	**4.11**	**Fail**
Lagoon	Manganese	2	2	265.50	120	T	**2.21**	**Fail**
Lagoon	Potassium	2	2	95150	53000	T	**1.80**	**Fail**
Lagoon	Selenium	1	2	11.15	5	T	**2.23**	**Fail**
Lagoon	Silver	0	2	0.18	0.36	T	0.50	Pass
Lagoon	Sodium	2	2	2295000	680000	T	**3.38**	**Fail**

TABLE 3-5

Mean Concentrations of Inorganics in Surface Water Compared to Literature-Derived Surface Water Benchmarks by Area and Water Level

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Number of Detects	N	Mean (µg/L)	Surface Water Benchmark (µg/L)[a]	Basis[b]	Hazard Quotient	Result
NCL - East	Aluminum	3	4	401	87	T	**4.61**	**Fail**
NCL - East	Barium	4	4	78.8	4	T	**19.69**	**Fail**
NCL - East	Beryllium	3	4	0.12	0.66	T	0.19	Pass
NCL - East	Calcium	4	4	226000	116000	T	**1.95**	**Fail**
NCL - East	Magnesium	4	4	252250	82000	T	**3.08**	**Fail**
NCL - East	Manganese	4	4	173	120	T	**1.44**	**Fail**
NCL - East	Potassium	4	4	83525	53000	T	**1.58**	**Fail**
NCL - East	Selenium	0	4	17.5	5	T	**3.50**	**Fail**
NCL - East	Silver	1	4	0.142	0.36	T	0.40	Pass
NCL - East	Sodium	4	4	1737500	680000	T	**2.56**	**Fail**
OID	Aluminum	4	10	59.50	87	T	0.68	Pass
OID	Barium	10	10	28.5	4	T	**7.12**	**Fail**
OID	Beryllium	0	10	0.30	0.66	T	0.45	Pass
OID	Calcium	10	10	334200	116000	T	**2.88**	**Fail**
OID	Magnesium	10	10	252900	82000	T	**3.08**	**Fail**
OID	Manganese	10	10	323	120	T	**2.70**	**Fail**
OID	Potassium	10	10	53940	53000	T	**1.02**	**Fail**
OID	Selenium	6	10	8.60	5	T	**1.72**	**Fail**
OID	Silver	0	10	0.147	0.36	T	0.41	Pass
OID	Sodium	10	10	1314500	680000	T	**1.93**	**Fail**
Other drains	Aluminum	0	2	42.50	87	T	0.49	Pass
Other drains	Barium	2	2	47.5	4	T	**11.88**	**Fail**
Other drains	Beryllium	0	2	0.82	0.66	T	**1.23**	Pass
Other drains	Calcium	2	2	236000	116000	T	**2.03**	**Fail**
Other drains	Iron	2	2	664	1000	T	0.66	Pass
Other drains	Magnesium	2	2	323000	82000	T	**3.94**	**Fail**
Other drains	Manganese	2	2	330	120	T	**2.75**	**Fail**
Other drains	Potassium	2	2	98750	53000	T	**1.86**	**Fail**
Other drains	Selenium	2	2	4.15	5	T	0.83	Pass
Other drains	Silver	0	2	0.27	0.36	T	0.75	Pass
Other drains	Sodium	2	2	2510000	680000	T	**3.69**	**Fail**
Seawater	Arsenic	2	2	36.55	36	D	**1.02**	**Fail**
Seawater	Copper	2	2	3.85	3.1	D	**1.24**	**Fail**

Notes:

-- = benchmark value not available

D = dissolved

Fail = mean concentration exceeded the surface water benchmark; therefore, this analyte is considered to pose potential risk

Pass = mean concentration was less than the surface water benchmark; therefore, there are no risks to the aquatic biota community

T = total

[a] All surface water screened using chronic freshwater values with the exception of seawater which was screened using chronic marine values (see Table 3-1).

[b] When benchmark is based on dissolved, dissolved data were used to calculate the HQ. When benchmark is based on total, total data are used to calculate the HQ.

Bold and shading indicates analyte-area combination may pose a potential risk.

TABLE 3-6

Mean Concentrations of Inorganic Analytes in Fish Tissue (whole body - mg/kg, wet weight) Compared to Literature-Derived Fish Tissue Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Analyte	Number of Detects	N	Mean	NOEC	LOEC	HQ_{NOEC}	HQ_{LOEC}	$Risk_{NOEC}$	$Risk_{LOEC}$
OID Lagoon	Lagoon - Main	Aluminum	1	4	28.60	1	8	28.60	3.58	**Fail**	**Fail**
OID Lagoon	Lagoon Finger - East	Aluminum	1	4	25.86	1	8	25.86	3.23	**Fail**	**Fail**
OID Lagoon	Lagoon Finger - Footbridge	Aluminum	0	5	ND	1	8	--	--	--	--
OID Lagoon	Lagoon Finger - West	Aluminum	1	7	20.57	1	8	20.57	2.57	**Fail**	**Fail**
NCL - East	NCL - East (<8' Elev)	Aluminum	3	4	70.31	1	8	70.31	8.79	**Fail**	**Fail**
Wetlands Beach	WMU Ditch	Aluminum	3	5	43.89	1	8	43.89	5.49	**Fail**	**Fail**
OID Lagoon	Lagoon - Main	Copper	0	4	ND	1.17	1.71	--	--	--	--
OID Lagoon	Lagoon Finger - East	Copper	1	4	2.57	1.17	1.71	2.19	1.50	**Fail**	**Fail**
OID Lagoon	Lagoon Finger - Footbridge	Copper	1	5	2.20	1.17	1.71	1.88	1.29	**Fail**	**Fail**
OID Lagoon	Lagoon Finger - West	Copper	0	7	ND	1.17	1.71	--	--	--	--
NCL - East	NCL - East (<8' Elev)	Copper	2	4	2.51	1.17	1.71	2.15	1.47	**Fail**	**Fail**
Wetlands Beach	WMU Ditch	Copper	1	5	2.39	1.17	1.71	2.04	1.40	**Fail**	**Fail**
OID Lagoon	Lagoon - Main	Mercury	2	4	0.003	0.2	0.47	0.02	0.01	Pass	Pass
OID Lagoon	Lagoon Finger - East	Mercury	2	4	0.004	0.2	0.47	0.02	0.01	Pass	Pass
OID Lagoon	Lagoon Finger - Footbridge	Mercury	2	5	0.002	0.2	0.47	0.01	0.01	Pass	Pass
OID Lagoon	Lagoon Finger - West	Mercury	7	7	0.003	0.2	0.47	0.02	0.01	Pass	Pass
NCL - East	NCL - East (<8' Elev)	Mercury	1	4	0.004	0.2	0.47	0.02	0.01	Pass	Pass
Wetlands Beach	WMU Ditch	Mercury	2	5	0.004	0.2	0.47	0.02	0.01	Pass	Pass
OID Lagoon	Lagoon - Main	Selenium	3	4	1.33	0.6	0.68	2.22	1.96	**Fail**	**Fail**
OID Lagoon	Lagoon Finger - East	Selenium	2	4	1.45	0.6	0.68	2.42	2.13	**Fail**	**Fail**
OID Lagoon	Lagoon Finger - Footbridge	Selenium	4	5	1.33	0.6	0.68	2.22	1.96	**Fail**	**Fail**
OID Lagoon	Lagoon Finger - West	Selenium	7	7	1.34	0.6	0.68	2.24	1.97	**Fail**	**Fail**
NCL - East	NCL - East (<8' Elev)	Selenium	2	4	1.45	0.6	0.68	2.41	2.13	**Fail**	**Fail**
Wetlands Beach	WMU Ditch	Selenium	3	5	1.66	0.6	0.68	2.77	2.44	**Fail**	**Fail**
OID Lagoon	Lagoon - Main	Zinc	4	4	23.81	41.4	88.8	0.58	0.27	Pass	Pass
OID Lagoon	Lagoon Finger - East	Zinc	4	4	22.50	41.4	88.8	0.54	0.25	Pass	Pass
OID Lagoon	Lagoon Finger - Footbridge	Zinc	5	5	23.19	41.4	88.8	0.56	0.26	Pass	Pass
OID Lagoon	Lagoon Finger - West	Zinc	7	7	35.87	41.4	88.8	0.87	0.40	Pass	Pass
NCL - East	NCL - East (<8' Elev)	Zinc	4	4	27.66	41.4	88.8	0.67	0.31	Pass	Pass
Wetlands Beach	WMU Ditch	Zinc	5	5	40.20	41.4	88.8	0.97	0.45	Pass	Pass

Notes:

Fail = mean concentration exceeded fish tissue benchmark; therefore, potential risks to tidewater goby (NOEC-based) or the fish community (LOEC-based) cannot be excluded

HQ = hazard quotient

LOEC = lowest observed effect concentration

Pass = mean concentration was less than the fish tissue benchmark; therefore, indicates that no risks to individual tidewater goby (NOEC-based) or the fish community (LOEC-based) are predicted

ND = all samples were undetected

NOEC = no observed effect concentration

A risk result of Pass indicates that no risks to individual tidewater goby (NOEC-based) or the fish community (LOEC-based) are predicted.

Bold and shading indicates analyte-area combination may pose a potential risk.

TABLE 3-7

Weight-of-Evidence Summary for Risks to the Aquatic Biota Community and Individual Tidewater Goby

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Result and COPEC Risk Driver by Area						
Line of Evidence	**OID**	**NCL - East**	**WMU Ditch**	**Lagoon**	**Other Drains**	**Ocean**	**Explanation**
Literature-based Single-chemical Toxicity Data High Water Level (Intact Berm)	Ba, Ca, Mg, Mn, Se	--	Al, Ba, Ca, Mg, Mn, Se	Ba, Ca, Mg, Mn, Se	Al, Ba, Ca, Mg, Mn, K, Se, Na	As	Mean water concentration exceeded benchmark (see Table 3-1) for at least one COPEC. Calcium, magnesium, potassium, and sodium are essential nutrients and are not considered to be a risk at the site. However, it is notable that concentrations of potassium and sodium in the OID, Lagoon, and WMU Ditch areas are at levels that are below freshwater benchmarks during the high water level condition. This is likely indicative of the freshwater input into these areas from upstream of the site when the berm is intact during the dry season. Generally, aluminum is not considered to be a risk in surface water at the site because of the high water hardness (EPA, 2012 indicates that toxicity of aluminum likely decreases with increased water hardness, though this relationship is not fully understood) and the likelihood that aluminum bound to sediment particles may contribute to the total aluminum measured (also discussed in EPA, 2012). It should be noted that mean concentrations of dissolved aluminum are all below the chronic criterion for aluminum. Selenium was detected in 4 of 19 high water samples and 9 of 20 low water samples. All detected samples (13 samples) were lower than the surface water benchmark, but the detection limit for the remaining 26 samples exceeded the benchmark. In these samples, the detection limit (35 µg/L) for selenium was insufficient to determine risk.
Low Water Level (Breached Berm)	Ba, Ca, Mg, Mn, K, Se, Na	Al, Ba, Ca, Mg, Mn, K, Se, Na	--	Al, Ba, Ca, Mg, Mn, K, Se, Na	Ba, Ca, Mg, Mn, K, Na	As, Cu	
Tissue-Based Toxicity Data - Tidewater Goby (based on NOECs)		Al, Cu, Se	Al, Cu, Se	Al, Cu, Se			Mean whole-body concentrations for fish exceeded the NOEC and LOEC (see Table 3-2) for at least one COPEC at NCL-East, WMU Ditch, and the Lagoon Areas. Although this indicates a possible risk to individual tidewater goby, these risks, if present, are either overestimated (aluminum) or are not likely site-related (copper and selenium).
Tissue-Based Toxicity Data - LOECs		Al, Cu, Se	Al, Cu, Se	Al, Cu, Se			Mean whole-body concentrations for fish exceeded the LOEC (see Table 3-2) for at least one COPEC at NCL-East, WMU Ditch, and the Lagoon Areas. Although this indicates a possible risk to fish, these risks, if present, are either overestimated (aluminum) or are not likely site-related (copper and selenium).

TABLE 3-7

Weight-of-Evidence Summary for Risks to the Aquatic Biota Community and Individual Tidewater Goby

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Result and COPEC Risk Driver by Area						
Line of Evidence	**OID**	**NCL - East**	**WMU Ditch**	**Lagoon**	**Other Drains**	**Ocean**	**Explanation**
Weight-of-Evidence High Water Level (Intact Berm)	No site-related risks	--	No site-related risks	No site-related risks	No site-related risks	No site-related risks	Overall, surface water risks were similar during high water level and low water level conditions. The one exception was that potassium and sodium in the OID, Lagoon, and WMU Ditch were below surface water benchmarks during high water level conditions, though this does not affect risk conclusions. Calcium, magnesium, potassium, and sodium are essential nutrients and are not considered to be a risk at the site. Generally, aluminum is not considered to be a risk in surface water at the site because of the high water hardness (i.e., toxicity of aluminum likely decreases with increased water hardness [EPA, 2012]) and because aluminum bound to sediment likely contributes significantly to total aluminum. Although tissue concentrations of aluminum in fish collected from NCL-East, WMU Ditch, and the Lagoon areas are at levels that may result in an adverse effect to individual tidewater gobies or the fish community, risks are likely overestimated. Aluminum concentrations in the outfingers were clustered around 100 mg/kg compared to those in the two higher concentration areas which were around 200 to 300 mg/kg. This suggests that aluminum concentrations are site-related. However, the pH at the site (pH>5.5) indicates that aluminum in sediment has low bioavailability. Given this low bioavailability, it is likely that the higher concentrations observed in NCL-East and WMU Ditch are a result of sediment present in the gut of the fish rather than aluminum incorporated into the fish tissues. For exposure to wildlife, this whole body measurement that includes sediment in the gut is appropriate (i.e., fish-eating birds eat the whole fish), but for determining risks to fish from tissue-based or “internal” exposures, aluminum associated with the sediment in the gut overestimates exposure and risk. Therefore, aluminum is not considered a risk to aquatic biota. Risks from selenium are considered uncertain due to an insufficient detection limit in a majority of the samples; however, in detected surface water samples, concentrations are less than the surface water benchmark. Although risk cannot be excluded, this suggests that selenium concentrations in surface water are likely not a risk to aquatic biota. Tissue concentrations of selenium in fish collected from NCL-East, WMU Ditch, and the Lagoon areas exceeded NOECs and LOECs. The concentrations of selenium in fish collected in the Lagoon fingers were compared to those collected in NCL-East and WMU Ditch. These concentrations were similar across all locations, suggesting that risks, if present, are not site-related. Similarly, copper concentrations in fish tissue from these three areas were similar and suggest that risks, if present, are not site-related. Barium and manganese exceeded water quality benchmarks in all freshwater/brackish onsite and background subareas, except for the Ocean area. Additionally, hazard quotients (HQs) in the background subarea (Other Drains) were similar to or greater than those in the onsite areas. This suggests that onsite concentrations of these analytes are likely within the range of regional background concentrations, and that risks are not site-related. Arsenic at both water levels and copper at low water levels exceeded water quality criteria in the ocean samples. Arsenic and copper risks in ocean water are also not likely to be site-related because neither analyte exceeded water quality criteria at the other surface water areas. Therefore, the weight-of-evidence is that there are no site-related risks to the aquatic biota community, fish populations, or individual tidewater goby.
Low Water Level (Breached Berm)	No site-related risks	No site-related risks	--	No site-related risks	No site-related risks	No site-related risks	

Notes:

-- = Not sampled. Surface water from the WMU Ditch was only sampled during the high water conditions because it was dry during the low conditions. Surface water from NCL- East was only sampled once (June 2010) and this water represents surface water that spilled from the OID and Lagoon during the high water conditions and subsequently evaporated until it was sampled.

[a] Results are listed for each line of evidence, and risk drivers are listed on the basis of the weight-of-evidence analysis/summary.

Shading indicates a lack of line-of-evidence data within an area.

TABLE 4-1

Literature-Based Ecological Benchmarks Dioxins/Furans in Sediment (pg/g, dry weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	TEFs Used to Calculate TEQs	Background (EPA, 2000)[a]	(EPA, 1993)[b]	
			Low	High
2,3,7,8-TCDD - TEQ	Mammal	2 - 5		
2,3,7,8-TCDD - TEQ Fish	Fish		60	100
2,3,7,8-TCDD - TEQ Birds	Birds		21	210
2,3,7,8-TCDD - TEQ Mammals	Mammals		2.5	25

Notes:

Values from EPA (2010)

pg/g = picograms per gram

TEF = toxic equivalency factor

TEQ = toxic equivalency quotient

[a] Median and Mean TEQ reported as background in San Francisco Bay (EPA Region 9).

[b] Low value represents threshold for low risk and high value for high-level risk.

TABLE 4-2

Literature-Based Invertebrate Whole-Body Tissue Benchmarks (µg/g, wet weight)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			NOEC			LOEC			
Analyte	**Form**	**Test Species Type**	**NOEC**	**Test Species**	**Test Endpoint**	**LOEC**	**Test Species**	**Effect**	**Most Similar Halaco Tissue**
Arsenic	Sodium arsenate	Crustacean	1.28	Grass shrimp	Growth	--	--	--	Crayfish
Cadmium	Cadmium chloride	Insect	5.6	Midge, Chironomus riparius (Fw)	Survival	7.6	Midge, Chironomus riparius (Fw)	Reduced survival	Terrestrial and aquatic insects and spiders
Cadmium	Cadmium chloride	Amphipods	2.6	Amphipod, Hyalella azteca (Fw)	Survival	3	Amphipod, Pontoporeia affinis (Sw)	Reduced reproduction	Beach hoppers
Cadmium	Cadmium chloride	Crustacean	--	--	--	1.3	Mysid, Mysidopsis bahia (Sw)	Reduced growth	Crayfish
Cadmium	Cadmium chloride	Crayfish	0.9	Crayfish, Orconectes virilis (Fw)	Survival	5.7	Crayfish, Orconectes virilis (Fw)	25% reduction in survival	Crayfish
Cadmium	Cadmium chloride	Mollusc	10	Snail, Physa integra (Fw)	Survival	30	Snail, Physa integra (Fw)	80% reduction in survival	Snails
Chromium	Potassium dichromate	Amphipods	9.2	Amphipod, Allorchestes compressa (Sw)	Survival, growth	--	--	--	Beach hoppers
Chromium	Potassium dichromate	Crustacean	1	Sand crab, Portunus pelagicus (Sw)	Growth	3.2	Sand crab, Portunus pelagicus (Sw)	Reduced growth	Crayfish
Copper	Copper chloride	Insect	--	--	--	140.4	Midge, Chironomus decorus (Fw)	50% reduction in survival	Terrestrial and aquatic insects and spiders
Copper	Copper sulfate	Amphipods	--	--	--	29.2	Amphipod, Hyalella azteca (Fw)	Reduced growth	Beach hoppers
Copper	Copper sulfate	Crustacean	50	Crayfish, Orconectes rusticus (Fw)	Survival	--	--	--	Crayfish
Lead	Lead nitrate	Insect	260	Caddisfly, Brachycentrus sp. (Fw)	Survival	--	--	--	Terrestrial and aquatic insects and spiders
Lead	Lead nitrate	Amphipods	--	--	--	98	Amphipod, Gammarus pseudolimnaeus (Fw)	50% reduction in survival	Beach hoppers
Lead	Lead nitrate	Mollusc	200	Snail, Physa integra (Fw)	Survival	--	--	--	Snails
Mercury	Mercuric chloride	Insect	107.6	Midge, Chironomus riparius (Fw)	Survival	--	--	--	Terrestrial and aquatic insects and spiders
Mercury	Mercuric chloride	Crustacean	2.1	Grass shrimp, Palaemonetes pugio (Sw)	Survival	--	--	--	Crayfish
Mercury	Mercuric chloride	Mollusc	--	--	--	22	Slipper limpet, Crepidula fornicata (Sw)	Reduced growth	Snails
Selenium	Sodium selenate	Insect	5.08	Midge, Chironomus decorus (Fw)	Survival	12.6	Midge, Chironomus decorus (Fw)	50% reduction in survival	Terrestrial and aquatic insects and spiders
Selenium	6:1 mixture selenate to selenite	Crustacean	0.26	Cladoceran, Daphnia magna (Fw)	Growth, reproduction	6.34	Cladoceran, Daphnia magna (Fw)	Reduced growth and reproduction	Crayfish
Zinc		Insect	524	Midge, Chironomus riparius (Fw)	Survival	--	--	--	Terrestrial and aquatic insects and spiders
Zinc	Zinc sulfate	Amphipods	--	--	--	24	Amphipod, Allorchestes compressa (Sw)	Reduced growth	Beach hoppers
Zinc	Zinc sulfate	Crustacean	12.7	Crayfish, Orconectes virilis (Fw)	Survival	35.2	Crayfish, Orconectes virilis (Fw)	22% reduction in survival	Crayfish
2,3,7,8-TCDD		Insect	0.138	Midge, Chironomus tentans (Fw)	Survival, growth, reproduction	--	--	--	Terrestrial and aquatic insects and spiders
2,3,7,8-TCDD		Crustacean	0.017	Cladoceran, Daphnia magna (Fw)	Survival	--	--	--	Crayfish
2,3,7,8-TCDD		Mollusc	0.0097	Snail, Physa sp. (Fw)	Survival	--	--	--	Snails

Notes:

Data extracted from Jarvinen and Ankley (1999)

-- = no data available

LOEC = lowest observed effect concentration

NOEC = no observed effect concentration

TABLE 4-3

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Literature-Derived Sediment Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										Freshwater Sediment (mg/kg)[a]			Marine Sediment (mg/kg)[b]			Hazard Quotients						
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	**Result**
NCL - East	Aluminum	0-6 in	50	50	31294.60	39810.37	2150	12200	159000	--	--	--	--	--	18000	**--**	**--**	**--**	**--**	**--**	**8.83**	**Retain**
NCL - East	Aluminum	2 ft	44	44	10325.23	3959.42	5290	9445	22900	--	--	--	--	--	18000	**--**	**--**	**--**	**--**	**--**	**1.27**	**Retain**
NCL - East	Antimony	0-6 in	50	50	2.85	4.30	0.24	0.735	20.1	--	--	3	0.63	2.4	9.3	**--**	**--**	**6.70**	**31.90**	**8.38**	**2.16**	**Retain**
NCL - East	Antimony	2 ft	44	44	0.30	0.20	0.11	0.265	1.4	--	--	3	0.63	2.4	9.3	**--**	**--**	0.47	**2.22**	0.58	0.15	Pass
NCL - East	Arsenic	0-6 in	50	50	4.74	4.66	0.83	3.65	33.7	9.79	33	17	7.4	20	35	**3.44**	**1.02**	**1.98**	**4.55**	**1.69**	0.96	**Retain**
NCL - East	Arsenic	2 ft	44	44	4.16	1.60	1.8	3.7	9.4	9.79	33	17	7.4	20	35	0.96	0.28	0.55	**1.27**	0.47	0.27	Pass
NCL - East	Barium	0-6 in	50	50	672.19	1048.73	49.9	200	5040	--	--	--	--	--	48	**--**	**--**	**--**	**--**	**--**	**105.00**	**Retain**
NCL - East	Barium	2 ft	44	44	144.96	40.73	94.2	132.5	277	--	--	--	--	--	48	**--**	**--**	**--**	**--**	**--**	**5.77**	**Retain**
NCL - East	Beryllium	0-6 in	41	50	2.51	3.67	0.14	0.815	16.8	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Beryllium	2 ft	31	44	0.51	0.22	0.25	0.445	1.1	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Cadmium	0-6 in	50	50	1.46	1.55	0.098	0.98	6.7	0.99	4.98	3	0.38	1.4	3	**6.77**	**1.35**	**2.23**	**17.63**	**4.79**	**2.23**	**Retain**
NCL - East	Cadmium	2 ft	44	44	0.92	0.43	0.34	0.795	2.1	0.99	4.98	3	0.38	1.4	3	**2.12**	0.42	0.70	**5.53**	**1.50**	0.70	**Retain**
NCL - East	Calcium	0-6 in	50	50	10326.20	6709.13	2190	8690	32100	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Calcium	2 ft	44	44	23388.18	12061.91	8050	22250	66900	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Chromium	0-6 in	50	50	61.10	78.53	6.2	24.85	342	43.4	111	95	49	141	62	**7.88**	**3.08**	**3.60**	**6.98**	**2.43**	**5.52**	**Retain**
NCL - East	Chromium (total)	2 ft	44	44	18.63	8.79	8.8	15.55	51.2	43.4	111	95	49	141	62	**1.18**	0.46	0.54	**1.04**	0.36	0.83	Pass
NCL - East	Cobalt	0-6 in	27	50	7.06	2.60	1.4	6.7	13.7	--	--	--	--	--	10	**--**	**--**	**--**	**--**	**--**	**1.37**	**Retain**
NCL - East	Cobalt	2 ft	22	44	7.23	2.51	3.5	6.65	15.9	--	--	--	--	--	10	**--**	**--**	**--**	**--**	**--**	**1.59**	**Retain**
NCL - East	Copper	0-6 in	50	50	591.73	1014.51	15.9	86.15	3950	31.6	149	86	32	94	390	**125.00**	**26.51**	**45.93**	**123.44**	**42.02**	**10.13**	**Retain**
NCL - East	Copper	2 ft	44	44	26.09	30.26	8.1	15.85	160	31.6	149	86	32	94	390	**5.06**	**1.07**	**1.86**	**5.00**	**1.70**	0.41	**Retain**
NCL - East	Iron	0-6 in	50	50	17015.00	4687.91	5370	18300	24400	--	--	40000	--	--	22000	**--**	**--**	0.61	**--**	**--**	**1.11**	**Retain**
NCL - East	Iron	2 ft	44	44	19859.09	6461.53	10700	18250	40000	--	--	40000	--	--	22000	**--**	**--**	**1.00**	**--**	**--**	**1.82**	**Retain**
NCL - East	Lead	0-6 in	50	50	89.89	119.56	7.3	28.95	616	35.5	128	127	30	94	400	**17.35**	**4.81**	**4.85**	**20.53**	**6.55**	**1.54**	**Retain**
NCL - East	Lead	2 ft	44	44	8.72	6.40	4	6.3	41.8	35.5	128	127	30	94	400	**1.18**	0.33	0.33	**1.39**	0.44	0.10	Pass
NCL - East	Magnesium	0-6 in	50	50	13752.80	12983.54	1490	8455	55600	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Magnesium	2 ft	44	44	7353.64	2447.39	3480	6815	14300	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Manganese	0-6 in	50	50	473.50	460.36	62.5	282.5	2100	--	--	1100	--	--	260	**--**	**--**	**1.91**	**--**	**--**	**8.08**	**Retain**
NCL - East	Manganese	2 ft	44	44	338.25	102.93	202	321.5	606	--	--	1100	--	--	260	**--**	**--**	0.55	**--**	**--**	**2.33**	**Retain**
NCL - East	Mercury	0-6 in	18	50	0.09	0.05	0.014	0.0755	0.18	0.18	1.06	0.56	0.14	0.48	0.41	**1.00**	0.17	0.32	**1.29**	0.38	0.44	Pass
NCL - East	Mercury	2 ft	8	44	0.10	0.06	0.013	0.12	0.23	0.18	1.06	0.56	0.14	0.48	0.41	**1.28**	0.22	0.41	**1.64**	0.48	0.56	Pass
NCL - East	Nickel	0-6 in	49	50	41.96	41.56	5	20.85	179	22.7	48.6	43	15	47	110	**7.89**	**3.68**	**4.16**	**11.93**	**3.81**	**1.63**	**Retain**
NCL - East	Nickel	2 ft	44	44	18.76	7.71	9.2	16.7	46.3	22.7	48.6	43	15	47	110	**2.04**	0.95	**1.08**	**3.09**	0.99	0.42	**Retain**
NCL - East	Potassium	0-6 in	50	50	4321.60	1458.04	770	4480	7300	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Potassium	2 ft	44	44	5599.55	2941.75	2320	4880	19900	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Selenium	0-6 in	47	50	1.62	1.26	0.53	1.05	5.6	--	--	--	--	--	1	**--**	**--**	**--**	**--**	**--**	**5.60**	**Retain**
NCL - East	Selenium	2 ft	44	44	0.72	0.27	0.36	0.66	1.8	--	--	--	--	--	1	**--**	**--**	**--**	**--**	**--**	**1.80**	**Retain**
NCL - East	Silver	0-6 in	29	50	1.14	1.24	0.13	0.65	4.9	--	--	4.5	0.23	1.1	3.1	**--**	**--**	**1.09**	**21.30**	**4.45**	**1.58**	**Retain**
NCL - East	Silver	2 ft	5	44	0.63	0.19	0.13	0.635	1.2	--	--	4.5	0.23	1.1	3.1	**--**	**--**	0.27	**5.22**	**1.09**	0.39	**Retain**
NCL - East	Sodium	0-6 in	50	50	2574.82	1304.70	861	2225	6220	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Sodium	2 ft	44	44	2903.11	2148.52	977	1875	8990	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Thallium	0-6 in	47	50	0.21	0.12	0.04	0.21	0.71	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Thallium	2 ft	44	44	0.24	0.09	0.1	0.205	0.49	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty
NCL - East	Vanadium	0-6 in	50	50	41.81	18.51	12.8	36.6	125	--	--	--	--	--	57	**--**	**--**	**--**	**--**	**--**	**2.19**	**Retain**
NCL - East	Vanadium	2 ft	44	44	33.50	12.21	16.6	29.2	70.4	--	--	--	--	--	57	**--**	**--**	**--**	**--**	**--**	**1.24**	**Retain**
NCL - East	Zinc	0-6 in	50	50	567.28	943.95	30.8	131	4570	121	459	520	94	247	410	**37.77**	**9.96**	**8.79**	**48.62**	**18.50**	**11.15**	**Retain**
NCL - East	Zinc	2 ft	44	44	63.29	46.66	24.7	47.75	311	121	459	520	94	247	410	**2.57**	0.68	0.60	**3.31**	**1.26**	0.76	**Retain**
NCL - North	Aluminum	0-6 in	22	22	13884.55	4525.83	5920	13450	27800	--	--	--	--	--	18000	**--**	**--**	**--**	**--**	**--**	**1.54**	**Retain**
NCL - North	Aluminum	2 ft	16	16	14351.25	5925.23	6360	12650	25700	--	--	--	--	--	18000	**--**	**--**	**--**	**--**	**--**	**1.43**	**Retain**
NCL - North	Antimony	0-6 in	13	22	0.73	0.50	0.21	0.535	2.2	--	--	3	0.63	2.4	9.3	**--**	**--**	0.73	**3.49**	0.92	0.24	Pass
NCL - North	Antimony	2 ft	3	16	0.67	0.35	0.46	0.59	1.9	--	--	3	0.63	2.4	9.3	**--**	**--**	0.63	**3.02**	0.79	0.20	Pass
NCL - North	Arsenic	0-6 in	22	22	3.65	1.68	0.89	3.35	7.2	9.79	33	17	7.4	20	35	0.74	0.22	0.42	0.97	0.36	0.21	Pass
NCL - North	Arsenic	2 ft	15	16	3.83	1.34	0.91	4.05	5.5	9.79	33	17	7.4	20	35	0.56	0.17	0.32	0.74	0.28	0.16	Pass
NCL - North	Barium	0-6 in	22	22	423.73	1042.31	103	166.5	5060	--	--	--	--	--	48	**--**	**--**	**--**	**--**	**--**	**105.42**	**Retain**
NCL - North	Barium	2 ft	16	16	230.83	341.86	68.6	146.5	1500	--	--	--	--	--	48	**--**	**--**	**--**	**--**	**--**	**31.25**	**Retain**
NCL - North	Beryllium	0-6 in	22	22	1.70	3.81	0.29	0.86	18.7	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	Uncertainty

TABLE 4-3

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Literature-Derived Sediment Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										Freshwater Sediment (mg/kg)[a]			Marine Sediment (mg/kg)[b]			Hazard Quotients						
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	**Result**
NCL - North	Beryllium	2 ft	16	16	1.19	1.36	0.4	0.86	6.2	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Cadmium	0-6 in	22	22	1.30	0.74	0.2	1.15	3.7	0.99	4.98	3	0.38	1.4	3	**3.74**	0.74	**1.23**	**9.74**	**2.64**	**1.23**	**Retain**
NCL - North	Cadmium	2 ft	16	16	1.16	0.56	0.35	1	2.7	0.99	4.98	3	0.38	1.4	3	**2.73**	0.54	0.90	**7.11**	**1.93**	0.90	**Retain**
NCL - North	Calcium	0-6 in	22	22	25030.91	30067.45	3240	14800	111000	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Calcium	2 ft	16	16	30561.25	27591.20	7590	22650	116000	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Chromium (total)	0-6 in	22	22	21.61	8.93	13.6	18.4	51.3	43.4	111	95	49	141	62	**1.18**	0.46	0.54	**1.05**	0.36	0.83	Pass
NCL - North	Chromium (total)	2 ft	16	16	19.14	7.06	7.5	19.2	35.6	43.4	111	95	49	141	62	0.82	0.32	0.37	0.73	0.25	0.57	Pass
NCL - North	Cobalt	0-6 in	17	22	7.75	1.88	2.9	7.45	11.5	--	--	--	--	--	10	--	--	--	--	--	**1.15**	**Retain**
NCL - North	Cobalt	2 ft	13	16	8.31	2.41	4.5	8.45	13.5	--	--	--	--	--	10	--	--	--	--	--	**1.35**	**Retain**
NCL - North	Copper	0-6 in	22	22	58.34	65.03	14.5	35.25	270	31.6	149	86	32	94	390	**8.54**	**1.81**	**3.14**	**8.44**	**2.87**	0.69	**Retain**
NCL - North	Copper	2 ft	16	16	27.40	23.09	7.9	19.8	97.4	31.6	149	86	32	94	390	**3.08**	0.65	**1.13**	**3.04**	**1.04**	0.25	**Retain**
NCL - North	Iron	0-6 in	22	22	22007.27	5185.57	9060	21800	34500	--	--	40000	--	--	22000	--	--	0.86	--	--	**1.57**	**Retain**
NCL - North	Iron	2 ft	16	16	23131.25	7495.66	10700	23100	40400	--	--	40000	--	--	22000	--	--	**1.01**	--	--	**1.84**	**Retain**
NCL - North	Lead	0-6 in	22	22	59.51	72.09	6.1	34	306	35.5	128	127	30	94	400	**8.62**	**2.39**	**2.41**	**10.20**	**3.26**	0.77	**Retain**
NCL - North	Lead	2 ft	16	16	17.57	14.24	3	15.5	58	35.5	128	127	30	94	400	**1.63**	0.45	0.46	**1.93**	0.62	0.15	Pass
NCL - North	Magnesium	0-6 in	22	22	8445.00	3614.11	3480	7700	22800	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Magnesium	2 ft	16	16	9217.50	3309.73	3440	8895	16500	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Manganese	0-6 in	22	22	317.35	191.52	90.8	269	986	--	--	1100	--	--	260	--	--	0.90	--	--	**3.79**	**Retain**
NCL - North	Manganese	2 ft	16	16	400.06	157.56	129	408	670	--	--	1100	--	--	260	--	--	0.61	--	--	**2.58**	**Retain**
NCL - North	Mercury	0-6 in	3	22	0.14	0.05	0.03	0.135	0.23	0.18	1.06	0.56	0.14	0.48	0.41	**1.28**	0.22	0.41	**1.64**	0.48	0.56	Pass
NCL - North	Mercury	2 ft	4	16	0.11	0.05	0.02	0.13	0.2	0.18	1.06	0.56	0.14	0.48	0.41	**1.11**	0.19	0.36	**1.43**	0.42	0.49	Pass
NCL - North	Nickel	0-6 in	22	22	23.64	7.12	10.1	22.35	42.9	22.7	48.6	43	15	47	110	**1.89**	0.88	1.00	**2.86**	0.91	0.39	**Retain**
NCL - North	Nickel	2 ft	16	16	22.84	6.86	9.1	23.05	33.3	22.7	48.6	43	15	47	110	**1.47**	0.69	0.77	**2.22**	0.71	0.30	Pass
NCL - North	Potassium	0-6 in	22	22	4585.00	1054.06	1930	4560	6690	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Potassium	2 ft	16	16	4569.38	1427.51	1920	4440	6800	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Selenium	0-6 in	13	22	2.74	3.02	0.17	2.1	15.2	--	--	--	--	--	1	--	--	--	--	--	**15.20**	**Retain**
NCL - North	Selenium	2 ft	7	16	1.60	1.58	0.064	1.185	6	--	--	--	--	--	1	--	--	--	--	--	**6.00**	**Retain**
NCL - North	Silver	0-6 in	8	22	0.53	0.19	0.22	0.52	1.2	--	--	4.5	0.23	1.1	3.1	--	--	0.27	**5.22**	**1.09**	0.39	**Retain**
NCL - North	Silver	2 ft	2	16	0.60	0.21	0.35	0.555	1.3	--	--	4.5	0.23	1.1	3.1	--	--	0.29	**5.65**	**1.18**	0.42	**Retain**
NCL - North	Sodium	0-6 in	22	22	2344.59	1240.87	567	1920	5120	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Sodium	2 ft	16	16	2105.44	883.19	797	2030	3700	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Thallium	0-6 in	6	22	0.42	0.17	0.048	0.39	0.67	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Thallium	2 ft		16	0.55	0.12	0.35	0.515	0.74	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
NCL - North	Vanadium	0-6 in	22	22	38.60	13.21	16.2	34.55	62.7	--	--	--	--	--	57	--	--	--	--	--	**1.10**	**Retain**
NCL - North	Vanadium	2 ft	16	16	36.33	9.96	11.2	35.1	53	--	--	--	--	--	57	--	--	--	--	--	0.93	Pass
NCL - North	Zinc	0-6 in	22	22	196.83	182.32	57.2	107.5	790	121	459	520	94	247	410	**6.53**	**1.72**	**1.52**	**8.40**	**3.20**	**1.93**	**Retain**
NCL - North	Zinc	2 ft	16	16	93.68	54.61	32.2	77.05	253	121	459	520	94	247	410	**2.09**	0.55	0.49	**2.69**	**1.02**	0.62	**Retain**
OID Lagoon	Aluminum	0-6 in	49	49	5582.24	5665.33	1110	3500	23900	--	--	--	--	--	18000	--	--	--	--	--	**1.33**	**Retain**
OID Lagoon	Aluminum	2 ft	39	39	8754.87	8724.06	1330	5840	34100	--	--	--	--	--	18000	--	--	--	--	--	**1.89**	**Retain**
OID Lagoon	Aluminum	2 to 6	18	18	7023.89	6577.47	1220	3735	20600	--	--	--	--	--	18000	--	--	--	--	--	**1.14**	**Retain**
OID Lagoon	Antimony	0-6 in	43	49	0.50	0.35	0.077	0.43	1.7	--	--	3	0.63	2.4	9.3	--	--	0.57	**2.70**	0.71	0.18	Pass
OID Lagoon	Antimony	2 ft	39	39	0.99	1.69	0.056	0.29	7.7	--	--	3	0.63	2.4	9.3	--	--	**2.57**	**12.22**	**3.21**	0.83	**Retain**
OID Lagoon	Antimony	2 to 6	18	18	0.27	0.15	0.11	0.2	0.61	--	--	3	0.63	2.4	9.3	--	--	0.20	0.97	0.25	0.07	Pass
OID Lagoon	Arsenic	0-6 in	49	49	2.66	1.96	0.61	1.9	7.5	9.79	33	17	7.4	20	35	0.77	0.23	0.44	**1.01**	0.38	0.21	Pass
OID Lagoon	Arsenic	2 ft	39	39	4.03	3.80	0.73	2.4	18.2	9.79	33	17	7.4	20	35	**1.86**	0.55	**1.07**	**2.46**	0.91	0.52	**Retain**
OID Lagoon	Arsenic	2 to 6	18	18	3.11	2.46	0.81	2.35	9.3	9.79	33	17	7.4	20	35	0.95	0.28	0.55	**1.26**	0.47	0.27	Pass
OID Lagoon	Barium	0-6 in	42	49	99.26	92.80	12.2	76.6	410	--	--	--	--	--	48	--	--	--	--	--	**8.54**	**Retain**
OID Lagoon	Barium	2 ft	37	39	1024.40	2236.40	24	116	9100	--	--	--	--	--	48	--	--	--	--	--	**189.58**	**Retain**
OID Lagoon	Barium	2 to 6	15	18	380.88	1244.65	12.7	84.1	5360	--	--	--	--	--	48	--	--	--	--	--	**111.67**	**Retain**
OID Lagoon	Beryllium	0-6 in	24	49	0.44	0.41	0.051	0.29	1.4	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Beryllium	2 ft	18	39	2.99	7.71	0.073	0.32	39.6	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Beryllium	2 to 6	7	18	0.41	0.37	0.08	0.255	1.1	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Cadmium	0-6 in	42	49	0.68	0.60	0.049	0.47	3.5	0.99	4.98	3	0.38	1.4	3	**3.54**	0.70	**1.17**	**9.21**	**2.50**	**1.17**	**Retain**
OID Lagoon	Cadmium	2 ft	36	39	0.70	0.93	0.038	0.45	5	0.99	4.98	3	0.38	1.4	3	**5.05**	**1.00**	**1.67**	**13.16**	**3.57**	**1.67**	**Retain**
OID Lagoon	Cadmium	2 to 6	18	18	0.57	0.48	0.086	0.485	1.6	0.99	4.98	3	0.38	1.4	3	**1.62**	0.32	0.53	**4.21**	**1.14**	0.53	**Retain**

TABLE 4-3

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Literature-Derived Sediment Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										Freshwater Sediment (mg/kg)[a]			Marine Sediment (mg/kg)[b]			Hazard Quotients						
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	**Result**
OID Lagoon	Calcium	0-6 in	49	49	43032.86	47531.77	3890	16400	178000	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Calcium	2 ft	39	39	36826.41	46439.48	2090	11400	179000	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Calcium	2 to 6	18	18	18115.00	28716.01	4070	7990	126000	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Chromium (total)	0-6 in	49	49	12.79	9.77	0.64	9.8	41.2	43.4	111	95	49	141	62	0.95	0.37	0.43	0.84	0.29	0.66	Pass
OID Lagoon	Chromium (total)	2 ft	39	39	20.44	23.15	3	9.1	86.4	43.4	111	95	49	141	62	**1.99**	0.78	0.91	**1.76**	0.61	**1.39**	**Retain**
OID Lagoon	Chromium (total)	2 to 6	18	18	16.02	14.89	3.6	12	57.9	43.4	111	95	49	141	62	**1.33**	0.52	0.61	**1.18**	0.41	0.93	Pass
OID Lagoon	Cobalt	0-6 in	7	49	4.10	3.80	0.76	3.2	18.8	--	--	--	--	--	10	--	--	--	--	--	**1.88**	**Retain**
OID Lagoon	Cobalt	2 ft	3	39	3.95	3.32	0.98	3.7	14.9	--	--	--	--	--	10	--	--	--	--	--	**1.49**	**Retain**
OID Lagoon	Cobalt	2 to 6	4	18	4.62	4.19	0.93	2.15	12.6	--	--	--	--	--	10	--	--	--	--	--	**1.26**	**Retain**
OID Lagoon	Copper	0-6 in	44	49	31.72	30.50	1.3	25.5	119	31.6	149	86	32	94	390	**3.77**	0.80	**1.38**	**3.72**	**1.27**	0.31	**Retain**
OID Lagoon	Copper	2 ft	32	39	101.63	200.54	1.1	23.6	803	31.6	149	86	32	94	390	**25.41**	**5.39**	**9.34**	**25.09**	**8.54**	**2.06**	**Retain**
OID Lagoon	Copper	2 to 6	14	18	20.02	22.30	1.8	11.85	91.2	31.6	149	86	32	94	390	**2.89**	0.61	**1.06**	**2.85**	0.97	0.23	**Retain**
OID Lagoon	Iron	0-6 in	49	49	11186.73	10007.77	2420	8230	43200	--	--	40000	--	--	22000	--	--	**1.08**	--	--	**1.96**	**Retain**
OID Lagoon	Iron	2 ft	39	39	12244.10	10947.78	3130	8520	48200	--	--	40000	--	--	22000	--	--	**1.21**	--	--	**2.19**	**Retain**
OID Lagoon	Iron	2 to 6	18	18	14940.56	13883.66	3130	6395	40700	--	--	40000	--	--	22000	--	--	**1.02**	--	--	**1.85**	**Retain**
OID Lagoon	Lead	0-6 in	48	49	12.85	12.17	0.89	10.3	46.8	35.5	128	127	30	94	400	**1.32**	0.37	0.37	**1.56**	0.50	0.12	Pass
OID Lagoon	Lead	2 ft	39	39	26.78	35.95	1.5	8.5	128	35.5	128	127	30	94	400	**3.61**	**1.00**	**1.01**	**4.27**	**1.36**	0.32	**Retain**
OID Lagoon	Lead	2 to 6	18	18	6.22	4.70	1.7	4.55	15.1	35.5	128	127	30	94	400	0.43	0.12	0.12	0.50	0.16	0.04	Pass
OID Lagoon	Magnesium	0-6 in	49	49	4243.63	3611.16	934	3070	14500	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Magnesium	2 ft	39	39	15658.46	27073.67	1050	4070	116000	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Magnesium	2 to 6	18	18	5174.44	4637.22	1050	2690	12800	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Manganese	0-6 in	49	49	272.16	230.20	46.5	189	989	--	--	1100	--	--	260	--	--	0.90	--	--	**3.80**	**Retain**
OID Lagoon	Manganese	2 ft	39	39	405.13	451.39	51.4	252	1660	--	--	1100	--	--	260	--	--	**1.51**	--	--	**6.38**	**Retain**
OID Lagoon	Manganese	2 to 6	18	18	280.40	316.39	48.3	155.5	1270	--	--	1100	--	--	260	--	--	**1.15**	--	--	**4.88**	**Retain**
OID Lagoon	Mercury	0-6 in	14	49	0.12	0.10	0.015	0.12	0.58	0.18	1.06	0.56	0.14	0.48	0.41	**3.22**	0.55	**1.04**	**4.14**	**1.21**	**1.41**	**Retain**
OID Lagoon	Mercury	2 ft	18	39	0.07	0.06	0.015	0.04	0.24	0.18	1.06	0.56	0.14	0.48	0.41	**1.33**	0.23	0.43	**1.71**	0.50	0.59	Pass
OID Lagoon	Mercury	2 to 6	5	18	0.10	0.05	0.027	0.12	0.18	0.18	1.06	0.56	0.14	0.48	0.41	**1.00**	0.17	0.32	**1.29**	0.38	0.44	Pass
OID Lagoon	Nickel	0-6 in	36	49	11.44	10.53	2.4	8.7	49.5	22.7	48.6	43	15	47	110	**2.18**	**1.02**	**1.15**	**3.30**	**1.05**	0.45	**Retain**
OID Lagoon	Nickel	2 ft	30	39	15.30	12.74	3.2	11.8	49.6	22.7	48.6	43	15	47	110	**2.19**	**1.02**	**1.15**	**3.31**	**1.06**	0.45	**Retain**
OID Lagoon	Nickel	2 to 6	13	18	13.01	11.42	2.6	6.45	34.8	22.7	48.6	43	15	47	110	**1.53**	0.72	0.81	**2.32**	0.74	0.32	Pass
OID Lagoon	Potassium	0-6 in	43	49	1981.80	2269.38	335	999	10100	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Potassium	2 ft	39	39	2334.44	2360.65	357	1070	8710	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Potassium	2 to 6	18	18	3289.56	3616.70	362	963.5	10700	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Selenium	0-6 in	35	49	1.36	1.25	0.3	0.9	6.8	--	--	--	--	--	1	--	--	--	--	--	**6.80**	**Retain**
OID Lagoon	Selenium	2 ft	28	39	0.98	0.61	0.31	0.7	2.5	--	--	--	--	--	1	--	--	--	--	--	**2.50**	**Retain**
OID Lagoon	Selenium	2 to 6	14	18	0.78	0.39	0.26	0.68	1.6	--	--	--	--	--	1	--	--	--	--	--	**1.60**	**Retain**
OID Lagoon	Silver	0-6 in	12	49	0.78	0.45	0.23	0.65	2.8	--	--	4.5	0.23	1.1	3.1	--	--	0.62	**12.17**	**2.55**	0.90	**Retain**
OID Lagoon	Silver	2 ft	19	39	1.06	1.08	0.13	0.67	5	--	--	4.5	0.23	1.1	3.1	--	--	**1.11**	**21.74**	**4.55**	**1.61**	**Retain**
OID Lagoon	Silver	2 to 6	9	18	0.61	0.18	0.16	0.65	0.85	--	--	4.5	0.23	1.1	3.1	--	--	0.19	**3.70**	0.77	0.27	Pass
OID Lagoon	Sodium	0-6 in	49	49	4406.22	4204.09	975	2730	20800	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Sodium	2 ft	39	39	3837.77	3207.34	358	3100	13000	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Sodium	2 to 6	18	18	3619.06	3104.67	742	2060	9840	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Thallium	0-6 in	39	49	0.22	0.20	0.028	0.16	0.69	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Thallium	2 ft	39	39	0.13	0.12	0.027	0.083	0.49	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Thallium	2 to 6	18	18	0.16	0.13	0.029	0.092	0.39	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
OID Lagoon	Vanadium	0-6 in	49	49	22.98	18.04	2.6	18.2	72.1	--	--	--	--	--	57	--	--	--	--	--	**1.26**	**Retain**
OID Lagoon	Vanadium	2 ft	39	39	21.39	16.31	4.7	15.5	63.6	--	--	--	--	--	57	--	--	--	--	--	**1.12**	**Retain**
OID Lagoon	Vanadium	2 to 6	18	18	22.75	19.76	5.6	11.4	64.6	--	--	--	--	--	57	--	--	--	--	--	**1.13**	**Retain**
OID Lagoon	Zinc	0-6 in	49	49	106.61	98.81	9.4	70	427	121	459	520	94	247	410	**3.53**	0.93	0.82	**4.54**	**1.73**	**1.04**	**Retain**
OID Lagoon	Zinc	2 ft	39	39	166.32	282.89	8.5	60	1250	121	459	520	94	247	410	**10.33**	**2.72**	**2.40**	**13.30**	**5.06**	**3.05**	**Retain**
OID Lagoon	Zinc	2 to 6	18	18	43.94	34.19	8.9	41.7	104	121	459	520	94	247	410	0.86	0.23	0.20	**1.11**	0.42	0.25	Pass
Wetlands Beach	Aluminum	0-6 in	21	21	61695.24	39621.94	3760	54500	166000	--	--	--	--	--	18000	--	--	--	--	--	**9.22**	**Retain**
Wetlands Beach	Aluminum	2 ft	18	18	6233.89	8526.85	1620	2790	37400	--	--	--	--	--	18000	--	--	--	--	--	**2.08**	**Retain**
Wetlands Beach	Aluminum	2 to 6	9	9	5852.22	5170.05	1480	3590	16100	--	--	--	--	--	18000	--	--	--	--	--	0.89	Pass
Wetlands Beach	Antimony	0-6 in	21	21	5.08	3.28	0.34	4.9	10.4	--	--	3	0.63	2.4	9.3	--	--	**3.47**	**16.51**	**4.33**	**1.12**	**Retain**

TABLE 4-3

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Literature-Derived Sediment Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										Freshwater Sediment (mg/kg)[a]			Marine Sediment (mg/kg)[b]			Hazard Quotients						
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	**Result**
Wetlands Beach	Antimony	2 ft	18	18	0.36	0.48	0.12	0.215	2.2	--	--	3	0.63	2.4	9.3	--	--	0.73	**3.49**	0.92	0.24	Pass
Wetlands Beach	Antimony	2 to 6	9	9	0.34	0.32	0.084	0.2	1.1	--	--	3	0.63	2.4	9.3	--	--	0.37	**1.75**	0.46	0.12	Pass
Wetlands Beach	Arsenic	0-6 in	21	21	5.24	2.91	1.1	5	10.7	9.79	33	17	7.4	20	35	**1.09**	0.32	0.63	**1.45**	0.54	0.31	Pass
Wetlands Beach	Arsenic	2 ft	18	18	1.59	0.72	0.79	1.4	3.3	9.79	33	17	7.4	20	35	0.34	0.10	0.19	0.45	0.17	0.09	Pass
Wetlands Beach	Arsenic	2 to 6	9	9	2.23	1.61	1.1	1.5	6.2	9.79	33	17	7.4	20	35	0.63	0.19	0.36	0.84	0.31	0.18	Pass
Wetlands Beach	Barium	0-6 in	21	21	1142.00	873.42	67.4	927	3110	--	--	--	--	--	48	--	--	--	--	--	**64.79**	**Retain**
Wetlands Beach	Barium	2 ft	15	18	88.19	131.32	13.9	44.3	578	--	--	--	--	--	48	--	--	--	--	--	**12.04**	**Retain**
Wetlands Beach	Barium	2 to 6	8	9	139.03	219.24	16.3	53.3	706	--	--	--	--	--	48	--	--	--	--	--	**14.71**	**Retain**
Wetlands Beach	Beryllium	0-6 in	21	21	5.15	4.54	0.26	4.2	19.9	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Beryllium	2 ft	13	18	0.33	0.45	0.09	0.145	2	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Beryllium	2 to 6	5	9	0.48	0.58	0.086	0.25	1.9	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Cadmium	0-6 in	21	21	1.97	1.35	0.049	1.7	4.1	0.99	4.98	3	0.38	1.4	3	**4.14**	0.82	**1.37**	**10.79**	**2.93**	**1.37**	**Retain**
Wetlands Beach	Cadmium	2 ft	18	18	0.38	0.38	0.084	0.24	1.4	0.99	4.98	3	0.38	1.4	3	**1.41**	0.28	0.47	**3.68**	**1.00**	0.47	**Retain**
Wetlands Beach	Cadmium	2 to 6	9	9	0.33	0.21	0.13	0.24	0.69	0.99	4.98	3	0.38	1.4	3	0.70	0.14	0.23	**1.82**	0.49	0.23	Pass
Wetlands Beach	Calcium	0-6 in	21	21	18191.43	17360.47	1620	8180	52500	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Calcium	2 ft	18	18	6698.33	6239.13	1420	3890	23300	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Calcium	2 to 6	9	9	7646.67	3957.99	2960	5850	15400	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Chromium (total)	0-6 in	21	21	114.44	103.10	5.4	83.7	472	43.4	111	95	49	141	62	**10.88**	**4.25**	**4.97**	**9.63**	**3.35**	**7.61**	**Retain**
Wetlands Beach	Chromium (total)	2 ft	18	18	12.09	12.61	3.6	8.25	58	43.4	111	95	49	141	62	**1.34**	0.52	0.61	**1.18**	0.41	0.94	Pass
Wetlands Beach	Chromium (total)	2 to 6	9	9	11.89	6.91	5.4	9.4	24.2	43.4	111	95	49	141	62	0.56	0.22	0.25	0.49	0.17	0.39	Pass
Wetlands Beach	Cobalt	0-6 in	10	21	5.06	2.34	1.1	5.2	9.2	--	--	--	--	--	10	--	--	--	--	--	0.92	Pass
Wetlands Beach	Cobalt	2 ft	9	18	2.01	1.93	0.87	1.25	6.9	--	--	--	--	--	10	--	--	--	--	--	0.69	Pass
Wetlands Beach	Cobalt	2 to 6	5	9	2.91	3.08	1.1	1.4	10.2	--	--	--	--	--	10	--	--	--	--	--	**1.02**	**Retain**
Wetlands Beach	Copper	0-6 in	21	21	1423.25	1025.16	55.6	1260	3970	31.6	149	86	32	94	390	**125.63**	**26.64**	**46.16**	**124.06**	**42.23**	**10.18**	**Retain**
Wetlands Beach	Copper	2 ft	18	18	80.83	176.85	6.1	24.35	772	31.6	149	86	32	94	390	**24.43**	**5.18**	**8.98**	**24.13**	**8.21**	**1.98**	**Retain**
Wetlands Beach	Copper	2 to 6	9	9	47.61	58.69	3	34.4	191	31.6	149	86	32	94	390	**6.04**	**1.28**	**2.22**	**5.97**	**2.03**	0.49	**Retain**
Wetlands Beach	Iron	0-6 in	21	21	9985.24	3741.06	3690	10900	16900	--	--	40000	--	--	22000	--	--	0.42	--	--	0.77	Pass
Wetlands Beach	Iron	2 ft	18	18	6921.11	6254.82	3130	4350	24400	--	--	40000	--	--	22000	--	--	0.61	--	--	**1.11**	**Retain**
Wetlands Beach	Iron	2 to 6	9	9	9727.78	9329.16	3310	5780	32700	--	--	40000	--	--	22000	--	--	0.82	--	--	**1.49**	**Retain**
Wetlands Beach	Lead	0-6 in	21	21	159.58	144.21	13.7	122	641	35.5	128	127	30	94	400	**18.06**	**5.01**	**5.05**	**21.37**	**6.82**	**1.60**	**Retain**
Wetlands Beach	Lead	2 ft	18	18	10.71	15.75	2.1	4.8	69.7	35.5	128	127	30	94	400	**1.96**	0.54	0.55	**2.32**	0.74	0.17	Pass
Wetlands Beach	Lead	2 to 6	9	9	7.59	6.29	2.1	5	21.5	35.5	128	127	30	94	400	0.61	0.17	0.17	0.72	0.23	0.05	Pass
Wetlands Beach	Magnesium	0-6 in	21	21	13250.00	8159.41	1250	11900	31200	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Magnesium	2 ft	18	18	3035.39	3543.58	837	1470	11300	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Magnesium	2 to 6	9	9	3812.22	3226.31	1080	2470	9810	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Manganese	0-6 in	21	21	644.80	385.22	57.1	599	1470	--	--	1100	--	--	260	--	--	**1.34**	--	--	**5.65**	**Retain**
Wetlands Beach	Manganese	2 ft	18	18	127.31	147.77	33.8	61.95	626	--	--	1100	--	--	260	--	--	0.57	--	--	**2.41**	**Retain**
Wetlands Beach	Manganese	2 to 6	9	9	248.62	322.66	51.3	121	1060	--	--	1100	--	--	260	--	--	0.96	--	--	**4.08**	**Retain**
Wetlands Beach	Mercury	0-6 in	3	21	0.19	0.13	0.019	0.17	0.6	0.18	1.06	0.56	0.14	0.48	0.41	**3.33**	0.57	**1.07**	**4.29**	**1.25**	**1.46**	**Retain**
Wetlands Beach	Mercury	2 ft		18	0.12	0.04	0.02	0.125	0.18	0.18	1.06	0.56	0.14	0.48	0.41	**1.00**	0.17	0.32	**1.29**	0.38	0.44	Pass
Wetlands Beach	Mercury	2 to 6	1	9	0.12	0.03	0.028	0.12	0.14	0.18	1.06	0.56	0.14	0.48	0.41	0.78	0.13	0.25	**1.00**	0.29	0.34	Pass
Wetlands Beach	Nickel	0-6 in	21	21	67.93	41.07	6	61.6	154	22.7	48.6	43	15	47	110	**6.78**	**3.17**	**3.58**	**10.27**	**3.28**	**1.40**	**Retain**
Wetlands Beach	Nickel	2 ft	18	18	9.04	11.56	2.7	4.1	50.4	22.7	48.6	43	15	47	110	**2.22**	**1.04**	**1.17**	**3.36**	**1.07**	0.46	**Retain**
Wetlands Beach	Nickel	2 to 6	9	9	9.99	8.60	2.8	5.8	28.8	22.7	48.6	43	15	47	110	**1.27**	0.59	0.67	**1.92**	0.61	0.26	Pass
Wetlands Beach	Potassium	0-6 in	21	21	1631.57	951.30	360	1460	3500	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Potassium	2 ft	15	18	1256.61	2128.23	340	418	7540	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Potassium	2 to 6	6	9	2322.44	3732.58	330	584	11300	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Selenium	0-6 in	19	21	2.60	2.16	0.3	2.1	8.1	--	--	--	--	--	1	--	--	--	--	--	**8.10**	**Retain**
Wetlands Beach	Selenium	2 ft	13	18	0.57	0.26	0.3	0.525	1.2	--	--	--	--	--	1	--	--	--	--	--	**1.20**	**Retain**
Wetlands Beach	Selenium	2 to 6	7	9	0.51	0.21	0.27	0.48	0.82	--	--	--	--	--	1	--	--	--	--	--	0.82	Pass
Wetlands Beach	Silver	0-6 in	19	21	1.52	0.97	0.26	1.2	3.6	--	--	4.5	0.23	1.1	3.1	--	--	0.80	**15.65**	**3.27**	**1.16**	**Retain**
Wetlands Beach	Silver	2 ft	9	18	0.47	0.23	0.13	0.61	0.83	--	--	4.5	0.23	1.1	3.1	--	--	0.18	**3.61**	0.75	0.27	Pass
Wetlands Beach	Silver	2 to 6	3	9	0.56	0.14	0.22	0.62	0.67	--	--	4.5	0.23	1.1	3.1	--	--	0.15	**2.91**	0.61	0.22	Pass
Wetlands Beach	Sodium	0-6 in	21	21	3147.81	2317.83	757	2600	10700	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Sodium	2 ft	18	18	887.61	609.43	446	631.5	2510	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty

TABLE 4-3

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Literature-Derived Sediment Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										Freshwater Sediment (mg/kg)[a]			Marine Sediment (mg/kg)[b]			Hazard Quotients						
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	***TEC***	***PEC***	***UET***	***T20***	***T50***	***AET***	**Result**
Wetlands Beach	Sodium	2 to 6	9	9	1034.56	715.64	587	800	2900	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Thallium	0-6 in	18	21	0.20	0.33	0.023	0.078	1.4	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Thallium	2 ft	18	18	0.06	0.07	0.019	0.024	0.27	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Thallium	2 to 6	9	9	0.09	0.11	0.025	0.041	0.36	--	--	--	--	--	--	--	--	--	--	--	--	Uncertainty
Wetlands Beach	Vanadium	0-6 in	21	21	34.60	17.91	6.6	29	74.7	--	--	--	--	--	57	--	--	--	--	--	**1.31**	**Retain**
Wetlands Beach	Vanadium	2 ft	18	18	12.86	9.57	5	9.25	36.3	--	--	--	--	--	57	--	--	--	--	--	0.64	Pass
Wetlands Beach	Vanadium	2 to 6	9	9	16.81	12.82	7.3	10.2	45.9	--	--	--	--	--	57	--	--	--	--	--	0.81	Pass
Wetlands Beach	Zinc	0-6 in	21	21	1193.70	827.90	81.3	981	3670	121	459	520	94	247	410	**30.33**	**8.00**	**7.06**	**39.04**	**14.86**	**8.95**	**Retain**
Wetlands Beach	Zinc	2 ft	18	18	1098.54	4467.75	13.8	30.25	19000	121	459	520	94	247	410	**157.02**	**41.39**	**36.54**	**202.13**	**76.92**	**46.34**	**Retain**
Wetlands Beach	Zinc	2 to 6	9	9	80.74	137.26	7.8	36.7	441	121	459	520	94	247	410	**3.64**	0.96	0.85	**4.69**	**1.79**	**1.08**	**Retain**

Notes:

AET = apparent effect threshold

mg/kg = milligrams per kilogram

Pass = maximum concentration was less than the PEC, T50, AET, and/or UET; therefore, there are no risks to the benthic invertebrate community and no further evaluation was necessary

PEC = probable effect concentration

Retain = maximum concentration exceeded the PEC, T50, AET, and/or UET; therefore, this analyte was retained for further evaluation

T20 = 20% probability of observing sediment toxicity

T50 = 50% probability of observing sediment toxicity

TEC = threshold effect concentration

UET = upper effects threshold

UTL = upper tolerance limit

[a] TEC and PEC from MacDonald, 2000. UET from Buchman, 2008.

[b] T20 and T50 from Field et al., 2002. AET from Buchman 2008.

Uncertainty = benchmark value not available; therefore, this analyte retained as an uncertainty

Bold indicates exceedance of a benchmark

Shading and bold indicates analytes that exceed one or more of the PEC, UET, T50, or AET.

TABLE 4-4

Maximum Concentrations of Dioxin/Furans (TEQ) in Sediment (ng/kg, dry weight) Compared to Literature-Derived Sediment Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Depth	Number of Detects	N	Maximum	Low Benchmark	High Benchmark	Hazard Quotients Low	Hazard Quotients High	Result
NCL - East	TEQ - Fish	0-6 in	7	7	0.78402	60	100	0.01	0.01	Pass
NCL - East	TEQ - Birds	0-6 in	7	7	2.9838	21	210	0.14	0.01	Pass
NCL - East	TEQ - Mammals	0-6 in	7	7	1.3214	2.5	25	0.53	0.05	Pass
NCL - North	TEQ - Fish	0-6 in	3	3	0.2154	60	100	0.00	0.00	Pass
NCL - North	TEQ - Birds	0-6 in	3	3	0.2154	21	210	0.01	0.00	Pass
NCL - North	TEQ - Mammals	0-6 in	3	3	0.6522	2.5	25	0.26	0.03	Pass
OID Lagoon	TEQ - Fish	0-6 in	28	28	27.23074	60	100	0.45	0.27	Pass
OID Lagoon	TEQ - Birds	0-6 in	28	28	41.893	21	210	**1.99**	0.20	**Retain**
OID Lagoon	TEQ - Mammals	0-6 in	28	28	25.909	2.5	25	**10.36**	**1.04**	**Retain**
Wetlands Beach	TEQ - Fish	0-6 in	8	8	78.413	60	100	**1.31**	0.78	**Retain**
Wetlands Beach	TEQ - Birds	0-6 in	8	8	121.521	21	210	**5.79**	0.58	**Retain**
Wetlands Beach	TEQ - Mammals	0-6 in	8	8	72.053	2.5	25	**28.82**	**2.88**	**Retain**

Notes:

Benchmarks from Table 4-1.

N = sample size

ng/kg - nanograms per kilogram

Pass = maximum concentration was less than the sediment benchmark; therefore, there are no risks and no further evaluation was necessary

Retain = maximum concentration exceeded the low sediment benchmark; therefore, this analyte was retained for further evaluation

TEQ = toxic equivalency quotient

Bold indicates analytes that exceed the low or high benchmark.

Shading and bold indicates analytes that exceed the low benchmark.

TABLE 4-5

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Site-Specific LOECs and Background by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					Summary Statistics							
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Sediment LOEC (mg/kg)**	**Hazard Quotient**	**Result**
NCL - East	Aluminum	0-6 in	50	50	31294.60	39810.37	2150	12200	159000	159000	**1.00**	**Retain**
NCL - East	Aluminum	2 ft	44	44	10325.23	3959.42	5290	9445	22900	159000	0.14	Pass
NCL - East	Antimony	0-6 in	50	50	2.85	4.30	0.24	0.735	20.1	11.4	**1.76**	**Retain**
NCL - East	Antimony	2 ft	44	44	0.30	0.20	0.11	0.265	1.4	11.4	0.12	Pass
NCL - East	Arsenic	0-6 in	50	50	4.74	4.66	0.83	3.65	33.7	NC	--	Pass
NCL - East	Arsenic	2 ft	44	44	4.16	1.60	1.8	3.7	9.4	NC	--	Pass
NCL - East	Barium	0-6 in	50	50	672.19	1048.73	49.9	200	5040	2480	**2.03**	**Retain**
NCL - East	Barium	2 ft	44	44	144.96	40.73	94.2	132.5	277	2480	0.11	Pass
NCL - East	Beryllium	0-6 in	41	50	2.51	3.67	0.14	0.815	16.8	10.3	**1.63**	**Retain**
NCL - East	Beryllium	2 ft	31	44	0.51	0.22	0.25	0.445	1.1	10.3	0.11	Pass
NCL - East	Cadmium	0-6 in	50	50	1.46	1.55	0.098	0.98	6.7	5.8	**1.16**	**Retain**
NCL - East	Cadmium	2 ft	44	44	0.92	0.43	0.34	0.795	2.1	5.8	0.36	Pass
NCL - East	Calcium	0-6 in	50	50	10326.20	6709.13	2190	8690	32100	NC	--	Pass
NCL - East	Calcium	2 ft	44	44	23388.18	12061.91	8050	22250	66900	NC	--	Pass
NCL - East	Chromium	0-6 in	50	50	61.10	78.53	6.2	24.85	342	342	**1.00**	**Retain**
NCL - East	Chromium	2 ft	44	44	18.63	8.79	8.8	15.55	51.2	342	0.15	Pass
NCL - East	Cobalt	0-6 in	27	50	7.06	2.60	1.4	6.7	13.7	11	**1.25**	**Retain**
NCL - East	Cobalt	2 ft	22	44	7.23	2.51	3.5	6.65	15.9	11	**1.45**	**Retain**
NCL - East	Copper	0-6 in	50	50	591.73	1014.51	15.9	86.15	3950	3190	**1.24**	**Retain**
NCL - East	Copper	2 ft	44	44	26.09	30.26	8.1	15.85	160	3190	0.05	Pass
NCL - East	Iron	0-6 in	50	50	17015.00	4687.91	5370	18300	24400	NC	--	Pass
NCL - East	Iron	2 ft	44	44	19859.09	6461.53	10700	18250	40000	NC	--	Pass
NCL - East	Lead	0-6 in	50	50	89.89	119.56	7.3	28.95	616	274	**2.25**	**Retain**
NCL - East	Lead	2 ft	44	44	8.72	6.40	4	6.3	41.8	274	0.15	Pass
NCL - East	Magnesium	0-6 in	50	50	13752.80	12983.54	1490	8455	55600	42200	**1.32**	**Retain**
NCL - East	Magnesium	2 ft	44	44	7353.64	2447.39	3480	6815	14300	42200	0.34	Pass
NCL - East	Manganese	0-6 in	50	50	473.50	460.36	62.5	282.5	2100	2100	**1.00**	**Retain**
NCL - East	Manganese	2 ft	44	44	338.25	102.93	202	321.5	606	2100	0.29	Pass
NCL - East	Mercury	0-6 in	18	50	0.09	0.05	0.014	0.0755	0.18	NC	--	Pass
NCL - East	Mercury	2 ft	8	44	0.10	0.06	0.013	0.12	0.23	NC	--	Pass
NCL - East	Nickel	0-6 in	49	50	41.96	41.56	5	20.85	179	158	**1.13**	**Retain**
NCL - East	Nickel	2 ft	44	44	18.76	7.71	9.2	16.7	46.3	158	0.29	Pass
NCL - East	Potassium	0-6 in	50	50	4321.60	1458.04	770	4480	7300	NC	--	Pass
NCL - East	Potassium	2 ft	44	44	5599.55	2941.75	2320	4880	19900	NC	--	Pass
NCL - East	Selenium	0-6 in	47	50	1.62	1.26	0.53	1.05	5.6	NC	--	Pass
NCL - East	Selenium	2 ft	44	44	0.72	0.27	0.36	0.66	1.8	NC	--	Pass
NCL - East	Silver	0-6 in	29	50	1.14	1.24	0.13	0.65	4.9	4.9	**1.00**	**Retain**
NCL - East	Silver	2 ft	5	44	0.63	0.19	0.13	0.635	1.2	4.9	0.24	Pass
NCL - East	Sodium	0-6 in	50	50	2574.82	1304.70	861	2225	6220	NC	--	Pass
NCL - East	Sodium	2 ft	44	44	2903.11	2148.52	977	1875	8990	NC	--	Pass
NCL - East	Thallium	0-6 in	47	50	0.21	0.12	0.04	0.21	0.71	NC	--	Pass

TABLE 4-5

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Site-Specific LOECs and Background by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					Summary Statistics							
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Sediment LOEC (mg/kg)**	**Hazard Quotient**	**Result**
NCL - East	Thallium	2 ft	44	44	0.24	0.09	0.1	0.205	0.49	NC	--	Pass
NCL - East	Vanadium	0-6 in	50	50	41.81	18.51	12.8	36.6	125	125	**1.00**	**Retain**
NCL - East	Vanadium	2 ft	44	44	33.50	12.21	16.6	29.2	70.4	125	0.56	Pass
NCL - East	Zinc	0-6 in	50	50	567.28	943.95	30.8	131	4570	2560	**1.79**	**Retain**
NCL - East	Zinc	2 ft	44	44	63.29	46.66	24.7	47.75	311	2560	0.12	Pass
NCL - North	Aluminum	0-6 in	22	22	13884.55	4525.83	5920	13450	27800	159000	0.17	Pass
NCL - North	Aluminum	2 ft	16	16	14351.25	5925.23	6360	12650	25700	159000	0.16	Pass
NCL - North	Antimony	0-6 in	13	22	0.73	0.50	0.21	0.535	2.2	11.4	0.19	Pass
NCL - North	Antimony	2 ft	3	16	0.67	0.35	0.46	0.59	1.9	11.4	0.17	Pass
NCL - North	Arsenic	0-6 in	22	22	3.65	1.68	0.89	3.35	7.2	NC	--	Pass
NCL - North	Arsenic	2 ft	15	16	3.83	1.34	0.91	4.05	5.5	NC	--	Pass
NCL - North	Barium	0-6 in	22	22	423.73	1042.31	103	166.5	5060	2480	**2.04**	**Retain**
NCL - North	Barium	2 ft	16	16	230.83	341.86	68.6	146.5	1500	2480	0.60	Pass
NCL - North	Beryllium	0-6 in	22	22	1.70	3.81	0.29	0.86	18.7	10.3	**1.82**	**Retain**
NCL - North	Beryllium	2 ft	16	16	1.19	1.36	0.4	0.86	6.2	10.3	0.60	Pass
NCL - North	Cadmium	0-6 in	22	22	1.30	0.74	0.2	1.15	3.7	5.8	0.64	Pass
NCL - North	Cadmium	2 ft	16	16	1.16	0.56	0.35	1	2.7	5.8	0.47	Pass
NCL - North	Calcium	0-6 in	22	22	25030.91	30067.45	3240	14800	111000	NC	--	Pass
NCL - North	Calcium	2 ft	16	16	30561.25	27591.20	7590	22650	116000	NC	--	Pass
NCL - North	Chromium	0-6 in	22	22	21.61	8.93	13.6	18.4	51.3	342	0.15	Pass
NCL - North	Chromium	2 ft	16	16	19.14	7.06	7.5	19.2	35.6	342	0.10	Pass
NCL - North	Cobalt	0-6 in	17	22	7.75	1.88	2.9	7.45	11.5	11	**1.05**	**Retain**
NCL - North	Cobalt	2 ft	13	16	8.31	2.41	4.5	8.45	13.5	11	**1.23**	**Retain**
NCL - North	Copper	0-6 in	22	22	58.34	65.03	14.5	35.25	270	3190	0.08	Pass
NCL - North	Copper	2 ft	16	16	27.40	23.09	7.9	19.8	97.4	3190	0.03	Pass
NCL - North	Iron	0-6 in	22	22	22007.27	5185.57	9060	21800	34500	NC	--	Pass
NCL - North	Iron	2 ft	16	16	23131.25	7495.66	10700	23100	40400	NC	--	Pass
NCL - North	Lead	0-6 in	22	22	59.51	72.09	6.1	34	306	274	**1.12**	**Retain**
NCL - North	Lead	2 ft	16	16	17.57	14.24	3	15.5	58	274	0.21	Pass
NCL - North	Magnesium	0-6 in	22	22	8445.00	3614.11	3480	7700	22800	42200	0.54	Pass
NCL - North	Magnesium	2 ft	16	16	9217.50	3309.73	3440	8895	16500	42200	0.39	Pass
NCL - North	Manganese	0-6 in	22	22	317.35	191.52	90.8	269	986	2100	0.47	Pass
NCL - North	Manganese	2 ft	16	16	400.06	157.56	129	408	670	2100	0.32	Pass
NCL - North	Mercury	0-6 in	3	22	0.14	0.05	0.03	0.135	0.23	NC	--	Pass
NCL - North	Mercury	2 ft	4	16	0.11	0.05	0.02	0.13	0.2	NC	--	Pass
NCL - North	Nickel	0-6 in	22	22	23.64	7.12	10.1	22.35	42.9	158	0.27	Pass
NCL - North	Nickel	2 ft	16	16	22.84	6.86	9.1	23.05	33.3	158	0.21	Pass
NCL - North	Potassium	0-6 in	22	22	4585.00	1054.06	1930	4560	6690	NC	--	Pass
NCL - North	Potassium	2 ft	16	16	4569.38	1427.51	1920	4440	6800	NC	--	Pass
NCL - North	Selenium	0-6 in	13	22	2.74	3.02	0.17	2.1	15.2	NC	--	Pass
NCL - North	Selenium	2 ft	7	16	1.60	1.58	0.064	1.185	6	NC	--	Pass

TABLE 4-5

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Site-Specific LOECs and Background by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					Summary Statistics							
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Sediment LOEC (mg/kg)**	**Hazard Quotient**	**Result**
NCL - North	Silver	0-6 in	8	22	0.53	0.19	0.22	0.52	1.2	4.9	0.24	Pass
NCL - North	Silver	2 ft	2	16	0.60	0.21	0.35	0.555	1.3	4.9	0.27	Pass
NCL - North	Sodium	0-6 in	22	22	2344.59	1240.87	567	1920	5120	NC	--	Pass
NCL - North	Sodium	2 ft	16	16	2105.44	883.19	797	2030	3700	NC	--	Pass
NCL - North	Thallium	0-6 in	6	22	0.42	0.17	0.048	0.39	0.67	NC	--	Pass
NCL - North	Thallium	2 ft		16	0.55	0.12	0.35	0.515	0.74	NC	--	Pass
NCL - North	Vanadium	0-6 in	22	22	38.60	13.21	16.2	34.55	62.7	125	0.50	Pass
NCL - North	Vanadium	2 ft	16	16	36.33	9.96	11.2	35.1	53	125	0.42	Pass
NCL - North	Zinc	0-6 in	22	22	196.83	182.32	57.2	107.5	790	2560	0.31	Pass
NCL - North	Zinc	2 ft	16	16	93.68	54.61	32.2	77.05	253	2560	0.10	Pass
OID Lagoon	Aluminum	0-6 in	49	49	5582.24	5665.33	1110	3500	23900	159000	0.15	Pass
OID Lagoon	Aluminum	2 ft	39	39	8754.87	8724.06	1330	5840	34100	159000	0.21	Pass
OID Lagoon	Aluminum	2 to 6	18	18	7023.89	6577.47	1220	3735	20600	159000	0.13	Pass
OID Lagoon	Antimony	0-6 in	43	49	0.50	0.35	0.077	0.43	1.7	11.4	0.15	Pass
OID Lagoon	Antimony	2 ft	39	39	0.99	1.69	0.056	0.29	7.7	11.4	0.68	Pass
OID Lagoon	Antimony	2 to 6	18	18	0.27	0.15	0.11	0.2	0.61	11.4	0.05	Pass
OID Lagoon	Arsenic	0-6 in	49	49	2.66	1.96	0.61	1.9	7.5	NC	--	Pass
OID Lagoon	Arsenic	2 ft	39	39	4.03	3.80	0.73	2.4	18.2	NC	--	Pass
OID Lagoon	Arsenic	2 to 6	18	18	3.11	2.46	0.81	2.35	9.3	NC	--	Pass
OID Lagoon	Barium	0-6 in	42	49	99.26	92.80	12.2	76.6	410	2480	0.17	Pass
OID Lagoon	Barium	2 ft	37	39	1024.40	2236.40	24	116	9100	2480	**3.67**	**Retain**
OID Lagoon	Barium	2 to 6	15	18	380.88	1244.65	12.7	84.1	5360	2480	**2.16**	**Retain**
OID Lagoon	Beryllium	0-6 in	24	49	0.44	0.41	0.051	0.29	1.4	10.3	0.14	Pass
OID Lagoon	Beryllium	2 ft	18	39	2.99	7.71	0.073	0.32	39.6	10.3	**3.84**	**Retain**
OID Lagoon	Beryllium	2 to 6	7	18	0.41	0.37	0.08	0.255	1.1	10.3	0.11	Pass
OID Lagoon	Cadmium	0-6 in	42	49	0.68	0.60	0.049	0.47	3.5	5.8	0.60	Pass
OID Lagoon	Cadmium	2 ft	36	39	0.70	0.93	0.038	0.45	5	5.8	0.86	Pass
OID Lagoon	Cadmium	2 to 6	18	18	0.57	0.48	0.086	0.485	1.6	5.8	0.28	Pass
OID Lagoon	Calcium	0-6 in	49	49	43032.86	47531.77	3890	16400	178000	NC	--	Pass
OID Lagoon	Calcium	2 ft	39	39	36826.41	46439.48	2090	11400	179000	NC	--	Pass
OID Lagoon	Calcium	2 to 6	18	18	18115.00	28716.01	4070	7990	126000	NC	--	Pass
OID Lagoon	Chromium	0-6 in	49	49	12.79	9.77	0.64	9.8	41.2	342	0.12	Pass
OID Lagoon	Chromium	2 ft	39	39	20.44	23.15	3	9.1	86.4	342	0.25	Pass
OID Lagoon	Chromium	2 to 6	18	18	16.02	14.89	3.6	12	57.9	342	0.17	Pass
OID Lagoon	Cobalt	0-6 in	7	49	4.10	3.80	0.76	3.2	18.8	11	**1.71**	**Retain**
OID Lagoon	Cobalt	2 ft	3	39	3.95	3.32	0.98	3.7	14.9	11	**1.35**	**Retain**
OID Lagoon	Cobalt	2 to 6	4	18	4.62	4.19	0.93	2.15	12.6	11	**1.15**	**Retain**
OID Lagoon	Copper	0-6 in	44	49	31.72	30.50	1.3	25.5	119	3190	0.04	Pass
OID Lagoon	Copper	2 ft	32	39	101.63	200.54	1.1	23.6	803	3190	0.25	Pass
OID Lagoon	Copper	2 to 6	14	18	20.02	22.30	1.8	11.85	91.2	3190	0.03	Pass
OID Lagoon	Iron	0-6 in	49	49	11186.73	10007.77	2420	8230	43200	NC	--	Pass

TABLE 4-5

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Site-Specific LOECs and Background by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					Summary Statistics							
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Sediment LOEC (mg/kg)**	**Hazard Quotient**	**Result**
OID Lagoon	Iron	2 ft	39	39	12244.10	10947.78	3130	8520	48200	NC	--	Pass
OID Lagoon	Iron	2 to 6	18	18	14940.56	13883.66	3130	6395	40700	NC	--	Pass
OID Lagoon	Lead	0-6 in	48	49	12.85	12.17	0.89	10.3	46.8	274	0.17	Pass
OID Lagoon	Lead	2 ft	39	39	26.78	35.95	1.5	8.5	128	274	0.47	Pass
OID Lagoon	Lead	2 to 6	18	18	6.22	4.70	1.7	4.55	15.1	274	0.06	Pass
OID Lagoon	Magnesium	0-6 in	49	49	4243.63	3611.16	934	3070	14500	42200	0.34	Pass
OID Lagoon	Magnesium	2 ft	39	39	15658.46	27073.67	1050	4070	116000	42200	**2.75**	**Retain**
OID Lagoon	Magnesium	2 to 6	18	18	5174.44	4637.22	1050	2690	12800	42200	0.30	Pass
OID Lagoon	Manganese	0-6 in	49	49	272.16	230.20	46.5	189	989	2100	0.47	Pass
OID Lagoon	Manganese	2 ft	39	39	405.13	451.39	51.4	252	1660	2100	0.79	Pass
OID Lagoon	Manganese	2 to 6	18	18	280.40	316.39	48.3	155.5	1270	2100	0.60	Pass
OID Lagoon	Mercury	0-6 in	14	48	0.11	0.08	0.015	0.12	0.36	NC	--	Pass
OID Lagoon	Mercury	2 ft	18	39	0.07	0.06	0.015	0.04	0.24	NC	--	Pass
OID Lagoon	Mercury	2 to 6	5	18	0.10	0.05	0.027	0.12	0.18	NC	--	Pass
OID Lagoon	Nickel	0-6 in	36	49	11.44	10.53	2.4	8.7	49.5	158	0.31	Pass
OID Lagoon	Nickel	2 ft	30	39	15.30	12.74	3.2	11.8	49.6	158	0.31	Pass
OID Lagoon	Nickel	2 to 6	13	18	13.01	11.42	2.6	6.45	34.8	158	0.22	Pass
OID Lagoon	Potassium	0-6 in	43	49	1981.80	2269.38	335	999	10100	NC	--	Pass
OID Lagoon	Potassium	2 ft	39	39	2334.44	2360.65	357	1070	8710	NC	--	Pass
OID Lagoon	Potassium	2 to 6	18	18	3289.56	3616.70	362	963.5	10700	NC	--	Pass
OID Lagoon	Selenium	0-6 in	35	49	1.36	1.25	0.3	0.9	6.8	NC	--	Pass
OID Lagoon	Selenium	2 ft	28	39	0.98	0.61	0.31	0.7	2.5	NC	--	Pass
OID Lagoon	Selenium	2 to 6	14	18	0.78	0.39	0.26	0.68	1.6	NC	--	Pass
OID Lagoon	Silver	0-6 in	12	49	0.78	0.45	0.23	0.65	2.8	4.9	0.57	Pass
OID Lagoon	Silver	2 ft	19	39	1.06	1.08	0.13	0.67	5	4.9	**1.02**	**Retain**
OID Lagoon	Silver	2 to 6	9	18	0.61	0.18	0.16	0.65	0.85	4.9	0.17	Pass
OID Lagoon	Sodium	0-6 in	49	49	4406.22	4204.09	975	2730	20800	NC	--	Pass
OID Lagoon	Sodium	2 ft	39	39	3837.77	3207.34	358	3100	13000	NC	--	Pass
OID Lagoon	Sodium	2 to 6	18	18	3619.06	3104.67	742	2060	9840	NC	--	Pass
OID Lagoon	Thallium	0-6 in	39	49	0.22	0.20	0.028	0.16	0.69	NC	--	Pass
OID Lagoon	Thallium	2 ft	39	39	0.13	0.12	0.027	0.083	0.49	NC	--	Pass
OID Lagoon	Thallium	2 to 6	18	18	0.16	0.13	0.029	0.092	0.39	NC	--	Pass
OID Lagoon	Vanadium	0-6 in	49	49	22.98	18.04	2.6	18.2	72.1	125	0.58	Pass
OID Lagoon	Vanadium	2 ft	39	39	21.39	16.31	4.7	15.5	63.6	125	0.51	Pass
OID Lagoon	Vanadium	2 to 6	18	18	22.75	19.76	5.6	11.4	64.6	125	0.52	Pass
OID Lagoon	Zinc	0-6 in	49	49	106.61	98.81	9.4	70	427	2560	0.17	Pass
OID Lagoon	Zinc	2 ft	39	39	166.32	282.89	8.5	60	1250	2560	0.49	Pass
OID Lagoon	Zinc	2 to 6	18	18	43.94	34.19	8.9	41.7	104	2560	0.04	Pass
Wetlands Beach	Aluminum	0-6 in	21	21	61695.24	39621.94	3760	54500	166000	159000	**1.04**	**Retain**
Wetlands Beach	Aluminum	2 ft	18	18	6233.89	8526.85	1620	2790	37400	159000	0.24	Pass
Wetlands Beach	Aluminum	2 to 6	9	9	5852.22	5170.05	1480	3590	16100	159000	0.10	Pass

TABLE 4-5

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Site-Specific LOECs and Background by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					Summary Statistics							
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Sediment LOEC (mg/kg)**	**Hazard Quotient**	**Result**
Wetlands Beach	Antimony	0-6 in	21	21	5.08	3.28	0.34	4.9	10.4	11.4	0.91	Pass
Wetlands Beach	Antimony	2 ft	18	18	0.36	0.48	0.12	0.215	2.2	11.4	0.19	Pass
Wetlands Beach	Antimony	2 to 6	9	9	0.34	0.32	0.084	0.2	1.1	11.4	0.10	Pass
Wetlands Beach	Arsenic	0-6 in	21	21	5.24	2.91	1.1	5	10.7	NC	--	Pass
Wetlands Beach	Arsenic	2 ft	18	18	1.59	0.72	0.79	1.4	3.3	NC	--	Pass
Wetlands Beach	Arsenic	2 to 6	9	9	2.23	1.61	1.1	1.5	6.2	NC	--	Pass
Wetlands Beach	Barium	0-6 in	21	21	1142.00	873.42	67.4	927	3110	2480	**1.25**	**Retain**
Wetlands Beach	Barium	2 ft	15	18	88.19	131.32	13.9	44.3	578	2480	0.23	Pass
Wetlands Beach	Barium	2 to 6	8	9	139.03	219.24	16.3	53.3	706	2480	0.28	Pass
Wetlands Beach	Beryllium	0-6 in	21	21	5.15	4.54	0.26	4.2	19.9	10.3	**1.93**	**Retain**
Wetlands Beach	Beryllium	2 ft	13	18	0.33	0.45	0.09	0.145	2	10.3	0.19	Pass
Wetlands Beach	Beryllium	2 to 6	5	9	0.48	0.58	0.086	0.25	1.9	10.3	0.18	Pass
Wetlands Beach	Cadmium	0-6 in	21	21	1.97	1.35	0.049	1.7	4.1	5.8	0.71	Pass
Wetlands Beach	Cadmium	2 ft	18	18	0.38	0.38	0.084	0.24	1.4	5.8	0.24	Pass
Wetlands Beach	Cadmium	2 to 6	9	9	0.33	0.21	0.13	0.24	0.69	5.8	0.12	Pass
Wetlands Beach	Calcium	0-6 in	21	21	18191.43	17360.47	1620	8180	52500	NC	--	Pass
Wetlands Beach	Calcium	2 ft	18	18	6698.33	6239.13	1420	3890	23300	NC	--	Pass
Wetlands Beach	Calcium	2 to 6	9	9	7646.67	3957.99	2960	5850	15400	NC	--	Pass
Wetlands Beach	Chromium	0-6 in	21	21	114.44	103.10	5.4	83.7	472	342	**1.38**	**Retain**
Wetlands Beach	Chromium	2 ft	18	18	12.09	12.61	3.6	8.25	58	342	0.17	Pass
Wetlands Beach	Chromium	2 to 6	9	9	11.89	6.91	5.4	9.4	24.2	342	0.07	Pass
Wetlands Beach	Cobalt	0-6 in	10	21	5.06	2.34	1.1	5.2	9.2	11	0.84	Pass
Wetlands Beach	Cobalt	2 ft	9	18	2.01	1.93	0.87	1.25	6.9	11	0.63	Pass
Wetlands Beach	Cobalt	2 to 6	5	9	2.91	3.08	1.1	1.4	10.2	11	0.93	Pass
Wetlands Beach	Copper	0-6 in	21	21	1423.25	1025.16	55.6	1260	3970	3190	**1.24**	**Retain**
Wetlands Beach	Copper	2 ft	18	18	80.83	176.85	6.1	24.35	772	3190	0.24	Pass
Wetlands Beach	Copper	2 to 6	9	9	47.61	58.69	3	34.4	191	3190	0.06	Pass
Wetlands Beach	Iron	0-6 in	21	21	9985.24	3741.06	3690	10900	16900	NC	--	Pass
Wetlands Beach	Iron	2 ft	18	18	6921.11	6254.82	3130	4350	24400	NC	--	Pass
Wetlands Beach	Iron	2 to 6	9	9	9727.78	9329.16	3310	5780	32700	NC	--	Pass
Wetlands Beach	Lead	0-6 in	21	21	159.58	144.21	13.7	122	641	274	**2.34**	**Retain**
Wetlands Beach	Lead	2 ft	18	18	10.71	15.75	2.1	4.8	69.7	274	0.25	Pass
Wetlands Beach	Lead	2 to 6	9	9	7.59	6.29	2.1	5	21.5	274	0.08	Pass
Wetlands Beach	Magnesium	0-6 in	21	21	13250.00	8159.41	1250	11900	31200	42200	0.74	Pass
Wetlands Beach	Magnesium	2 ft	18	18	3035.39	3543.58	837	1470	11300	42200	0.27	Pass
Wetlands Beach	Magnesium	2 to 6	9	9	3812.22	3226.31	1080	2470	9810	42200	0.23	Pass
Wetlands Beach	Manganese	0-6 in	21	21	644.80	385.22	57.1	599	1470	2100	0.70	Pass
Wetlands Beach	Manganese	2 ft	18	18	127.31	147.77	33.8	61.95	626	2100	0.30	Pass
Wetlands Beach	Manganese	2 to 6	9	9	248.62	322.66	51.3	121	1060	2100	0.50	Pass
Wetlands Beach	Mercury	0-6 in	3	20	0.16	0.09	0.019	0.165	0.3	NC	--	Pass
Wetlands Beach	Mercury	2 ft		18	0.12	0.04	0.02	0.125	0.18	NC	--	Pass

TABLE 4-5

Maximum Concentrations of Inorganics in Sediment (mg/kg, dry weight) Compared to Site-Specific LOECs and Background by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					Summary Statistics							
Area	**Analyte**	**Depth**	**Number of Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Sediment LOEC (mg/kg)**	**Hazard Quotient**	**Result**
Wetlands Beach	Mercury	2 to 6	1	9	0.12	0.03	0.028	0.12	0.14	NC	--	Pass
Wetlands Beach	Nickel	0-6 in	21	21	67.93	41.07	6	61.6	154	158	0.97	Pass
Wetlands Beach	Nickel	2 ft	18	18	9.04	11.56	2.7	4.1	50.4	158	0.32	Pass
Wetlands Beach	Nickel	2 to 6	9	9	9.99	8.60	2.8	5.8	28.8	158	0.18	Pass
Wetlands Beach	Potassium	0-6 in	21	21	1631.57	951.30	360	1460	3500	NC	--	Pass
Wetlands Beach	Potassium	2 ft	15	18	1256.61	2128.23	340	418	7540	NC	--	Pass
Wetlands Beach	Potassium	2 to 6	6	9	2322.44	3732.58	330	584	11300	NC	--	Pass
Wetlands Beach	Selenium	0-6 in	19	21	2.60	2.16	0.3	2.1	8.1	NC	--	Pass
Wetlands Beach	Selenium	2 ft	13	18	0.57	0.26	0.3	0.525	1.2	NC	--	Pass
Wetlands Beach	Selenium	2 to 6	7	9	0.51	0.21	0.27	0.48	0.82	NC	--	Pass
Wetlands Beach	Silver	0-6 in	19	21	1.52	0.97	0.26	1.2	3.6	4.9	0.73	Pass
Wetlands Beach	Silver	2 ft	9	18	0.47	0.23	0.13	0.61	0.83	4.9	0.17	Pass
Wetlands Beach	Silver	2 to 6	3	9	0.56	0.14	0.22	0.62	0.67	4.9	0.14	Pass
Wetlands Beach	Sodium	0-6 in	21	21	3147.81	2317.83	757	2600	10700	NC	--	Pass
Wetlands Beach	Sodium	2 ft	18	18	887.61	609.43	446	631.5	2510	NC	--	Pass
Wetlands Beach	Sodium	2 to 6	9	9	1034.56	715.64	587	800	2900	NC	--	Pass
Wetlands Beach	Thallium	0-6 in	18	21	0.20	0.33	0.023	0.078	1.4	NC	--	Pass
Wetlands Beach	Thallium	2 ft	18	18	0.06	0.07	0.019	0.024	0.27	NC	--	Pass
Wetlands Beach	Thallium	2 to 6	9	9	0.09	0.11	0.025	0.041	0.36	NC	--	Pass
Wetlands Beach	Vanadium	0-6 in	21	21	34.60	17.91	6.6	29	74.7	125	0.60	Pass
Wetlands Beach	Vanadium	2 ft	18	18	12.86	9.57	5	9.25	36.3	125	0.29	Pass
Wetlands Beach	Vanadium	2 to 6	9	9	16.81	12.82	7.3	10.2	45.9	125	0.37	Pass
Wetlands Beach	Zinc	0-6 in	21	21	1193.70	827.90	81.3	981	3670	2560	**1.43**	**Retain**
Wetlands Beach	Zinc	2 ft	18	18	1098.54	4467.75	13.8	30.25	19000	2560	**7.42**	**Retain**
Wetlands Beach	Zinc	2 to 6	9	9	80.74	137.26	7.8	36.7	441	2560	0.17	Pass

Notes:

-- calculation not possible

LOEC - lowest observed effect concentration

mg/kg - milligrams per kilogram

NA = not available

NC = This analyte was not significantly correlated with observed toxicity in the sediment bioassays; therefore, a LOEC was not developed and it was assumed that sediment concentrations at the site are not toxic (i.e., analyte passes the screen).

Pass = maximum concentration was less than the sediment benchmark; therefore, there are no risks to the benthic invertebrate community and no further evaluation was necessary

Retain = maximum concentration exceeded the sediment benchmark; therefore, this analyte was retained for further evaluation

UTL = upper tolerance limit

Shading and bold indicates analytes that exceed the benchmark.

TABLE 4-6

Maximum Concentrations in Benthic Invertebrate Whole-body Tissue Compared to Literature-Derived Benchmarks by Analyte and Taxa

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Taxa	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum	NOEC	LOEC	HQ - NOEC	HQ - LOEC	Result
Inorganics - mg/kg, wet weight													
Aluminum	Crayfish	5	83	48	28	71	152	152	--	--	**--**	**--**	Uncertainty
Aluminum	Mixed insects	3	37	13	22	44	45	45	--	--	**--**	**--**	Uncertainty
Aluminum	Waterboatmen	4	949	1416	45	358.5	3034	3034	--	--	**--**	**--**	Uncertainty
Barium	Crayfish	5	11.4	7.44	4	9	23	23	--	--	**--**	**--**	Uncertainty
Barium	Mixed insects	1	11		11	11	11	11	--	--	**--**	**--**	Uncertainty
Barium	Waterboatmen	4	20.5	21.14	7	11.5	52	52	--	--	**--**	**--**	Uncertainty
Beryllium	Waterboatmen	1	0.32		0.32	0.32	0.32	0.32	--	--	**--**	**--**	Uncertainty
Calcium	Crayfish	5	37388	22342	21735	25300	73639	73639	--	--	**--**	**--**	Essential nutrient
Calcium	Dragonflies/damselflies	1	271		271	271	271	271	--	--	**--**	**--**	Essential nutrient
Calcium	Mixed insects	3	2511	3682	279	493	6760	6760	--	--	**--**	**--**	Essential nutrient
Calcium	Waterboatmen	4	1872	382	1473	1829.5	2354	2354	--	--	**--**	**--**	Essential nutrient
Chromium	Crayfish	1	1		1	1	1	1	1	3.2	**1.00**	0.3125	Pass
Chromium	Waterboatmen	3	2.33	1.53	1	2	4	4	9.2		0.43		Pass
Copper	Crayfish	5	57.6	32.07	19	49	95	95	50	--	**1.90**	**--**	**Retain**
Copper	Dragonflies/damselflies	1	4		4	4	4	4	--	140.4	--	0.03	Pass
Copper	Mixed insects	3	11.3	6.43	4	14	16	16	--	140.4	--	0.11	Pass
Copper	Waterboatmen	4	24.25	18.84	12	16.5	52	52	--	140.4	--	0.37	Pass
Iron	Crayfish	5	78	39	32	65	132	132	--	--	--	--	Essential nutrient
Iron	Dragonflies/damselflies	1	27		27	27	27	27	--	--	--	--	Essential nutrient
Iron	Mixed insects	3	45	23	23	44	69	69	--	--	--	--	Essential nutrient
Iron	Waterboatmen	4	166	112	97	117.5	332	332	--	--	--	--	Essential nutrient
Lead	Waterboatmen	3	2.33	1.53	1	2	4	4	260	--	0.02	--	Pass
Magnesium	Crayfish	5	1258	816.86	638	919	2670	2670	--	--	--	--	Essential nutrient
Magnesium	Dragonflies/damselflies	1	169		169	169	169	169	--	--	--	--	Essential nutrient
Magnesium	Mixed insects	3	260.33	92.20	180	240	361	361	--	--	--	--	Essential nutrient
Magnesium	Waterboatmen	4	515	360.39	231	394.5	1040	1040	--	--	--	--	Essential nutrient
Manganese	Crayfish	5	152	104.30	54	121	310	310	--	--	--	--	Uncertainty
Manganese	Dragonflies/damselflies	1	21		21	21	21	21	--	--	--	--	Uncertainty
Manganese	Mixed insects	3	29.33	14.57	14	31	43	43	--	--	--	--	Uncertainty
Manganese	Waterboatmen	4	34.5	29.54	11	25.5	76	76	--	--	--	--	Uncertainty
Mercury	Crayfish	1	0.008		0.008	0.008	0.008	0.008	2.1	--	0.004	--	Pass
Mercury	Mixed insects	1	0.009		0.009	0.009	0.009	0.009	107.6	--	0.0001	--	Pass
Nickel	Waterboatmen	1	3		3	3	3	3	--	--	**--**	**--**	Uncertainty
Potassium	Crayfish	5	2109	419	1520	2205	2552	2552	--	--	--	--	Essential nutrient
Potassium	Dragonflies/damselflies	1	1320		1320	1320	1320	1320	--	--	--	--	Essential nutrient
Potassium	Mixed insects	3	1390	512	1070	1120	1980	1980	--	--	--	--	Essential nutrient
Potassium	Waterboatmen	4	1137	230	903	1121	1404	1404	--	--	--	--	Essential nutrient
Selenium	Crayfish	3	1.33	0.58	1	1	2	2	0.26	6.34	**7.69**	0.32	Pass
Selenium	Mixed insects	1	2		2	2	2	2	5.08	12.6	0.39	0.16	Pass

TABLE 4-6

Maximum Concentrations in Benthic Invertebrate Whole-body Tissue Compared to Literature-Derived Benchmarks by Analyte and Taxa

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Taxa	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum	NOEC	LOEC	HQ - NOEC	HQ - LOEC	Result
Sodium	Crayfish	5	2035	481	1280	2184	2456	2456	--	--	--	--	Essential nutrient
Sodium	Dragonflies/damselflies	1	979		979	979	979	979	--	--	--	--	Essential nutrient
Sodium	Mixed insects	3	985	300	790	835	1330	1330	--	--	--	--	Essential nutrient
Sodium	Waterboatmen	4	782	323	511	687	1244	1244	--	--	--	--	Essential nutrient
Vanadium	Waterboatmen	1	1		1	1	1	1	--	--	**--**	**--**	Uncertainty
Zinc	Crayfish	5	27.8	13.66	14	22	49	49	12.7	35.2	**3.86**	**1.39**	**Retain**
Zinc	Dragonflies/damselflies	1	14		14	14	14	14	524	--	0.03	--	Pass
Zinc	Mixed insects	3	33.33	16.50	15	38	47	47	524	--	0.09	--	Pass
Zinc	Waterboatmen	4	54.75	18.01	36	55	73	73	524	--	0.14	--	Pass
Dioxins/Furans - ng/kg, wet weight													
OCDD	Waterboatmen	2	14.2	12.5	5.3	14.2	21.2	23	138000	--	0.0002	--	Pass
Total TCDD	Waterboatmen	3	2.2	1.1	1.1	2.3	3.1	3.3	138000	--	0.00002	--	Pass
Total TCDF	Waterboatmen	3	12.7	14.2	3.3	5.8	24.4	29	138000	--	0.0002	--	Pass

Notes:

-- benchmark not available

Essential nutrient = essential nutrients were not retained for further evaluation

HQ = hazard quotient

LOEC = lowest observed effect concentration

mg/kg = milligrams per kilogram

ng/kg = nanograms per kilogram

NOEC = no observed effect concentration

P90 = 90th percentile

Pass = maximum concentration was less than the LOEC-based tissue benchmark; therefore, there are no risks to the benthic invertebrate community and no further evaluation was necessary

Retain = maximum concentration exceeded the LOEC-based tissue benchmark; therefore, this analyte was retained for further evaluation

Uncertainty = benchmark value not available; therefore, this analyte retained as an uncertainty

Shading and bold indicates exceedances of the tissue-based benchmarks.

TABLE 4-7

Mean Concentrations of Dioxin/Furans (TEQ) in Sediment (ng/kg, dry weight) Compared to Literature-Derived Sediment Benchmarks by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Analyte	Depth	Number of Detects	N	Mean	Low Benchmark	High Benchmark	Hazard Quotients Low	Hazard Quotients High	Result
OID Lagoon	TEQ - Birds	0-6 in	28	28	5.63	21	210	0.268	0.027	**Pass**
OID Lagoon	TEQ - Mammals	0-6 in	28	28	4.31	2.5	25	**1.724**	0.172	**Pass**
Wetlands Beach	TEQ - Fish	0-6 in	8	8	16.93	60	100	0.282	0.169	**Pass**
Wetlands Beach	TEQ - Birds	0-6 in	8	8	27.47	21	210	**1.308**	0.131	**Pass**
Wetlands Beach	TEQ - Mammals	0-6 in	8	8	15.46	2.5	25	**6.184**	0.618	**Pass**

Notes:

Benchmarks from Table 4-1.

N = sample size

ng/kg - nanograms per kilogram

Pass = mean concentration was less than the sediment benchmarks; therefore, there are no risks and no further evaluation was necessary

TEQ = toxic equivalency quotient

Bold indicates the exceedance of the benchmark.

TABLE 4-8

Mean Concentrations (mg/kg, dry weight) of Inorganics in Sediment Compared to Site-Specific LOECs by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Site-Specific LOEC	HQ_{LOEC}	$Risk_{LOEC}$
NCL - East	NCL - East (< 8' Elev)	0-6 in	Aluminum	50	50	31295	39810	2150	12200	159000	159000	0.20	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Antimony	50	50	2.85	4.30	0.24	0.735	20.1	11.4	0.25	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Barium	50	50	672.2	1048.7	49.9	200	5040	2480	0.27	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Beryllium	41	50	2.51	3.67	0.14	0.815	16.8	10.3	0.24	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Cadmium	50	50	1.46	1.55	0.098	0.98	6.7	5.8	0.25	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Chromium	50	50	61.10	78.53	6.2	24.85	342	342	0.18	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Cobalt	27	50	7.06	2.60	1.4	6.7	13.7	11	0.64	Pass
NCL - East	NCL - East (< 8' Elev)	2 ft	Cobalt	22	44	7.23	2.51	3.5	6.65	15.9	11	0.66	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Copper	50	50	591.7	1014.5	15.9	86.15	3950	3190	0.19	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Lead	50	50	89.89	119.56	7.3	28.95	616	274	0.33	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Magnesium	50	50	13753	12984	1490	8455	55600	42200	0.33	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Manganese	50	50	473.5	460.4	62.5	282.5	2100	2100	0.23	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Nickel	49	50	41.96	41.56	5	20.85	179	158	0.27	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Silver	29	50	1.14	1.24	0.13	0.65	4.9	4.9	0.23	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Vanadium	50	50	41.8	18.5	12.8	36.6	125	125	0.33	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Zinc	50	50	567.3	943.9	30.8	131	4570	2560	0.22	Pass
NCL - North	NCL - Ditch	0-6 in	Barium	4	4	283.5	124.8	177	258	441	2480	0.11	Pass
NCL - North	NCL - Ditch	0-6 in	Beryllium	4	4	0.70	0.38	0.29	0.645	1.2	10.3	0.07	Pass
NCL - North	NCL - Ditch	0-6 in	Cobalt	1	4	7.00	3.04	2.9	7.45	10.2	11	0.64	Pass
NCL - North	NCL - Ditch	0-6 in	Lead	4	4	160.13	105.43	80.1	127.2	306	274	0.58	Pass
NCL - North	NCL - Pond	0-6 in	Barium	18	18	454.9	1154.8	103	145	5060	2480	0.18	Pass
NCL - North	NCL - Pond	0-6 in	Beryllium	18	18	1.92	4.20	0.61	0.88	18.7	10.3	0.19	Pass
NCL - North	NCL - Pond	0-6 in	Cobalt	16	18	7.91	1.61	5.5	7.45	11.5	11	0.72	Pass
NCL - North	NCL - Pond	2 ft	Cobalt	13	16	8.31	2.41	4.5	8.45	13.5	11	0.76	Pass
NCL - North	NCL - Pond	0-6 in	Lead	18	18	37.15	39.33	6.1	15.1	123	274	0.14	Pass
OID Lagoon	Lagoon - Main	2 ft	Barium	11	11	574.6	1523.3	26.5	95.6	5160	2480	0.23	Pass
OID Lagoon	Lagoon - Main	2 to 6	Barium	8	11	536.3	1601.2	12.7	22.1	5360	2480	0.22	Pass
OID Lagoon	Lagoon - Main	2 ft	Beryllium	5	11	0.35	0.35	0.073	0.19	1.1	10.3	0.03	Pass
OID Lagoon	Lagoon - Main	0-6 in	Cobalt	1	13	3.41	1.67	1.1	3.9	6.9	11	0.31	Pass
OID Lagoon	Lagoon - Main	2 ft	Cobalt	0	11	1.79	1.17	1	1.4	5.1	11	0.16	Pass
OID Lagoon	Lagoon - Main	2 to 6	Cobalt	2	11	3.01	3.89	0.93	1.4	12.6	11	0.27	Pass
OID Lagoon	Lagoon - Main	2 ft	Magnesium	11	11	2575	2249	1050	1630	8910	42200	0.06	Pass
OID Lagoon	Lagoon - Main	2 ft	Silver	6	11	0.56	0.19	0.13	0.65	0.84	4.9	0.11	Pass
OID Lagoon	Lagoon Finger - West	2 ft	Barium	4	5	52.8	30.7	25.9	39.6	102	2480	0.02	Pass
OID Lagoon	Lagoon Finger - West	2 ft	Beryllium	1	5	0.12	0.09	0.074	0.087	0.28	10.3	0.01	Pass
OID Lagoon	Lagoon Finger - West	0-6 in	Cobalt	0	8	2.88	1.70	0.76	3.35	4.5	11	0.26	Pass
OID Lagoon	Lagoon Finger - West	2 ft	Cobalt	0	5	1.50	0.45	1.1	1.3	2.2	11	0.14	Pass
OID Lagoon	Lagoon Finger - West	2 ft	Magnesium	5	5	1634	488	1240	1400	2460	42200	0.04	Pass
OID Lagoon	Lagoon Finger - West	2 ft	Silver	0	5	0.66	0.04	0.61	0.67	0.71	4.9	0.13	Pass

TABLE 4-8

Mean Concentrations (mg/kg, dry weight) of Inorganics in Sediment Compared to Site-Specific LOECs by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Site-Specific LOEC	HQ_{LOEC}	$Risk_{LOEC}$
OID Lagoon	Lagoon Finger - East	2 ft	Barium	2	3	28.0	5.6	24	25.5	34.4	2480	0.01	Pass
OID Lagoon	Lagoon Finger - East	2 ft	Beryllium	3	3	0.09	0.02	0.076	0.091	0.11	10.3	0.01	Pass
OID Lagoon	Lagoon Finger - East	0-6 in	Cobalt	0	6	3.52	2.73	0.89	3.15	6.5	11	0.32	Pass
OID Lagoon	Lagoon Finger - East	2 ft	Cobalt	0	3	1.06	0.12	0.98	1	1.2	11	0.10	Pass
OID Lagoon	Lagoon Finger - East	2 ft	Magnesium	3	3	1367	131	1220	1410	1470	42200	0.03	Pass
OID Lagoon	Lagoon Finger - East	2 ft	Silver	0	3	0.63	0.01	0.62	0.64	0.64	4.9	0.13	Pass
OID Lagoon	Lagoon Finger - Footbridge	2 ft	Barium	5	5	6068.0	2174.5	3340	5960	9100	2480	**2.45**	**Fail**
OID Lagoon	Lagoon Finger - Footbridge	2 ft	Beryllium	5	5	20.68	10.76	13.3	17.4	39.6	10.3	**2.01**	**Fail**
OID Lagoon	Lagoon Finger - Footbridge	0-6 in	Cobalt	2	7	3.27	1.77	1.4	2.6	6.1	11	0.30	Pass
OID Lagoon	Lagoon Finger - Footbridge	2 ft	Cobalt	0	5	4.60	0.87	3.7	4.6	6	11	0.42	Pass
OID Lagoon	Lagoon Finger - Footbridge	2 ft	Magnesium	5	5	77900	28487	38600	74800	116000	42200	**1.85**	**Fail**
OID Lagoon	Lagoon Finger - Footbridge	2 ft	Silver	5	5	3.70	0.91	2.6	3.6	5	4.9	0.76	Pass
OID Lagoon	OID - North	2 ft	Barium	7	7	157.9	47.4	91	168	230	2480	0.06	Pass
OID Lagoon	OID - North	2 ft	Beryllium	1	7	0.52	0.27	0.26	0.44	0.98	10.3	0.05	Pass
OID Lagoon	OID - North	0-6 in	Cobalt	0	7	1.66	0.30	1.2	1.7	2	11	0.15	Pass
OID Lagoon	OID - North	2 ft	Cobalt	1	7	6.13	2.45	3.7	5.1	10.3	11	0.56	Pass
OID Lagoon	OID - North	2 ft	Magnesium	7	7	12356	7131	4070	10100	23900	42200	0.29	Pass
OID Lagoon	OID - North	2 ft	Silver	4	7	0.85	0.29	0.39	0.82	1.2	4.9	0.17	Pass
OID Lagoon	OID - Site	2 ft	Barium	8	8	229.8	266.8	33.2	146	867	2480	0.09	Pass
OID Lagoon	OID - Site	2 to 6	Barium	7	7	136.6	50.6	65.2	117	204	2480	0.06	Pass
OID Lagoon	OID - Site	2 ft	Beryllium	3	8	0.62	0.43	0.15	0.47	1.4	10.3	0.06	Pass
OID Lagoon	OID - Site	0-6 in	Cobalt	4	8	9.73	6.14	2.9	10	18.8	11	0.88	Pass
OID Lagoon	OID - Site	2 ft	Cobalt	2	8	7.21	4.46	2.4	6.05	14.9	11	0.66	Pass
OID Lagoon	OID - Site	2 to 6	Cobalt	2	7	7.14	3.51	2.4	6.1	12.3	11	0.65	Pass
OID Lagoon	OID - Site	2 ft	Magnesium	8	8	11763	13112	1880	6810	42800	42200	0.28	Pass
OID Lagoon	OID - Site	2 ft	Silver	4	8	0.69	0.06	0.6	0.69	0.77	4.9	0.14	Pass
Wetlands Beach	WMU Ditch	0-6 in	Aluminum	12	12	64763	34942	3760	69200	112000	159000	0.41	Pass
Wetlands Beach	WMU Ditch	0-6 in	Barium	12	12	1327.5	843.2	69.5	1200	2880	2480	0.54	Pass
Wetlands Beach	WMU Ditch	0-6 in	Beryllium	12	12	6.38	5.60	0.28	4.8	19.9	10.3	0.62	Pass
Wetlands Beach	WMU Ditch	0-6 in	Chromium	12	12	131.84	116.71	5.4	118.5	472	342	0.39	Pass
Wetlands Beach	WMU Ditch	0-6 in	Copper	12	12	1615.6	1128.0	63.7	1505	3970	3190	0.51	Pass
Wetlands Beach	WMU Ditch	0-6 in	Lead	12	12	167.18	107.54	13.7	135	311	274	0.61	Pass
Wetlands Beach	WMU Ditch	0-6 in	Zinc	12	12	1289.4	666.2	81.3	1370	2100	2560	0.50	Pass
Wetlands Beach	WMU Ditch	2 ft	Zinc	9	9	54.0	44.0	17	28.7	131	2560	0.02	Pass
Wetlands Beach	WMU Ditch - 5' South	0-6 in	Aluminum	9	9	57604	47043	4240	53600	166000	159000	0.36	Pass
Wetlands Beach	WMU Ditch - 5' South	0-6 in	Barium	9	9	894.7	899.5	67.4	691	3110	2480	0.36	Pass
Wetlands Beach	WMU Ditch - 5' South	0-6 in	Beryllium	9	9	3.51	1.76	0.26	4.2	5.9	10.3	0.34	Pass
Wetlands Beach	WMU Ditch - 5' South	0-6 in	Chromium	9	9	91.24	82.37	9.3	68.4	274	342	0.27	Pass
Wetlands Beach	WMU Ditch - 5' South	0-6 in	Copper	9	9	1166.8	865.1	55.6	1240	3070	3190	0.37	Pass
Wetlands Beach	WMU Ditch - 5' South	0-6 in	Lead	9	9	149.44	189.44	13.7	113	641	274	0.55	Pass

TABLE 4-8

Mean Concentrations (mg/kg, dry weight) of Inorganics in Sediment Compared to Site-Specific LOECs by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Site-Specific LOEC	HQ_{LOEC}	$Risk_{LOEC}$
Wetlands Beach	WMU Ditch - 5' South	0-6 in	Zinc	9	9	1066.2	1035.1	93.4	869	3670	2560	0.42	Pass
Wetlands Beach	WMU Ditch - 5' South	2 ft	Zinc	9	9	2143.1	6321.4	13.8	31.3	19000	2560	0.84	Pass

Notes:

Fail = mean concentration exceeded the sediment benchmark; therefore, this analyte was considered to pose potential risk.

HQ = hazard quotient

LOEC = lowest observed effect concentration

mg/kg = milligrams per kilogram

N = number of samples

Pass = mean concentration was less than the sediment benchmark; therefore, there are no risks to the benthic invertebrate community

Shading and bold indicates analyte-area combinations that may pose a potential risk.

TABLE 4-9

Whole-Body Benthic Invertebrate Tissue Concentrations (mg/kg, wet weight) Compared on a Point-by-Point Basis to Literature-Based Benchmarks by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Location	Concentration Range	Taxa	Analyte	Tissue Result	LOEC[a]	HQ	Risk
NCL - East	NCL-East (< 8' Elev)	NEL-007	High	Crayfish	Copper	39	50	0.77	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-007	High	Waterboatmen (duplicate)	Copper	20	140.4	0.14	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-021	Medium	Waterboatmen	Copper	13	140.4	0.09	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-007	High	Waterboatmen	Copper	52	140.4	0.37	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-009	High	Waterboatmen	Copper	12	140.4	0.09	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-007	High	Crayfish	Zinc	33	35.2	0.92	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-007	High	Waterboatmen (duplicate)	Zinc	67	524	0.13	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-021	Medium	Waterboatmen	Zinc	36	524	0.07	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-007	High	Waterboatmen	Zinc	73	524	0.14	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-009	High	Waterboatmen	Zinc	43	524	0.08	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-007	High	Waterboatmen	Total TCDF	2.9E-08	0.138	0.00	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-007	High	Waterboatmen (duplicate)	Total TCDF	5.8E-09	0.138	0.00	Pass
NCL - East	NCL-East (< 8' Elev)	NEL-009	High	Waterboatmen	Total TCDF	3.3E-09	0.138	0.00	Pass
OID Lagoon	Lagoon - Main	LGM-001	Medium	Crayfish	Copper	19	50	0.38	Pass
OID Lagoon	Lagoon - Main	LGM-001	Medium	Dragonflies/damselflies	Copper	4	140.4	0.03	Pass
OID Lagoon	Lagoon - Main	LGM-001	Medium	Crayfish	Zinc	14	35.2	0.41	Pass
OID Lagoon	Lagoon - Main	LGM-001	Medium	Dragonflies/damselflies	Zinc	14	524	0.03	Pass
Wetlands Beach	WMU Ditch	DSA-001	High	Crayfish	Copper	86	50	**1.71**	**Fail**
Wetlands Beach	WMU Ditch	DSA-003	High	Crayfish	Copper	49	50	0.98	Pass
Wetlands Beach	WMU Ditch	DSA-006	High	Crayfish	Copper	95	50	**1.89**	**Fail**
Wetlands Beach	WMU Ditch	DSA-001	High	Mixed insects	Copper	4	140.4	0.03	Pass
Wetlands Beach	WMU Ditch	DSA-003	High	Mixed insects	Copper	16	140.4	0.11	Pass
Wetlands Beach	WMU Ditch	DSA-006	High	Mixed insects	Copper	14	140.4	0.10	Pass
Wetlands Beach	WMU Ditch	DSA-001	High	Crayfish	Zinc	22	35.2	0.63	Pass
Wetlands Beach	WMU Ditch	DSA-003	High	Crayfish	Zinc	21	35.2	0.60	Pass
Wetlands Beach	WMU Ditch	DSA-006	High	Crayfish	Zinc	49	35.2	**1.40**	**Fail**
Wetlands Beach	WMU Ditch	DSA-001	High	Mixed insects	Zinc	15	524	0.03	Pass
Wetlands Beach	WMU Ditch	DSA-003	High	Mixed insects	Zinc	47	524	0.09	Pass
Wetlands Beach	WMU Ditch	DSA-006	High	Mixed insects	Zinc	38	524	0.07	Pass

Notes:

Fail = concentration exceeded the tissue benchmark; therefore, this analyte was considered to pose potential risk.

HQ = hazard quotient

LOEC = lowest observed effect concentration

mg/kg = milligrams per kilogram

Pass = concentration was less than the tissue benchmark; therefore, there are no risks to the benthic invertebrate community

[a] All values are LOECs except for the copper benchmark for crayfish and the zinc benchmark for mixed insects, dragonflies/damselflies, and waterboatmen, which are the no observed effect concentration (NOEC).

Shading and bold indicates exceedance of the benchmark.

TABLE 4-10

Weight-of-Evidence Summary for Risks to the Benthic Invertebrate Community

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Result and COPEC Risk Driver by Area[a]				
Line of Evidence	**NCL-East**	**NCL-North**	**OID Lagoon**	**Wetlands Beach**	**Explanation**
Literature-based Single-Chemical Toxicity Data	Multiple metals	Multiple metals	Multiple metals	Multiple metals	Maximum concentrations of multiple inorganics exceeded literature-derived sediment quality benchmarks. Because LOECs developed from site-specific bioassays supersede these literature values, further comparisons to literature-based benchmarks (i.e., comparison to the mean) were not conducted.
Bioassays	Reduced survival and reproduction - one bioassay sample from NCL-East (< 8' Elev)		Reduced survival - all bioassay samples from the East and West Fingers of the Lagoon and from Lagoon-Main Reduced reproduction - one sample from Lagoon Finger - West	No Risk	Survival, growth, and reproduction endpoints were evaluated in the site-specific sediment toxicity tests. Results indicated statistically significant reductions in survival and reproduction, though no differences in growth were observed. Although several samples across the OID Lagoon and NCL-East had reduced survival, reproduction or both, these effects in all samples, except one (NEL-007 in NCL-East), were likely driven by grain size rather than contamination. Site-specific LOECs were developed from concentrations in NEL-007 and represent values associated with reductions in survival and reproduction.
Site-specific LOECs	No Risk	No Risk	Ba, Be, Mg Lagoon Finger - Footbridge	No Risk	Mean sediment concentrations in one portion of the OID Lagoon exceeded the LOEC as determined by the site-specific bioassays.
Tissue-Based Toxicity Data - LOECs	No Risk		No Risk	Cu, Zn crayfish from WMU Ditch	Whole-body tissue in two of three crayfish samples collected from the WMU Ditch exceeded the literature-based NOEC. A LOEC was not available; therefore, risks to benthic invertebrates from copper are uncertain. Although one crayfish sample collected in the WMU Ditch exceeded the LOEC for Zn, the mean of the three samples did not (31 mg/kg vs. 35.2 mg/kg)
Weight-of-Evidence	No Risk	No Risk	Ba, Be, Mg Lagoon Finger - Footbridge	Cu WMU Ditch	Mean sediment and benthic invertebrate concentrations of dioxins and furans (represented as fish, bird, and mammal TEQs) were below thresholds for effects. Although maximum concentrations of multiple inorganics across all sediment areas exceeded literature-based benchmarks, only barium, beryllium, and magnesium mean concentrations at the Lagoon Finger - Footbridge subarea exceeded site-specific LOECs. Magnesium is an essential nutrient that is generally not considered a risk; however, magnesium concentrations in the toxic bioassay sample were significantly correlated with effects and therefore, may contribute to the observed toxicity. Copper in benthic invertebrate tissue (crayfish) exceeded the NOEC at WMU Ditch), but risks are uncertain because a LOEC was not available. Although zinc in benthic invertebrate tissue (crayfish) collected at WMU Ditch exceeded the threshold for effects, the mean of three crayfish samples from this area did not. This suggests that zinc is not likely a risk to the benthic invertebrate community. Therefore, the weight-of-evidence is that barium, beryllium, and magnesium at Lagoon Finger - Footbridge may be a risk to the benthic invertebrate communities in this subarea. Risks from copper in the WMU Ditch subarea are uncertain, but likely low because risks from copper were not identified using the site-specific toxicity data.

Notes:

No Risk = the available evidence does not support a conclusion of risk

[a] Results are listed for each line of evidence, and risk drivers are listed on the basis of the weight-of-evidence analysis/summary.

Shading indicates a lack of line-of-evidence data within an area.

TABLE 5-1

Maximum Concentrations of Inorganic Analytes in Soil (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Screening Values by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						Benchmarks		Hazard Quotients		Result	
Analyte	**Area**	**Depth**	**Number of Detects**	**N**	**Maximum**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**
Aluminum	NCL - East	0-6 in	93	93	159000	50	--	**3180**	--	**Retain**	Uncertainty
Aluminum	NCL - East	2 ft	58	58	22900	50	--	**458**	--	**Retain**	Uncertainty
Aluminum	NCL - North	0-6 in	45	45	27800	50	--	**556**	--	**Retain**	Uncertainty
Aluminum	NCL - North	2 ft	24	24	25700	50	--	**514**	--	**Retain**	Uncertainty
Aluminum	Wetlands Beach	0-6 in	95	95	225000	50	--	**4500**	--	**Retain**	Uncertainty
Aluminum	Wetlands Beach	2 ft	70	70	37400	50	--	**748**	--	**Retain**	Uncertainty
Aluminum	Wetlands Beach	2 to 6	20	20	16100	50	--	**322**	--	**Retain**	Uncertainty
Antimony	NCL - East	0-6 in	90	93	20.1	5	78	**4.02**	0.26	**Retain**	Pass
Antimony	NCL - East	2 ft	58	58	1.4	5	78	0.28	0.02	Pass	Pass
Antimony	NCL - North	0-6 in	30	45	2.2	5	78	0.44	0.03	Pass	Pass
Antimony	NCL - North	2 ft	8	24	1.9	5	78	0.38	0.02	Pass	Pass
Antimony	Wetlands Beach	0-6 in	85	95	23.2	5	78	**4.64**	0.30	**Retain**	Pass
Antimony	Wetlands Beach	2 ft	46	70	2.2	5	78	0.44	0.03	Pass	Pass
Antimony	Wetlands Beach	2 to 6	20	20	1.1	5	78	0.22	0.01	Pass	Pass
Arsenic	NCL - East	0-6 in	93	93	33.7	18	60	**1.87**	0.56	**Retain**	Pass
Arsenic	NCL - East	2 ft	58	58	9.4	18	60	0.52	0.16	Pass	Pass
Arsenic	NCL - North	0-6 in	45	45	7.2	18	60	0.40	0.12	Pass	Pass
Arsenic	NCL - North	2 ft	23	24	5.5	18	60	0.31	0.09	Pass	Pass
Arsenic	Wetlands Beach	0-6 in	95	95	13.6	18	60	0.76	0.23	Pass	Pass
Arsenic	Wetlands Beach	2 ft	69	70	5.8	18	60	0.32	0.10	Pass	Pass
Arsenic	Wetlands Beach	2 to 6	20	20	6.2	18	60	0.34	0.10	Pass	Pass
Barium	NCL - East	0-6 in	93	93	5040	500	330	**10.08**	**15.27**	**Retain**	**Retain**
Barium	NCL - East	2 ft	58	58	277	500	330	0.55	0.84	Pass	Pass
Barium	NCL - North	0-6 in	45	45	5060	500	330	**10.12**	**15.33**	**Retain**	**Retain**
Barium	NCL - North	2 ft	24	24	1500	500	330	**3.00**	**4.55**	**Retain**	**Retain**
Barium	Wetlands Beach	0-6 in	91	95	3810	500	330	**7.62**	**11.55**	**Retain**	**Retain**
Barium	Wetlands Beach	2 ft	40	70	578	500	330	**1.16**	**1.75**	**Retain**	**Retain**
Barium	Wetlands Beach	2 to 6	15	20	706	500	330	**1.41**	**2.14**	**Retain**	**Retain**
Beryllium	NCL - East	0-6 in	72	93	16.8	10	40	**1.68**	0.42	**Retain**	Pass
Beryllium	NCL - East	2 ft	34	58	1.1	10	40	0.11	0.03	Pass	Pass
Beryllium	NCL - North	0-6 in	28	45	18.7	10	40	**1.87**	0.47	**Retain**	Pass
Beryllium	NCL - North	2 ft	19	24	6.2	10	40	0.62	0.16	Pass	Pass
Beryllium	Wetlands Beach	0-6 in	64	95	19.9	10	40	**1.99**	0.50	**Retain**	Pass
Beryllium	Wetlands Beach	2 ft	40	70	2	10	40	0.20	0.05	Pass	Pass
Beryllium	Wetlands Beach	2 to 6	7	20	1.9	10	40	0.19	0.05	Pass	Pass
Cadmium	NCL - East	0-6 in	93	93	6.7	32	140	0.21	0.05	Pass	Pass
Cadmium	NCL - East	2 ft	58	58	2.1	32	140	0.07	0.02	Pass	Pass
Cadmium	NCL - North	0-6 in	45	45	3.7	32	140	0.12	0.03	Pass	Pass
Cadmium	NCL - North	2 ft	24	24	2.7	32	140	0.08	0.02	Pass	Pass
Cadmium	Wetlands Beach	0-6 in	86	95	11.3	32	140	0.35	0.08	Pass	Pass

TABLE 5-1

Maximum Concentrations of Inorganic Analytes in Soil (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Screening Values by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						Benchmarks		Hazard Quotients		Result	
Analyte	**Area**	**Depth**	**Number of Detects**	**N**	**Maximum**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**
Cadmium	Wetlands Beach	2 ft	52	70	2.4	32	140	0.08	0.02	Pass	Pass
Cadmium	Wetlands Beach	2 to 6	20	20	1.1	32	140	0.03	0.01	Pass	Pass
Calcium	NCL - East	0-6 in	93	93	32100	--	--	--	--	Uncertainty; Essential Nutrient	
Calcium	NCL - East	2 ft	58	58	66900	--	--	--	--	Uncertainty; Essential Nutrient	
Calcium	NCL - North	0-6 in	45	45	111000	--	--	--	--	Uncertainty; Essential Nutrient	
Calcium	NCL - North	2 ft	24	24	116000	--	--	--	--	Uncertainty; Essential Nutrient	
Calcium	Wetlands Beach	0-6 in	95	95	53600	--	--	--	--	Uncertainty; Essential Nutrient	
Calcium	Wetlands Beach	2 ft	70	70	23300	--	--	--	--	Uncertainty; Essential Nutrient	
Calcium	Wetlands Beach	2 to 6	20	20	37600	--	--	--	--	Uncertainty; Essential Nutrient	
Chromium	NCL - East	0-6 in	93	93	342	1	0.4	**342.00**	**855.00**	**Retain**	**Retain**
Chromium	NCL - East	2 ft	58	58	51.2	1	0.4	**51.20**	**128.00**	**Retain**	**Retain**
Chromium	NCL - North	0-6 in	45	45	51.3	1	0.4	**51.30**	**128.25**	**Retain**	**Retain**
Chromium	NCL - North	2 ft	24	24	35.6	1	0.4	**35.60**	**89.00**	**Retain**	**Retain**
Chromium	Wetlands Beach	0-6 in	95	95	472	1	0.4	**472.00**	**1180.00**	**Retain**	**Retain**
Chromium	Wetlands Beach	2 ft	70	70	58	1	0.4	**58.00**	**145.00**	**Retain**	**Retain**
Chromium	Wetlands Beach	2 to 6	20	20	27	1	0.4	**27.00**	**67.50**	**Retain**	**Retain**
Cobalt	NCL - East	0-6 in	49	93	13.7	13	--	**1.05**	--	**Retain**	Uncertainty
Cobalt	NCL - East	2 ft	33	58	15.9	13	--	**1.22**	--	**Retain**	Uncertainty
Cobalt	NCL - North	0-6 in	30	45	11.5	13	--	0.88	--	Pass	Uncertainty
Cobalt	NCL - North	2 ft	20	24	13.5	13	--	**1.04**	--	**Retain**	Uncertainty
Cobalt	Wetlands Beach	0-6 in	36	95	13.8	13	--	**1.06**	--	**Retain**	Uncertainty
Cobalt	Wetlands Beach	2 ft	34	70	8.6	13	--	0.66	--	Pass	Uncertainty
Cobalt	Wetlands Beach	2 to 6	8	20	10.2	13	--	0.78	--	**Retain**	Uncertainty
Copper	NCL - East	0-6 in	93	93	3950	70	80	**56.43**	**49.38**	**Retain**	**Retain**
Copper	NCL - East	2 ft	58	58	160	70	80	**2.29**	**2.00**	**Retain**	**Retain**
Copper	NCL - North	0-6 in	45	45	270	70	80	**3.86**	**3.38**	**Retain**	**Retain**
Copper	NCL - North	2 ft	24	24	97.4	70	80	**1.39**	**1.22**	**Retain**	**Retain**
Copper	Wetlands Beach	0-6 in	88	95	5480	70	80	**78.29**	**68.50**	**Retain**	**Retain**
Copper	Wetlands Beach	2 ft	65	70	772	70	80	**11.03**	**9.65**	**Retain**	**Retain**
Copper	Wetlands Beach	2 to 6	17	20	191	70	80	**2.73**	**2.39**	**Retain**	**Retain**
Iron	NCL - East	0-6 in	93	93	36400	--	--	--	--	Uncertainty; Essential Nutrient	
Iron	NCL - East	2 ft	58	58	40000	--	--	--	--	Uncertainty; Essential Nutrient	
Iron	NCL - North	0-6 in	45	45	34500	--	--	--	--	Uncertainty; Essential Nutrient	
Iron	NCL - North	2 ft	24	24	40400	--	--	--	--	Uncertainty; Essential Nutrient	
Iron	Wetlands Beach	0-6 in	95	95	22800	--	--	--	--	Uncertainty; Essential Nutrient	
Iron	Wetlands Beach	2 ft	70	70	26200	--	--	--	--	Uncertainty; Essential Nutrient	
Iron	Wetlands Beach	2 to 6	20	20	32700	--	--	--	--	Uncertainty; Essential Nutrient	
Lead	NCL - East	0-6 in	93	93	616	120	1700	**5.13**	0.36	**Retain**	Pass
Lead	NCL - East	2 ft	58	58	41.8	120	1700	0.35	0.02	Pass	Pass
Lead	NCL - North	0-6 in	45	45	306	120	1700	**2.55**	0.18	**Retain**	Pass

TABLE 5-1

Maximum Concentrations of Inorganic Analytes in Soil (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Screening Values by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						Benchmarks		Hazard Quotients		Result	
Analyte	**Area**	**Depth**	**Number of Detects**	**N**	**Maximum**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**
Lead	NCL - North	2 ft	24	24	58	120	1700	0.48	0.03	Pass	Pass
Lead	Wetlands Beach	0-6 in	95	95	641	120	1700	**5.34**	0.38	**Retain**	Pass
Lead	Wetlands Beach	2 ft	70	70	69.7	120	1700	0.58	0.04	Pass	Pass
Lead	Wetlands Beach	2 to 6	20	20	21.5	120	1700	0.18	0.01	Pass	Pass
Magnesium	NCL - East	0-6 in	93	93	55600	--	--	--	--	Uncertainty; Essential Nutrient	
Magnesium	NCL - East	2 ft	58	58	14300	--	--	--	--	Uncertainty; Essential Nutrient	
Magnesium	NCL - North	0-6 in	45	45	22800	--	--	--	--	Uncertainty; Essential Nutrient	
Magnesium	NCL - North	2 ft	24	24	16500	--	--	--	--	Uncertainty; Essential Nutrient	
Magnesium	Wetlands Beach	0-6 in	95	95	35300	--	--	--	--	Uncertainty; Essential Nutrient	
Magnesium	Wetlands Beach	2 ft	70	70	11300	--	--	--	--	Uncertainty; Essential Nutrient	
Magnesium	Wetlands Beach	2 to 6	20	20	9810	--	--	--	--	Uncertainty; Essential Nutrient	
Manganese	NCL - East	0-6 in	93	93	2100	220	450	**9.55**	**4.67**	**Retain**	**Retain**
Manganese	NCL - East	2 ft	58	58	606	220	450	**2.75**	**1.35**	**Retain**	**Retain**
Manganese	NCL - North	0-6 in	45	45	986	220	450	**4.48**	**2.19**	**Retain**	**Retain**
Manganese	NCL - North	2 ft	24	24	670	220	450	**3.05**	**1.49**	**Retain**	**Retain**
Manganese	Wetlands Beach	0-6 in	95	95	1870	220	450	**8.50**	**4.16**	**Retain**	**Retain**
Manganese	Wetlands Beach	2 ft	70	70	626	220	450	**2.85**	**1.39**	**Retain**	**Retain**
Manganese	Wetlands Beach	2 to 6	20	20	1060	220	450	**4.82**	**2.36**	**Retain**	**Retain**
Mercury	NCL - East	0-6 in	23	93	0.18	0.3	0.1	0.60	**1.80**	Pass	**Retain**
Mercury	NCL - East	2 ft	9	58	0.23	0.3	0.1	0.77	**2.30**	Pass	**Retain**
Mercury	NCL - North	0-6 in	9	45	0.23	0.3	0.1	0.77	**2.30**	Pass	**Retain**
Mercury	NCL - North	2 ft	6	24	0.2	0.3	0.1	0.67	**2.00**	Pass	**Retain**
Mercury	Wetlands Beach	0-6 in	10	95	1.3	0.3	0.1	**4.33**	**13.00**	**Retain**	**Retain**
Mercury	Wetlands Beach	2 ft	7	69	1.1	0.3	0.1	**3.67**	**11.00**	**Retain**	**Retain**
Mercury	Wetlands Beach	2 to 6	5	20	0.14	0.3	0.1	0.47	**1.40**	Pass	**Retain**
Nickel	NCL - East	0-6 in	92	93	179	38	280	**4.71**	0.64	**Retain**	Pass
Nickel	NCL - East	2 ft	58	58	46.3	38	280	**1.22**	0.17	**Retain**	Pass
Nickel	NCL - North	0-6 in	45	45	42.9	38	280	**1.13**	0.15	**Retain**	Pass
Nickel	NCL - North	2 ft	24	24	33.3	38	280	0.88	0.12	Pass	Pass
Nickel	Wetlands Beach	0-6 in	82	95	204	38	280	**5.37**	0.73	**Retain**	Pass
Nickel	Wetlands Beach	2 ft	54	70	50.4	38	280	**1.33**	0.18	**Retain**	Pass
Nickel	Wetlands Beach	2 to 6	16	20	28.8	38	280	0.76	0.10	Pass	Pass
Potassium	NCL - East	0-6 in	93	93	7300	--	--	--	--	Uncertainty; Essential Nutrient	
Potassium	NCL - East	2 ft	58	58	19900	--	--	--	--	Uncertainty; Essential Nutrient	
Potassium	NCL - North	0-6 in	45	45	6690	--	--	--	--	Uncertainty; Essential Nutrient	
Potassium	NCL - North	2 ft	24	24	6800	--	--	--	--	Uncertainty; Essential Nutrient	
Potassium	Wetlands Beach	0-6 in	77	95	5210	--	--	--	--	Uncertainty; Essential Nutrient	
Potassium	Wetlands Beach	2 ft	48	70	7540	--	--	--	--	Uncertainty; Essential Nutrient	
Potassium	Wetlands Beach	2 to 6	13	20	11300	--	--	--	--	Uncertainty; Essential Nutrient	

TABLE 5-1

Maximum Concentrations of Inorganic Analytes in Soil (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Screening Values by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						Benchmarks		Hazard Quotients		Result	
Analyte	**Area**	**Depth**	**Number of Detects**	**N**	**Maximum**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**
Selenium	NCL - East	0-6 in	85	93	5.6	0.52	4.1	**10.77**	**1.37**	**Retain**	**Retain**
Selenium	NCL - East	2 ft	58	58	1.8	0.52	4.1	**3.46**	0.44	**Retain**	Pass
Selenium	NCL - North	0-6 in	33	45	15.2	0.52	4.1	**29.23**	**3.71**	**Retain**	**Retain**
Selenium	NCL - North	2 ft	15	24	6	0.52	4.1	**11.54**	**1.46**	**Retain**	**Retain**
Selenium	Wetlands Beach	0-6 in	60	95	8.1	0.52	4.1	**15.58**	**1.98**	**Retain**	**Retain**
Selenium	Wetlands Beach	2 ft	34	70	2.2	0.52	4.1	**4.23**	0.54	**Retain**	Pass
Selenium	Wetlands Beach	2 to 6	12	20	0.86	0.52	4.1	**1.65**	0.21	**Retain**	Pass
Silver	NCL - East	0-6 in	52	93	4.9	560	--	0.009	--	Pass	Uncertainty
Silver	NCL - East	2 ft	7	58	1.2	560	--	0.002	--	Pass	Uncertainty
Silver	NCL - North	0-6 in	9	45	8.3	560	--	0.015	--	Pass	Uncertainty
Silver	NCL - North	2 ft	2	24	1.3	560	--	0.002	--	Pass	Uncertainty
Silver	Wetlands Beach	0-6 in	47	95	6.5	560	--	0.012	--	Pass	Uncertainty
Silver	Wetlands Beach	2 ft	27	70	3.4	560	--	0.006	--	Pass	Uncertainty
Silver	Wetlands Beach	2 to 6	8	20	0.67	560	--	0.001	--	Pass	Uncertainty
Sodium	NCL - East	0-6 in	92	93	42700	--	--	--	--	Uncertainty; Essential Nutrient	
Sodium	NCL - East	2 ft	58	58	9610	--	--	--	--	Uncertainty; Essential Nutrient	
Sodium	NCL - North	0-6 in	32	45	5120	--	--	--	--	Uncertainty; Essential Nutrient	
Sodium	NCL - North	2 ft	24	24	3700	--	--	--	--	Uncertainty; Essential Nutrient	
Sodium	Wetlands Beach	0-6 in	84	95	22900	--	--	--	--	Uncertainty; Essential Nutrient	
Sodium	Wetlands Beach	2 ft	61	70	9180	--	--	--	--	Uncertainty; Essential Nutrient	
Sodium	Wetlands Beach	2 to 6	20	20	4110	--	--	--	--	Uncertainty; Essential Nutrient	
Thallium	NCL - East	0-6 in	84	93	0.99	1	--	0.99	--	Pass	Uncertainty
Thallium	NCL - East	2 ft	58	58	0.49	1	--	0.49	--	Pass	Uncertainty
Thallium	NCL - North	0-6 in	23	45	0.67	1	--	0.67	--	Pass	Uncertainty
Thallium	NCL - North	2 ft	5	24	0.74	1	--	0.74	--	Pass	Uncertainty
Thallium	Wetlands Beach	0-6 in	66	95	1.4	1	--	**1.40**	--	**Retain**	Uncertainty
Thallium	Wetlands Beach	2 ft	52	70	0.97	1	--	0.97	--	Pass	Uncertainty
Thallium	Wetlands Beach	2 to 6	20	20	0.67	1	--	0.67	--	Pass	Uncertainty
Vanadium	NCL - East	0-6 in	93	93	125	2	--	**62.50**	--	**Retain**	Uncertainty
Vanadium	NCL - East	2 ft	58	58	70.4	2	--	**35.20**	--	**Retain**	Uncertainty
Vanadium	NCL - North	0-6 in	45	45	62.7	2	--	**31.35**	--	**Retain**	Uncertainty
Vanadium	NCL - North	2 ft	24	24	56.4	2	--	**28.20**	--	**Retain**	Uncertainty
Vanadium	Wetlands Beach	0-6 in	95	95	74.7	2	--	**37.35**	--	**Retain**	Uncertainty
Vanadium	Wetlands Beach	2 ft	70	70	67.1	2	--	**33.55**	--	**Retain**	Uncertainty
Vanadium	Wetlands Beach	2 to 6	20	20	49.3	2	--	**24.65**	--	**Retain**	Uncertainty
Zinc	NCL - East	0-6 in	93	93	4570	160	120	**28.56**	**38.08**	**Retain**	**Retain**
Zinc	NCL - East	2 ft	58	58	311	160	120	**1.94**	**2.59**	**Retain**	**Retain**
Zinc	NCL - North	0-6 in	45	45	790	160	120	**4.94**	**6.58**	**Retain**	**Retain**
Zinc	NCL - North	2 ft	24	24	253	160	120	**1.58**	**2.11**	**Retain**	**Retain**
Zinc	Wetlands Beach	0-6 in	95	95	3800	160	120	**23.75**	**31.67**	**Retain**	**Retain**

TABLE 5-1

Maximum Concentrations of Inorganic Analytes in Soil (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Screening Values by Area

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						Benchmarks		Hazard Quotients		Result	
Analyte	**Area**	**Depth**	**Number of Detects**	**N**	**Maximum**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**	**Plant**	**Invertebrate**
Zinc	Wetlands Beach	2 ft	67	70	19000	160	120	**118.75**	**158.33**	**Retain**	**Retain**
Zinc	Wetlands Beach	2 to 6	20	20	441	160	120	**2.76**	**3.68**	**Retain**	**Retain**

Notes:

-- = plant or invertebrate benchmark is unavailable

mg/kg = milligrams per kilogram

N = sample size

NA = not available

Pass = maximum concentration was less than the plant and invertebrate benchmarks; therefore, there are no risks to the terrestrial invertebrate or plant community and no further evaluation was necessary

Retain = maximum concentration exceeded the plant or invertebrate benchmark; therefore, this analyte was retained for further evaluation

Uncertainty = benchmark value not available; therefore, this analyte retained as an uncertainty

Uncertainty; Essential Nutrient = benchmark value not available, but analyte is an essential nutrient; therefore, was not retained for further evaluation and not retained as an uncertainty

UTL = upper tolerance limit

Shading and bold indicates exceedances of the benchmarks.

TABLE 5-2

Maximum Concentrations in Terrestrial Invertebrate Whole-body Tissue Compared to Literature-Derived Benchmarks by Analyte and Taxa

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Taxa1	Taxa2	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum	NOEC	LOEC	HQ - NOEC	HQ - LOEC	Result
Inorganics - mg/kg, wet weight														
Aluminum	Arthropods	Beach hoppers, sow bugs, beetles	2	474	147.79	369	473.5	578	578	--	--	--	--	Uncertainty
Aluminum	Arthropods	Mixed insects	2	1746	1504.72	682	1746	2810	2810	--	--	--	--	Uncertainty
Aluminum	Arthropods	Sow bugs/mixed insects	1	688		688	688	688	688	--	--	--	--	Uncertainty
Aluminum	Arthropods	Spiders/beetles	2	982	1086.12	214	982	1750	1750	--	--	--	--	Uncertainty
Aluminum	Arthropods	Spiders/beetles/beach hoppers	1	3110		3110	3110	3110	3110	--	--	--	--	Uncertainty
Aluminum	Arthropods	Spiders/cricket	1	1960		1960	1960	1960	1960	--	--	--	--	Uncertainty
Aluminum	Mollusc	Snails	3	165	97.98	76	149	270	270	--	--	--	--	Uncertainty
Barium	Arthropods	Beach hoppers, sow bugs, beetles	2	18	0.71	17	17.5	18	18	--	--	--	--	Uncertainty
Barium	Arthropods	Mixed insects	2	82	54.45	43	81.5	120	120	--	--	--	--	Uncertainty
Barium	Arthropods	Sow bugs/mixed insects	1	30		30	30	30	30	--	--	--	--	Uncertainty
Barium	Arthropods	Spiders/beetles	1	50		50	50	50	50	--	--	--	--	Uncertainty
Barium	Arthropods	Spiders/beetles/beach hoppers	1	72		72	72	72	72	--	--	--	--	Uncertainty
Barium	Arthropods	Spiders/cricket	1	28		28	28	28	28	--	--	--	--	Uncertainty
Barium	Mollusc	Snails	3	27	15.82	13	23	44	44	--	--	--	--	Uncertainty
Cadmium	Arthropods	Spiders/beetles/beach hoppers	1	1		1	1	1	1	2.6	3	0.38	0.3333333	Pass
Cadmium	Mollusc	Snails	3	1		1	1	1	1	10	30	0.1	0.03	Pass
Calcium	Arthropods	Beach hoppers, sow bugs, beetles	2	16083	3935.76	13300	16083	18866	18866	--	--	--	--	Essential nutrient
Calcium	Arthropods	Mixed insects	2	31150	25950.82	12800	31150	49500	49500	--	--	--	--	Essential nutrient
Calcium	Arthropods	Sow bugs/mixed insects	1	28400		28400	28400	28400	28400	--	--	--	--	Essential nutrient
Calcium	Arthropods	Spiders/beetles	2	3580	3280.98	1260	3580	5900	5900	--	--	--	--	Essential nutrient
Calcium	Arthropods	Spiders/beetles/beach hoppers	1	27300		27300	27300	27300	27300	--	--	--	--	Essential nutrient
Calcium	Arthropods	Spiders/cricket	1	5590		5590	5590	5590	5590	--	--	--	--	Essential nutrient
Calcium	Mollusc	Snails	3	4718	3128.42	2850	2975	8330	8330	--	--	--	--	Essential nutrient
Chromium	Arthropods	Beach hoppers, sow bugs, beetles	2	1		1	1	1	1	9.2	--	0.11	--	Pass
Chromium	Arthropods	Mixed insects	2	7	6.36	2	6.5	11	11	9.2	--	**1.20**	--	**Retain**
Chromium	Arthropods	Spiders/beetles/beach hoppers	1	7		7	7	7	7	9.2	--	0.76	--	Pass
Chromium	Arthropods	Spiders/cricket	1	4		4	4	4	4	9.2	--	0.43	--	Pass
Copper	Arthropods	Beach hoppers, sow bugs, beetles	2	17	1.41	16	17	18	18	--	29.2	--	0.62	Pass
Copper	Arthropods	Mixed insects	2	97	12.73	88	97	106	106	--	140.4	--	0.75	Pass
Copper	Arthropods	Sow bugs/mixed insects	1	40		40	40	40	40	--	140.4	--	0.28	Pass
Copper	Arthropods	Spiders/beetles	2	83	73.54	31	83	135	135	--	140.4	--	0.96	Pass
Copper	Arthropods	Spiders/beetles/beach hoppers	1	230		230	230	230	230	--	29.2	--	**7.88**	**Retain**
Copper	Arthropods	Spiders/cricket	1	97		97	97	97	97	--	140.4	--	0.69	Pass
Copper	Mollusc	Snails	3	22	15.95	9	18	40	40	--	29.2	--	**1.37**	**Retain**
Iron	Arthropods	Beach hoppers, sow bugs, beetles	2	903	31.82	880	902.5	925	925	--	--	--	--	Essential nutrient
Iron	Arthropods	Mixed insects	2	864	546.59	477	863.5	1250	1250	--	--	--	--	Essential nutrient
Iron	Arthropods	Sow bugs/mixed insects	1	1170		1170	1170	1170	1170	--	--	--	--	Essential nutrient
Iron	Arthropods	Spiders/beetles	2	389	365.57	130	388.5	647	647	--	--	--	--	Essential nutrient
Iron	Arthropods	Spiders/beetles/beach hoppers	1	1040		1040	1040	1040	1040	--	--	--	--	Essential nutrient
Iron	Arthropods	Spiders/cricket	1	336		336	336	336	336	--	--	--	--	Essential nutrient
Iron	Mollusc	Snails	3	343	182.78	192	290	546	546	--	--	--	--	Essential nutrient

TABLE 5-2

Maximum Concentrations in Terrestrial Invertebrate Whole-body Tissue Compared to Literature-Derived Benchmarks by Analyte and Taxa

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Taxa1	Taxa2	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum	NOEC	LOEC	HQ - NOEC	HQ - LOEC	Result
Lead	Arthropods	Beach hoppers, sow bugs, beetles	2	2	0.00	2	2	2	2		98		0.02	Pass
Lead	Arthropods	Mixed insects	2	4	2.83	2	4	6	6	260		0.02		Pass
Lead	Arthropods	Sow bugs/mixed insects	1	3		3	3	3	3	260		0.01		Pass
Lead	Arthropods	Spiders/beetles	1	5		5	5	5	5	260		0.02		Pass
Lead	Arthropods	Spiders/beetles/beach hoppers	1	9		9	9	9	9		98		0.09	Pass
Lead	Arthropods	Spiders/cricket	1	6		6	6	6	6	260		0.02		Pass
Lead	Mollusc	Snails	1	1		1	1	1	1	200		0.005		Pass
Magnesium	Arthropods	Beach hoppers, sow bugs, beetles	2	1188	126.57	1098	1187.5	1277	1277	--	--	--	--	Essential nutrient
Magnesium	Arthropods	Mixed insects	2	1570	438.41	1260	1570	1880	1880	--	--	--	--	Essential nutrient
Magnesium	Arthropods	Sow bugs/mixed insects	1	1390		1390	1390	1390	1390	--	--	--	--	Essential nutrient
Magnesium	Arthropods	Spiders/beetles	2	1049	525.38	677	1048.5	1420	1420	--	--	--	--	Essential nutrient
Magnesium	Arthropods	Spiders/beetles/beach hoppers	1	1790		1790	1790	1790	1790	--	--	--	--	Essential nutrient
Magnesium	Arthropods	Spiders/cricket	1	973		973	973	973	973	--	--	--	--	Essential nutrient
Magnesium	Mollusc	Snails	3	835	68.79	773	823	909	909	--	--	--	--	Essential nutrient
Manganese	Arthropods	Beach hoppers, sow bugs, beetles	2	20	1.41	19	20	21	21	--	--	--	--	Uncertainty
Manganese	Arthropods	Mixed insects	2	36	15.56	25	36	47	47	--	--	--	--	Uncertainty
Manganese	Arthropods	Sow bugs/mixed insects	1	22		22	22	22	22	--	--	--	--	Uncertainty
Manganese	Arthropods	Spiders/beetles	2	30	14.85	19	29.5	40	40	--	--	--	--	Uncertainty
Manganese	Arthropods	Spiders/beetles/beach hoppers	1	60		60	60	60	60	--	--	--	--	Uncertainty
Manganese	Arthropods	Spiders/cricket	1	30		30	30	30	30	--	--	--	--	Uncertainty
Manganese	Mollusc	Snails	3	13	4.51	9	13	18	18	--	--	--	--	Uncertainty
Mercury	Arthropods	Beach hoppers, sow bugs, beetles	2	0.018	0.001	0.017	0.0175	0.018	0.018	107.6	--	0.0002	--	Pass
Mercury	Arthropods	Mixed insects	2	0.032	0.02	0.015	0.0315	0.048	0.048	107.6	--	0.0004	--	Pass
Mercury	Arthropods	Sow bugs/mixed insects	1	0.017		0.017	0.017	0.017	0.017	107.6	--	0.0002	--	Pass
Mercury	Arthropods	Spiders/beetles	2	0.034	0.03	0.015	0.034	0.053	0.053	107.6	--	0.0005	--	Pass
Mercury	Arthropods	Spiders/beetles/beach hoppers	1	0.030		0.03	0.03	0.03	0.03	107.6	--	0.0003	--	Pass
Mercury	Arthropods	Spiders/cricket	1	0.030		0.03	0.03	0.03	0.03	107.6	--	0.0003	--	Pass
Mercury	Mollusc	Snails	2	0.013	0.01	0.008	0.013	0.018	0.018		22		0.0008	Pass
Nickel	Arthropods	Mixed insects	1	6		6	6	6	6	--	--	--	--	Uncertainty
Nickel	Arthropods	Spiders/beetles/beach hoppers	1	4		4	4	4	4	--	--	--	--	Uncertainty
Potassium	Arthropods	Beach hoppers, sow bugs, beetles	2	1434	22.63	1418	1434	1450	1450	--	--	--	--	Essential nutrient
Potassium	Arthropods	mixed insects	2	2790	933.38	2130	2790	3450	3450	--	--	--	--	Essential nutrient
Potassium	Arthropods	Sow bugs/mixed insects	1	2700		2700	2700	2700	2700	--	--	--	--	Essential nutrient
Potassium	Arthropods	Spiders/beetles	2	3225	671.75	2750	3225	3700	3700	--	--	--	--	Essential nutrient
Potassium	Arthropods	Spiders/beetles/beach hoppers	1	2070		2070	2070	2070	2070	--	--	--	--	Essential nutrient
Potassium	Arthropods	Spiders/cricket	1	2450		2450	2450	2450	2450	--	--	--	--	Essential nutrient
Potassium	Mollusc	Snails	3	1044	160.78	889	1033	1210	1210	--	--	--	--	Essential nutrient
Selenium	Arthropods	Mixed insects	1	1		1	1	1	1	5.08	12.6	0.20	0.08	Pass
Selenium	Arthropods	Spiders/beetles/beach hoppers	1	2		2	2	2	2	5.08	12.6	0.39	0.16	Pass

TABLE 5-2

Maximum Concentrations in Terrestrial Invertebrate Whole-body Tissue Compared to Literature-Derived Benchmarks by Analyte and Taxa

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Taxa1	Taxa2	N	Mean	Standard Deviation	Minimum	Median	P90	Maximum	NOEC	LOEC	HQ - NOEC	HQ - LOEC	Result
Sodium	Arthropods	Beach hoppers, sow bugs, beetles	2	2878	357.09	2625	2877.5	3130	3130	--	--	--	--	Essential nutrient
Sodium	Arthropods	Mixed insects	2	2690	707.11	2190	2690	3190	3190	--	--	--	--	Essential nutrient
Sodium	Arthropods	Sow bugs/mixed insects	1	1670		1670	1670	1670	1670	--	--	--	--	Essential nutrient
Sodium	Arthropods	Spiders/beetles	2	1445	332.34	1210	1445	1680	1680	--	--	--	--	Essential nutrient
Sodium	Arthropods	Spiders/beetles/beach hoppers	1	2930		2930	2930	2930	2930	--	--	--	--	Essential nutrient
Sodium	Arthropods	Spiders/cricket	1	1380		1380	1380	1380	1380	--	--	--	--	Essential nutrient
Sodium	Mollusc	Snails	3	1133	288.59	808	1230	1360	1360	--	--	--	--	Essential nutrient
Vanadium	Arthropods	Beach hoppers, sow bugs, beetles	2	2	0.71	1	1.5	2	2	--	--	--	--	Uncertainty
Vanadium	Arthropods	Mixed insects	2	3	0.71	2	2.5	3	3	--	--	--	--	Uncertainty
Vanadium	Arthropods	Sow bugs/mixed insects	1	2		2	2	2	2	--	--	--	--	Uncertainty
Vanadium	Arthropods	Spiders/beetles/beach hoppers	1	2		2	2	2	2	--	--	--	--	Uncertainty
Vanadium	Mollusc	Snails	1	1		1	1	1	1	--	--	--	--	Uncertainty
Zinc	Arthropods	Beach hoppers, sow bugs, beetles	2	26	2.83	24	26	28	28	--	24	--	**1.17**	**Retain**
Zinc	Arthropods	Mixed insects	2	85	0.71	84	84.5	85	85	524	--	0.16	--	Pass
Zinc	Arthropods	Sow bugs/mixed insects	1	52		52	52	52	52	524	--	0.10	--	Pass
Zinc	Arthropods	Spiders/beetles	2	94	15.56	83	94	105	105	524	--	0.20	--	Pass
Zinc	Arthropods	Spiders/beetles/beach hoppers	1	115		115	115	115	115	--	24	--	**5**	**Retain**
Zinc	Arthropods	Spiders/cricket	1	96		96	96	96	96	524	--	0.18	--	Pass
Zinc	Mollusc	Snails	3	30	1.53	29	30	32	32	--	24	--	**1.33**	**Retain**
Dioxins/Furans - ng/kg, wet weight														
1,2,3,4,6,7,8-HpCDD	Mollusc	Snails	1			11			11	9700	--	0.0011	--	Pass
OCDD	Arthropods	Beach hoppers, sow bugs, beetles	2	65.5	77.07	11	65.5	109.1	120	138000	--	0.0009	--	Pass
Total HpCDD	Mollusc	Snails	1			18			18	9700	--	0.0019	--	Pass

Notes:

-- benchmark not available

Essential nutrient = essential macronutrients were not retained for further evaluation

HQ = hazard quotient

LOEC = lowest observed effect concentration

mg/kg = milligrams per kilogram

ng/kg = nanograms per kilogram

NOEC = no observed effect concentration

P90 = 90th percentile

Pass = maximum concentration was less than the tissue benchmarks; therefore, there are no risks to the terrestrial invertebrate community and no further evaluation was necessary

Retain = maximum concentration exceeded the tissue benchmark; therefore, this analyte was retained for further evaluation

Uncertainty = benchmark value not available; therefore, this analyte retained as an uncertainty

Shading indicates exceedances of the tissue-based benchmarks.

TABLE 5-3

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

											Benchmarks			Hazard Quotients			Risk Results		
Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Plant	Invertebrate	Background 95% UTL	Plant	Invertebrate	Background	Plant	Invertebrate	Background
NCL - East	McWane - 5' South	0-6 in	Aluminum	4	4	12115.00	5127.93	9390	9635	19800	50	--	12100	242.30	--	1.00	Fail	Uncertainty	Fail
NCL - East	McWane - 5' South	2 ft	Aluminum	4	4	8592.50	726.79	7930	8580	9280	50	--	12100	171.85	--	0.71	Fail	Uncertainty	Pass
NCL - East	McWane - 5' South	0-6 in	Antimony	4	4	0.39	0.28	0.16	0.315	0.77	5	78	0.37	0.08	0.01	1.05	Pass	Pass	BL
NCL - East	McWane - 5' South	0-6 in	Arsenic	4	4	3.38	0.39	3	3.3	3.9	18	60	4	0.19	0.06	0.84	Pass	Pass	BL
NCL - East	McWane - 5' South	0-6 in	Barium	4	4	330.25	339.99	143	169.5	839	500	330	149	0.66	1.00	2.22	Pass	Fail	BL
NCL - East	McWane - 5' South	0-6 in	Beryllium	4	4	0.97	0.76	0.44	0.665	2.1	10	40	0.6	0.10	0.02	1.61	Pass	Pass	BL
NCL - East	McWane - 5' South	0-6 in	Chromium	4	4	20.23	9.26	13.4	16.8	33.9	1	0.4	17	20.23	50.56	1.19	Fail	Fail	Fail
NCL - East	McWane - 5' South	2 ft	Chromium	4	4	12.63	1.86	10	13.25	14	1	0.4	17	12.63	31.56	0.74	Fail	Fail	Pass
NCL - East	McWane - 5' South	0-6 in	Cobalt	3	4	6.75	2.26	3.4	7.65	8.3	13	--	8.1	0.52	--	0.83	Pass	Uncertainty	BL
NCL - East	McWane - 5' South	2 ft	Cobalt	3	4	6.43	1.07	4.9	6.75	7.3	13	--	8.1	0.49	--	0.79	Pass	Uncertainty	BL
NCL - East	McWane - 5' South	0-6 in	Copper	4	4	97.38	96.97	35.3	56.1	242	70	80	20.2	1.39	1.22	4.82	Fail	Fail	BL
NCL - East	McWane - 5' South	2 ft	Copper	4	4	14.63	1.44	12.5	15.2	15.6	70	80	20.2	0.21	0.18	0.72	Pass	Pass	BL
NCL - East	McWane - 5' South	0-6 in	Lead	4	4	26.33	15.65	12.3	22.35	48.3	120	1700	14.4	0.22	0.02	1.83	Pass	Pass	BL
NCL - East	McWane - 5' South	0-6 in	Manganese	4	4	439.25	111.72	335	431	560	220	450	399	2.00	0.98	1.10	Fail	Pass	Fail
NCL - East	McWane - 5' South	2 ft	Manganese	4	4	301.50	31.86	277	291.5	346	220	450	399	1.37	0.67	0.76	Fail	Pass	Pass
NCL - East	McWane - 5' South	0-6 in	Mercury	0	4	0.08	0.03	0.051	0.0665	0.12	0.3	0.1	0.05	0.25	0.76	1.52	Pass	Pass	BL
NCL - East	McWane - 5' South	2 ft	Mercury	0	4	0.07	0.04	0.028	0.0545	0.13	0.3	0.1	0.05	0.22	0.67	1.34	Pass	Pass	BL
NCL - East	McWane - 5' South	0-6 in	Nickel	4	4	20.13	7.87	9.6	21.6	27.7	38	280	21.2	0.53	0.07	0.95	Pass	Pass	BL
NCL - East	McWane - 5' South	2 ft	Nickel	4	4	16.05	1.73	13.8	16.3	17.8	38	280	21.2	0.42	0.06	0.76	Pass	Pass	BL
NCL - East	McWane - 5' South	0-6 in	Selenium	4	4	0.75	0.17	0.65	0.675	1	0.52	4.1	0.8	1.44	0.18	0.94	Fail	Pass	Pass
NCL - East	McWane - 5' South	2 ft	Selenium	4	4	0.56	0.15	0.37	0.57	0.73	0.52	4.1	0.8	1.08	0.14	0.70	Fail	Pass	Pass
NCL - East	McWane - 5' South	0-6 in	Vanadium	4	4	27.40	2.32	25.3	26.85	30.6	2	--	32.5	13.70	--	0.84	Fail	Uncertainty	Pass
NCL - East	McWane - 5' South	2 ft	Vanadium	4	4	24.23	3.66	19.3	25.15	27.3	2	--	32.5	12.11	--	0.75	Fail	Uncertainty	Pass
NCL - East	McWane - 5' South	0-6 in	Zinc	4	4	146.30	94.87	75.2	112.5	285	160	120	69.7	0.91	1.22	2.10	Pass	Fail	BL
NCL - East	McWane - 5' South	2 ft	Zinc	4	4	53.28	3.19	49	53.7	56.7	160	120	69.7	0.33	0.44	0.76	Pass	Pass	BL
NCL - East	McWane - Center	0-6 in	Aluminum	5	5	11220.00	2010.47	10100	10400	14800	50	--	12100	224.40	--	0.93	Fail	Uncertainty	Pass
NCL - East	McWane - Center	2 ft	Aluminum	5	5	8774.00	832.66	7610	8730	9600	50	--	12100	175.48	--	0.73	Fail	Uncertainty	Pass
NCL - East	McWane - Center	0-6 in	Antimony	5	5	0.33	0.24	0.16	0.24	0.76	5	78	0.37	0.07	0.00	0.90	Pass	Pass	BL
NCL - East	McWane - Center	0-6 in	Arsenic	5	5	5.74	2.95	3.3	3.8	9.3	18	60	4	0.32	0.10	1.44	Pass	Pass	BL
NCL - East	McWane - Center	0-6 in	Barium	5	5	263.20	133.72	170	227	496	500	330	149	0.53	0.80	1.77	Pass	Pass	BL
NCL - East	McWane - Center	0-6 in	Beryllium	5	5	0.97	0.44	0.58	0.87	1.7	10	40	0.6	0.10	0.02	1.62	Pass	Pass	BL
NCL - East	McWane - Center	0-6 in	Chromium	5	5	24.78	12.58	14.6	18.8	44.5	1	0.4	17	24.78	61.95	1.46	Fail	Fail	Fail
NCL - East	McWane - Center	2 ft	Chromium	5	5	13.16	1.24	11.7	13.7	14.5	1	0.4	17	13.16	32.90	0.77	Fail	Fail	Pass
NCL - East	McWane - Center	0-6 in	Cobalt	5	5	7.66	1.29	6.4	7	9.2	13	--	8.1	0.59	--	0.95	Pass	Uncertainty	BL
NCL - East	McWane - Center	2 ft	Cobalt	4	5	6.96	0.84	5.6	7.3	7.6	13	--	8.1	0.54	--	0.86	Pass	Uncertainty	BL
NCL - East	McWane - Center	0-6 in	Copper	5	5	80.68	43.91	56.9	63.9	159	70	80	20.2	1.15	1.01	3.99	Fail	Fail	BL
NCL - East	McWane - Center	2 ft	Copper	5	5	14.46	1.10	13.2	14.8	15.6	70	80	20.2	0.21	0.18	0.72	Pass	Pass	BL
NCL - East	McWane - Center	0-6 in	Lead	5	5	24.30	6.98	15.9	24.8	33	120	1700	14.4	0.20	0.01	1.69	Pass	Pass	BL
NCL - East	McWane - Center	0-6 in	Manganese	5	5	389.00	48.19	336	390	453	220	450	399	1.77	0.86	0.97	Fail	Pass	Pass
NCL - East	McWane - Center	2 ft	Manganese	5	5	309.40	40.55	253	316	348	220	450	399	1.41	0.69	0.78	Fail	Pass	Pass
NCL - East	McWane - Center	0-6 in	Mercury	0	5	0.05	0.01	0.043	0.045	0.058	0.3	0.1	0.05	0.16	0.48	0.97	Pass	Pass	BL
NCL - East	McWane - Center	2 ft	Mercury	0	5	0.05	0.01	0.041	0.049	0.061	0.3	0.1	0.05	0.17	0.50	1.00	Pass	Pass	BL
NCL - East	McWane - Center	0-6 in	Nickel	5	5	18.94	2.70	16	19.1	22.2	38	280	21.2	0.50	0.07	0.89	Pass	Pass	BL
NCL - East	McWane - Center	2 ft	Nickel	5	5	16.70	2.04	13.4	17.6	18.4	38	280	21.2	0.44	0.06	0.79	Pass	Pass	BL
NCL - East	McWane - Center	0-6 in	Selenium	5	5	0.87	0.31	0.56	0.73	1.3	0.52	4.1	0.8	1.68	0.21	1.09	Fail	Pass	Fail
NCL - East	McWane - Center	2 ft	Selenium	5	5	0.64	0.07	0.57	0.62	0.72	0.52	4.1	0.8	1.22	0.16	0.80	Fail	Pass	Pass
NCL - East	McWane - Center	0-6 in	Vanadium	5	5	25.64	2.14	22.5	25.8	28.5	2	--	32.5	12.82	--	0.79	Fail	Uncertainty	Pass
NCL - East	McWane - Center	2 ft	Vanadium	5	5	25.40	2.33	22.5	26.2	27.8	2	--	32.5	12.70	--	0.78	Fail	Uncertainty	Pass
NCL - East	McWane - Center	0-6 in	Zinc	5	5	122.60	46.91	89	108	205	160	120	69.7	0.77	1.02	1.76	Pass	Fail	BL
NCL - East	McWane - Center	2 ft	Zinc	5	5	53.36	3.77	48.7	54.2	57.6	160	120	69.7	0.33	0.44	0.77	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Aluminum	50	50	31294.60	39810.37	2150	12200	159000	50	--	12100	625.89	--	2.59	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	2 ft	Aluminum	44	44	10325.23	3959.42	5290	9445	22900	50	--	12100	206.50	--	0.85	Fail	Uncertainty	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Antimony	50	50	2.85	4.30	0.24	0.735	20.1	5	78	0.37	0.57	0.04	7.71	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Arsenic	50	50	4.74	4.66	0.83	3.65	33.7	18	60	4	0.26	0.08	1.18	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Barium	50	50	672.19	1048.73	49.9	200	5040	500	330	149	1.34	2.04	4.51	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Beryllium	41	50	2.51	3.67	0.14	0.815	16.8	10	40	0.6	0.25	0.06	4.19	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Chromium	50	50	61.10	78.53	6.2	24.85	342	1	0.4	17	61.10	152.75	3.59	Fail	Fail	Fail

TABLE 5-3

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

											Benchmarks			Hazard Quotients			Risk Results		
Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Plant	Invertebrate	Background 95% UTL	Plant	Invertebrate	Background	Plant	Invertebrate	Background
NCL - East	NCL - East (< 8' Elev)	2 ft	Chromium	44	44	18.63	8.79	8.8	15.55	51.2	1	0.4	17	18.63	46.57	1.10	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	0-6 in	Cobalt	27	50	7.06	2.60	1.4	6.7	13.7	13	--	8.1	0.54	--	0.87	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	2 ft	Cobalt	22	44	7.23	2.51	3.5	6.65	15.9	13	--	8.1	0.56	--	0.89	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Copper	50	50	591.73	1014.51	15.9	86.15	3950	70	80	20.2	8.45	7.40	29.29	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	2 ft	Copper	44	44	26.09	30.26	8.1	15.85	160	70	80	20.2	0.37	0.33	1.29	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Lead	50	50	89.89	119.56	7.3	28.95	616	120	1700	14.4	0.75	0.05	6.24	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Manganese	50	50	473.50	460.36	62.5	282.5	2100	220	450	399	2.15	1.05	1.19	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	2 ft	Manganese	44	44	338.25	102.93	202	321.5	606	220	450	399	1.54	0.75	0.85	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Mercury	18	50	0.09	0.05	0.014	0.0755	0.18	0.3	0.1	0.05	0.29	0.86	1.73	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	2 ft	Mercury	8	44	0.10	0.06	0.013	0.12	0.23	0.3	0.1	0.05	0.32	0.97	1.94	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Nickel	49	50	41.96	41.56	5	20.85	179	38	280	21.2	1.10	0.15	1.98	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	2 ft	Nickel	44	44	18.76	7.71	9.2	16.7	46.3	38	280	21.2	0.49	0.07	0.88	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	0-6 in	Selenium	47	50	1.62	1.26	0.53	1.05	5.6	0.52	4.1	0.8	3.12	0.40	2.03	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	2 ft	Selenium	44	44	0.72	0.27	0.36	0.66	1.8	0.52	4.1	0.8	1.39	0.18	0.90	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	0-6 in	Vanadium	50	50	41.81	18.51	12.8	36.6	125	2	--	32.5	20.91	--	1.29	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	2 ft	Vanadium	44	44	33.50	12.21	16.6	29.2	70.4	2	--	32.5	16.75	--	1.03	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	0-6 in	Zinc	50	50	567.28	943.95	30.8	131	4570	160	120	69.7	3.55	4.73	8.14	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	2 ft	Zinc	44	44	63.29	46.66	24.7	47.75	311	160	120	69.7	0.40	0.53	0.91	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Aluminum	34	34	10038.24	4833.61	3800	9370	30300	50	--	12100	200.76	--	0.83	Fail	Uncertainty	Pass
NCL - East	NCL - East (> 8' Elev)	2 ft	Aluminum	5	5	9656.00	2126.41	7390	8950	12800	50	--	12100	193.12	--	0.80	Fail	Uncertainty	Pass
NCL - East	NCL - East (> 8' Elev)	0-6 in	Antimony	31	34	0.54	0.61	0.18	0.41	3.8	5	78	0.37	0.11	0.01	1.45	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Arsenic	34	34	3.01	0.64	1.6	2.9	5.3	18	60	4	0.17	0.05	0.75	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Barium	34	34	231.96	231.00	87.5	156.5	1220	500	330	149	0.46	0.70	1.56	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Beryllium	22	34	0.77	0.73	0.17	0.535	4.5	10	40	0.6	0.08	0.02	1.28	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Chromium	34	34	19.86	9.91	11.1	15.5	64.2	1	0.4	17	19.86	49.65	1.17	Fail	Fail	Fail
NCL - East	NCL - East (> 8' Elev)	2 ft	Chromium	5	5	14.28	1.79	12.6	13.8	16.8	1	0.4	17	14.28	35.70	0.84	Fail	Fail	Pass
NCL - East	NCL - East (> 8' Elev)	0-6 in	Cobalt	14	34	5.24	1.19	2.9	5.15	8.6	13	--	8.1	0.40	--	0.65	Pass	Uncertainty	BL
NCL - East	NCL - East (> 8' Elev)	2 ft	Cobalt	4	5	6.28	1.10	5.3	5.9	7.6	13	--	8.1	0.48	--	0.78	Pass	Uncertainty	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Copper	34	34	80.82	96.92	15.9	52.05	535	70	80	20.2	1.15	1.01	4.00	Fail	Fail	BL
NCL - East	NCL - East (> 8' Elev)	2 ft	Copper	5	5	15.44	2.94	12.1	15.1	19.5	70	80	20.2	0.22	0.19	0.76	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Lead	34	34	34.81	44.44	8.7	20.65	248	120	1700	14.4	0.29	0.02	2.42	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Manganese	34	34	311.91	176.21	113	287.5	1200	220	450	399	1.42	0.69	0.78	Fail	Pass	Pass
NCL - East	NCL - East (> 8' Elev)	2 ft	Manganese	5	5	291.40	60.88	249	269	399	220	450	399	1.32	0.65	0.73	Fail	Pass	Pass
NCL - East	NCL - East (> 8' Elev)	0-6 in	Mercury	5	34	0.06	0.04	0.011	0.044	0.13	0.3	0.1	0.05	0.19	0.56	1.12	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	2 ft	Mercury	1	5	0.08	0.05	0.016	0.11	0.13	0.3	0.1	0.05	0.28	0.84	1.68	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Nickel	34	34	20.18	7.54	11.8	17.95	40.1	38	280	21.2	0.53	0.07	0.95	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	2 ft	Nickel	5	5	17.14	3.47	14.2	15.2	21.8	38	280	21.2	0.45	0.06	0.81	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	0-6 in	Selenium	29	34	0.89	0.46	0.3	0.795	2	0.52	4.1	0.8	1.72	0.22	1.12	Fail	Pass	Fail
NCL - East	NCL - East (> 8' Elev)	2 ft	Selenium	5	5	0.52	0.18	0.4	0.46	0.84	0.52	4.1	0.8	1.00	0.13	0.65	Fail	Pass	Pass
NCL - East	NCL - East (> 8' Elev)	0-6 in	Vanadium	34	34	26.38	7.14	13.9	24.65	46.7	2	--	32.5	13.19	--	0.81	Fail	Uncertainty	Pass
NCL - East	NCL - East (> 8' Elev)	2 ft	Vanadium	5	5	27.12	3.27	23.7	26.9	31.1	2	--	32.5	13.56	--	0.83	Fail	Uncertainty	Pass
NCL - East	NCL - East (> 8' Elev)	0-6 in	Zinc	34	34	214.98	396.06	59.6	111.5	2380	160	120	69.7	1.34	1.79	3.08	Fail	Fail	BL
NCL - East	NCL - East (> 8' Elev)	2 ft	Zinc	5	5	48.24	6.95	42.6	43.6	57.3	160	120	69.7	0.30	0.40	0.69	Pass	Pass	BL
NCL - North	NCL - Background	0-6 in	Aluminum	9	9	7012.22	748.28	6080	7100	8320	50	--	12100	140.24	--	0.58	Fail	Uncertainty	Pass
NCL - North	NCL - Background	0-6 in	Barium	9	9	113.34	14.46	89.1	111	137	500	330	149	0.23	0.34	0.76	Pass	Pass	BL
NCL - North	NCL - Background	0-6 in	Beryllium	2	9	0.41	0.10	0.33	0.37	0.61	10	40	0.6	0.04	0.01	0.68	Pass	Pass	BL
NCL - North	NCL - Background	0-6 in	Chromium	9	9	11.79	0.61	10.9	11.7	12.8	1	0.4	17	11.79	29.47	0.69	Fail	Fail	Pass
NCL - North	NCL - Background	0-6 in	Copper	9	9	15.67	1.33	13.7	15.7	17.6	70	80	20.2	0.22	0.20	0.78	Pass	Pass	BL
NCL - North	NCL - Background	0-6 in	Lead	9	9	8.88	0.83	7.5	8.9	10.2	120	1700	14.4	0.07	0.01	0.62	Pass	Pass	BL
NCL - North	NCL - Background	0-6 in	Manganese	9	9	254.33	21.89	225	251	282	220	450	399	1.16	0.57	0.64	Fail	Pass	Pass
NCL - North	NCL - Background	0-6 in	Mercury	1	9	0.04	0.02	0.02	0.041	0.1	0.3	0.1	0.05	0.15	0.45	0.90	Pass	Pass	BL
NCL - North	NCL - Background	0-6 in	Nickel	9	9	13.04	1.33	11.3	13.2	15.7	38	280	21.2	0.34	0.05	0.62	Pass	Pass	BL
NCL - North	NCL - Background	0-6 in	Selenium	7	9	0.62	0.31	0.44	0.47	1.4	0.52	4.1	0.8	1.19	0.15	0.77	Fail	Pass	Pass
NCL - North	NCL - Background	0-6 in	Vanadium	9	9	24.33	9.10	18.9	21.5	48.3	2	--	32.5	12.17	--	0.75	Fail	Uncertainty	Pass
NCL - North	NCL - Background	0-6 in	Zinc	9	9	60.68	7.08	52	60.5	76.9	160	120	69.7	0.38	0.51	0.87	Pass	Pass	BL
NCL - North	NCL - Ditch	0-6 in	Aluminum	4	4	12030.00	5589.36	5920	11400	19400	50	--	12100	240.60	--	0.99	Fail	Uncertainty	Pass
NCL - North	NCL - Ditch	0-6 in	Barium	4	4	283.50	124.76	177	258	441	500	330	149	0.57	0.86	1.90	Pass	Pass	BL

TABLE 5-3

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

											Benchmarks			Hazard Quotients			Risk Results		
Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Plant	Invertebrate	Background 95% UTL	Plant	Invertebrate	Background	Plant	Invertebrate	Background
NCL - North	NCL - Ditch	0-6 in	Beryllium	4	4	0.70	0.38	0.29	0.645	1.2	10	40	0.6	0.07	0.02	1.16	Pass	Pass	BL
NCL - North	NCL - Ditch	0-6 in	Chromium	4	4	24.13	8.12	14.5	24.3	33.4	1	0.4	17	24.13	60.31	1.42	Fail	Fail	Fail
NCL - North	NCL - Ditch	0-6 in	Copper	4	4	91.90	70.19	45.8	62.9	196	70	80	20.2	1.31	1.15	4.55	Fail	Fail	BL
NCL - North	NCL - Ditch	0-6 in	Lead	4	4	160.13	105.43	80.1	127.2	306	120	1700	14.4	1.33	0.09	11.12	Fail	Pass	BL
NCL - North	NCL - Ditch	0-6 in	Manganese	4	4	183.70	72.25	90.8	189	266	220	450	399	0.84	0.41	0.46	Pass	Pass	Pass
NCL - North	NCL - Ditch	0-6 in	Mercury	0	4	0.09	0.06	0.057	0.069	0.18	0.3	0.1	0.05	0.31	0.94	1.88	Pass	Pass	BL
NCL - North	NCL - Ditch	0-6 in	Nickel	4	4	23.05	10.01	10.1	23.8	34.5	38	280	21.2	0.61	0.08	1.09	Pass	Pass	BL
NCL - North	NCL - Ditch	0-6 in	Selenium	4	4	2.40	1.35	1	2.45	3.7	0.52	4.1	0.8	4.62	0.59	3.00	Fail	Pass	Fail
NCL - North	NCL - Ditch	0-6 in	Vanadium	4	4	34.40	13.56	16.2	36.85	47.7	2	--	32.5	17.20	--	1.06	Fail	Uncertainty	Fail
NCL - North	NCL - Ditch	0-6 in	Zinc	4	4	269.14	143.73	99.5554	269.5	438	160	120	69.7	1.68	2.24	3.86	Fail	Fail	BL
NCL - North	NCL - North	0-6 in	Aluminum	14	14	7615.71	691.76	6490	7555	8640	50	--	12100	152.31	--	0.63	Fail	Uncertainty	Pass
NCL - North	NCL - North	2 ft	Aluminum	8	8	8677.50	1077.64	7450	8450	10100	50	--	12100	173.55	--	0.72	Fail	Uncertainty	Pass
NCL - North	NCL - North	0-6 in	Barium	14	14	109.51	10.63	92.2	111.5	123	500	330	149	0.22	0.33	0.73	Pass	Pass	BL
NCL - North	NCL - North	2 ft	Barium	8	8	118.36	18.13	97.9	115.5	148	500	330	149	0.24	0.36	0.79	Pass	Pass	BL
NCL - North	NCL - North	0-6 in	Beryllium	4	14	0.46	0.07	0.36	0.45	0.58	10	40	0.6	0.05	0.01	0.77	Pass	Pass	BL
NCL - North	NCL - North	0-6 in	Chromium	14	14	14.06	0.81	12.7	13.95	15.4	1	0.4	17	14.06	35.14	0.83	Fail	Fail	Pass
NCL - North	NCL - North	2 ft	Chromium	8	8	15.23	1.47	12.7	15.35	17.2	1	0.4	17	15.23	38.06	0.90	Fail	Fail	Pass
NCL - North	NCL - North	2 ft	Cobalt	7	8	6.55	0.94	5.3	6.35	8.2	13	--	8.1	0.50	--	0.81	Pass	Uncertainty	BL
NCL - North	NCL - North	0-6 in	Copper	14	14	15.18	1.66	12.9	14.55	18.6	70	80	20.2	0.22	0.19	0.75	Pass	Pass	BL
NCL - North	NCL - North	2 ft	Copper	8	8	14.13	1.49	12.2	13.4	16.6	70	80	20.2	0.20	0.18	0.70	Pass	Pass	BL
NCL - North	NCL - North	0-6 in	Lead	14	14	11.54	3.10	7.4	11.4	19.1	120	1700	14.4	0.10	0.01	0.80	Pass	Pass	BL
NCL - North	NCL - North	0-6 in	Manganese	14	14	198.50	55.71	129	207	262	220	450	399	0.90	0.44	0.50	Pass	Pass	Pass
NCL - North	NCL - North	2 ft	Manganese	8	8	303.25	49.39	261	286	384	220	450	399	1.38	0.67	0.76	Fail	Pass	Pass
NCL - North	NCL - North	0-6 in	Mercury	5	14	0.07	0.05	0.014	0.0855	0.12	0.3	0.1	0.05	0.24	0.71	1.41	Pass	Pass	BL
NCL - North	NCL - North	2 ft	Mercury	2	8	0.07	0.05	0.018	0.081	0.13	0.3	0.1	0.05	0.25	0.75	1.49	Pass	Pass	BL
NCL - North	NCL - North	0-6 in	Nickel	14	14	15.09	0.71	14.2	15.2	16.4	38	280	21.2	0.40	0.05	0.71	Pass	Pass	BL
NCL - North	NCL - North	0-6 in	Selenium	13	14	0.62	0.31	0.25	0.625	1.5	0.52	4.1	0.8	1.19	0.15	0.78	Fail	Pass	Pass
NCL - North	NCL - North	2 ft	Selenium	8	8	0.50	0.17	0.31	0.5	0.76	0.52	4.1	0.8	0.97	0.12	0.63	Pass	Pass	Pass
NCL - North	NCL - North	0-6 in	Vanadium	14	14	29.98	11.18	20.1	25.6	52.9	2	--	32.5	14.99	--	0.92	Fail	Uncertainty	Pass
NCL - North	NCL - North	2 ft	Vanadium	8	8	31.14	10.45	24.3	27.65	56.4	2	--	32.5	15.57	--	0.96	Fail	Uncertainty	Pass
NCL - North	NCL - North	0-6 in	Zinc	14	14	80.83	57.79	53.2	58.55	220	160	120	69.7	0.51	0.67	1.16	Pass	Pass	BL
NCL - North	NCL - North	2 ft	Zinc	8	8	51.14	5.26	43.3	51.2	59.2	160	120	69.7	0.32	0.43	0.73	Pass	Pass	BL
NCL - North	NCL - Pond	0-6 in	Aluminum	18	18	14296.67	4335.95	8180	13950	27800	50	--	12100	285.93	--	1.18	Fail	Uncertainty	Fail
NCL - North	NCL - Pond	2 ft	Aluminum	16	16	14351.25	5925.23	6360	12650	25700	50	--	12100	287.03	--	1.19	Fail	Uncertainty	Fail
NCL - North	NCL - Pond	0-6 in	Barium	18	18	454.89	1154.83	103	145	5060	500	330	149	0.91	1.38	3.05	Pass	Fail	BL
NCL - North	NCL - Pond	2 ft	Barium	16	16	230.83	341.86	68.6	146.5	1500	500	330	149	0.46	0.70	1.55	Pass	Pass	BL
NCL - North	NCL - Pond	0-6 in	Beryllium	18	18	1.92	4.20	0.61	0.88	18.7	10	40	0.6	0.19	0.05	3.20	Pass	Pass	BL
NCL - North	NCL - Pond	0-6 in	Chromium	18	18	21.05	9.23	13.6	18.05	51.3	1	0.4	17	21.05	52.63	1.24	Fail	Fail	Fail
NCL - North	NCL - Pond	2 ft	Chromium	16	16	19.14	7.06	7.5	19.2	35.6	1	0.4	17	19.14	47.84	1.13	Fail	Fail	Fail
NCL - North	NCL - Pond	2 ft	Cobalt	13	16	8.31	2.41	4.5	8.45	13.5	13	--	8.1	0.64	--	1.03	Pass	Uncertainty	BL
NCL - North	NCL - Pond	0-6 in	Copper	18	18	50.88	63.48	14.5	24.4	270	70	80	20.2	0.73	0.64	2.52	Pass	Pass	BL
NCL - North	NCL - Pond	2 ft	Copper	16	16	27.40	23.09	7.9	19.8	97.4	70	80	20.2	0.39	0.34	1.36	Pass	Pass	BL
NCL - North	NCL - Pond	0-6 in	Lead	18	18	37.15	39.33	6.1	15.1	123	120	1700	14.4	0.31	0.02	2.58	Pass	Pass	BL
NCL - North	NCL - Pond	0-6 in	Manganese	18	18	347.06	198.12	136	287.5	986	220	450	399	1.58	0.77	0.87	Fail	Pass	Pass
NCL - North	NCL - Pond	2 ft	Manganese	16	16	400.06	157.56	129	408	670	220	450	399	1.82	0.89	1.00	Fail	Pass	Fail
NCL - North	NCL - Pond	0-6 in	Mercury	3	18	0.14	0.05	0.03	0.14	0.23	0.3	0.1	0.05	0.48	1.44	2.89	Pass	Fail	BL
NCL - North	NCL - Pond	2 ft	Mercury	4	16	0.11	0.05	0.02	0.13	0.2	0.3	0.1	0.05	0.38	1.14	2.28	Pass	Fail	BL
NCL - North	NCL - Pond	0-6 in	Nickel	18	18	23.77	6.70	17.2	21.6	42.9	38	280	21.2	0.63	0.08	1.12	Pass	Pass	BL
NCL - North	NCL - Pond	0-6 in	Selenium	9	18	2.82	3.31	0.17	2.1	15.2	0.52	4.1	0.8	5.42	0.69	3.52	Fail	Pass	Fail
NCL - North	NCL - Pond	2 ft	Selenium	7	16	1.60	1.58	0.064	1.185	6	0.52	4.1	0.8	3.08	0.39	2.00	Fail	Pass	Fail
NCL - North	NCL - Pond	0-6 in	Vanadium	18	18	39.53	13.35	24.4	34.25	62.7	2	--	32.5	19.77	--	1.22	Fail	Uncertainty	Fail
NCL - North	NCL - Pond	2 ft	Vanadium	16	16	36.33	9.96	11.2	35.1	53	2	--	32.5	18.17	--	1.12	Fail	Uncertainty	Fail
NCL - North	NCL - Pond	0-6 in	Zinc	18	18	180.77	189.50	57.2	98.05	790	160	120	69.7	1.13	1.51	2.59	Fail	Fail	BL
NCL - North	NCL - Pond	2 ft	Zinc	16	16	93.68	54.61	32.2	77.05	253	160	120	69.7	0.59	0.78	1.34	Pass	Pass	BL
Wetlands Beach	Beach - Background	0-6 in	Aluminum	7	7	2522.86	472.61	2110	2260	3360	50	--	12100	50.46	--	0.21	Fail	Uncertainty	Pass
Wetlands Beach	Beach - Background	0-6 in	Antimony	7	7	0.14	0.04	0.089	0.14	0.2	5	78	0.37	0.03	0.00	0.37	Pass	Pass	BL
Wetlands Beach	Beach - Background	0-6 in	Barium	7	7	54.99	17.01	35.1	51.4	84.2	500	330	149	0.11	0.17	0.37	Pass	Pass	BL

TABLE 5-3

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

											Benchmarks			Hazard Quotients			Risk Results		
Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Plant	Invertebrate	Background 95% UTL	Plant	Invertebrate	Background	Plant	Invertebrate	Background
Wetlands Beach	Beach - Background	0-6 in	Beryllium	0	7	0.14	0.02	0.12	0.13	0.17	10	40	0.6	0.01	0.00	0.23	Pass	Pass	BL
Wetlands Beach	Beach - Background	0-6 in	Chromium	7	7	6.63	1.27	4.6	6.5	8	1	0.4	17	6.63	16.57	0.39	Fail	Fail	Pass
Wetlands Beach	Beach - Background	0-6 in	Cobalt	0	7	1.91	0.40	1.5	1.7	2.6	13	--	8.1	0.15	--	0.24	Pass	Uncertainty	BL
Wetlands Beach	Beach - Background	0-6 in	Copper	7	7	5.21	1.13	3.8	5.2	7	70	80	20.2	0.07	0.07	0.26	Pass	Pass	BL
Wetlands Beach	Beach - Background	0-6 in	Lead	7	7	4.44	1.58	2.3	4.3	7.6	120	1700	14.4	0.04	0.00	0.31	Pass	Pass	BL
Wetlands Beach	Beach - Background	0-6 in	Manganese	7	7	91.51	25.58	64.4	82.1	141	220	450	399	0.42	0.20	0.23	Pass	Pass	Pass
Wetlands Beach	Beach - Background	0-6 in	Mercury	0	7	0.05	0.04	0.022	0.025	0.1	0.3	0.1	0.05	0.16	0.47	0.93	Pass	Pass	BL
Wetlands Beach	Beach - Background	0-6 in	Nickel	7	7	5.64	0.99	4.8	5.2	7.5	38	280	21.2	0.15	0.02	0.27	Pass	Pass	BL
Wetlands Beach	Beach - Background	0-6 in	Selenium	1	7	0.48	0.11	0.23	0.52	0.52	0.52	4.1	0.8	0.92	0.12	0.60	Pass	Pass	Pass
Wetlands Beach	Beach - Background	0-6 in	Thallium	7	7	0.07	0.01	0.056	0.065	0.087	1	--	0.27	0.07	--	0.26	Pass	Uncertainty	BL
Wetlands Beach	Beach - Background	0-6 in	Vanadium	7	7	10.60	1.81	8.1	10.4	13.5	2	--	32.5	5.30	--	0.33	Fail	Uncertainty	Pass
Wetlands Beach	Beach - Background	0-6 in	Zinc	7	7	26.03	5.37	19.6	28.7	32.3	160	120	69.7	0.16	0.22	0.37	Pass	Pass	BL
Wetlands Beach	Beach - Breach	2 to 6 ft	Aluminum	7	7	1718.57	213.42	1430	1810	1930	50	--	12100	34.37	--	0.14	Fail	Uncertainty	Pass
Wetlands Beach	Beach - Breach	2 to 6 ft	Barium	3	7	34.54	19.65	14.3	23.3	64.6	500	330	149	0.07	0.10	0.23	Pass	Pass	BL
Wetlands Beach	Beach - Breach	2 to 6 ft	Chromium	7	7	4.34	1.01	2.7	4.3	5.7	1	0.4	17	4.34	10.86	0.26	Fail	Fail	Pass
Wetlands Beach	Beach - Breach	2 to 6 ft	Cobalt	0	7	1.14	0.13	1	1.1	1.3	13	--	8.1	0.09	--	0.14	Pass	Uncertainty	BL
Wetlands Beach	Beach - Breach	2 to 6 ft	Copper	4	7	2.04	0.22	1.8	2	2.4	70	80	20.2	0.03	0.03	0.10	Pass	Pass	BL
Wetlands Beach	Beach - Breach	2 to 6 ft	Manganese	7	7	57.14	7.89	44.5	60.9	67.7	220	450	399	0.26	0.13	0.14	Pass	Pass	Pass
Wetlands Beach	Beach - Breach	2 to 6 ft	Mercury	0	7	0.12	0.01	0.11	0.12	0.13	0.3	0.1	0.05	0.40	1.21	2.43	Pass	Fail	BL
Wetlands Beach	Beach - Breach	2 to 6 ft	Selenium	1	7	0.62	0.05	0.52	0.62	0.68	0.52	4.1	0.8	1.20	0.15	0.78	Fail	Pass	Pass
Wetlands Beach	Beach - Breach	2 to 6 ft	Vanadium	7	7	6.81	1.34	4.9	6.5	8.7	2	--	32.5	3.41	--	0.21	Fail	Uncertainty	Pass
Wetlands Beach	Beach - Breach	2 to 6 ft	Zinc	7	7	9.90	0.96	8.4	10.1	11.4	160	120	69.7	0.06	0.08	0.14	Pass	Pass	BL
Wetlands Beach	Breach - Background	0-6 in	Aluminum	7	7	1638.57	120.34	1450	1630	1790	50	--	12100	32.77	--	0.14	Fail	Uncertainty	Pass
Wetlands Beach	Breach - Background	0-6 in	Antimony	7	7	0.11	0.03	0.079	0.11	0.16	5	78	0.37	0.02	0.00	0.29	Pass	Pass	BL
Wetlands Beach	Breach - Background	0-6 in	Barium	7	7	70.89	42.43	35.8	53.4	148	500	330	149	0.14	0.21	0.48	Pass	Pass	BL
Wetlands Beach	Breach - Background	0-6 in	Beryllium	0	7	0.09	0.01	0.081	0.095	0.11	10	40	0.6	0.01	0.00	0.16	Pass	Pass	BL
Wetlands Beach	Breach - Background	0-6 in	Chromium	7	7	8.51	3.12	4.9	7.7	14.5	1	0.4	17	8.51	21.29	0.50	Fail	Fail	Pass
Wetlands Beach	Breach - Background	0-6 in	Cobalt	0	7	1.29	0.13	1.1	1.3	1.5	13	--	8.1	0.10	--	0.16	Pass	Uncertainty	BL
Wetlands Beach	Breach - Background	0-6 in	Copper	1	7	2.24	0.27	1.9	2.3	2.7	70	80	20.2	0.03	0.03	0.11	Pass	Pass	BL
Wetlands Beach	Breach - Background	0-6 in	Lead	7	7	2.26	0.61	1.7	2	3.4	120	1700	14.4	0.02	0.00	0.16	Pass	Pass	BL
Wetlands Beach	Breach - Background	0-6 in	Manganese	7	7	78.56	7.54	68.7	77	91.9	220	450	399	0.36	0.17	0.20	Pass	Pass	Pass
Wetlands Beach	Breach - Background	0-6 in	Mercury	0	7	0.03	0.01	0.018	0.025	0.06	0.3	0.1	0.05	0.10	0.29	0.58	Pass	Pass	BL
Wetlands Beach	Breach - Background	0-6 in	Nickel	3	7	3.99	0.23	3.7	4	4.3	38	280	21.2	0.10	0.01	0.19	Pass	Pass	BL
Wetlands Beach	Breach - Background	0-6 in	Selenium	0	7	0.51	0.00	0.51	0.51	0.52	0.52	4.1	0.8	0.99	0.13	0.64	Pass	Pass	Pass
Wetlands Beach	Breach - Background	0-6 in	Thallium	7	7	0.06	0.02	0.047	0.057	0.09	1	--	0.27	0.06	--	0.22	Pass	Uncertainty	BL
Wetlands Beach	Breach - Background	0-6 in	Vanadium	7	7	18.07	8.48	7	18.4	32.8	2	--	32.5	9.04	--	0.56	Fail	Uncertainty	Pass
Wetlands Beach	Breach - Background	0-6 in	Zinc	7	7	10.76	0.86	9.4	10.9	12.1	160	120	69.7	0.07	0.09	0.15	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Aluminum	4	4	9885.00	777.54	9210	9665	11000	50	--	12100	197.70	--	0.82	Fail	Uncertainty	Pass
Wetlands Beach	Hueneme Parcel	2 ft	Aluminum	4	4	10000.00	2503.66	6750	10375	12500	50	--	12100	200.00	--	0.83	Fail	Uncertainty	Pass
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Aluminum	4	4	11197.50	2891.83	8790	10300	15400	50	--	12100	223.95	--	0.93	Fail	Uncertainty	Pass
Wetlands Beach	Hueneme Parcel	0-6 in	Antimony	4	4	0.63	0.23	0.43	0.575	0.93	5	78	0.37	0.13	0.01	1.70	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Barium	4	4	212.75	67.96	139	216	280	500	330	149	0.43	0.64	1.43	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	2 ft	Barium	4	4	177.00	56.33	132	159.5	257	500	330	149	0.35	0.54	1.19	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Barium	4	4	150.00	26.98	122	146	186	500	330	149	0.30	0.45	1.01	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Beryllium	3	4	0.62	0.15	0.52	0.565	0.84	10	40	0.6	0.06	0.02	1.04	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Chromium	4	4	25.10	8.74	18.7	21.85	38	1	0.4	17	25.10	62.75	1.48	Fail	Fail	Fail
Wetlands Beach	Hueneme Parcel	2 ft	Chromium	4	4	23.33	10.39	13.6	21.05	37.6	1	0.4	17	23.33	58.31	1.37	Fail	Fail	Fail
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Chromium	4	4	20.35	4.60	16.4	19	27	1	0.4	17	20.35	50.88	1.20	Fail	Fail	Fail
Wetlands Beach	Hueneme Parcel	0-6 in	Cobalt	3	4	6.38	1.33	4.6	6.55	7.8	13	--	8.1	0.49	--	0.79	Pass	Uncertainty	BL
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Cobalt	3	4	7.48	1.84	6.1	6.85	10.1	13	--	8.1	0.58	--	0.92	Pass	Uncertainty	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Copper	4	4	51.48	25.09	28.6	48.85	79.6	70	80	20.2	0.74	0.64	2.55	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	2 ft	Copper	4	4	43.78	21.40	29.7	35	75.4	70	80	20.2	0.63	0.55	2.17	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Copper	4	4	20.48	5.87	16.3	18.25	29.1	70	80	20.2	0.29	0.26	1.01	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Lead	4	4	46.73	28.36	21.9	38.75	87.5	120	1700	14.4	0.39	0.03	3.24	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Manganese	4	4	357.25	66.91	306	335	453	220	450	399	1.62	0.79	0.90	Fail	Pass	Pass
Wetlands Beach	Hueneme Parcel	2 ft	Manganese	4	4	354.00	107.00	223	356.5	480	220	450	399	1.61	0.79	0.89	Fail	Pass	Pass
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Manganese	4	4	389.25	90.34	292	380	505	220	450	399	1.77	0.87	0.98	Fail	Pass	Pass

TABLE 5-3

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

											Benchmarks			Hazard Quotients			Risk Results		
Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Plant	Invertebrate	Background 95% UTL	Plant	Invertebrate	Background	Plant	Invertebrate	Background
Wetlands Beach	Hueneme Parcel	0-6 in	Mercury	4	4	0.38	0.61	0.047	0.09	1.3	0.3	0.1	0.05	1.27	3.82	7.64	Fail	Fail	BL
Wetlands Beach	Hueneme Parcel	2 ft	Mercury	4	4	0.33	0.52	0.041	0.086	1.1	0.3	0.1	0.05	1.09	3.28	6.57	Fail	Fail	BL
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Mercury	4	4	0.03	0.01	0.016	0.0195	0.047	0.3	0.1	0.05	0.09	0.26	0.51	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Nickel	4	4	19.25	1.88	17.6	18.8	21.8	38	280	21.2	0.51	0.07	0.91	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	2 ft	Nickel	4	4	18.35	4.58	12.5	18.7	23.5	38	280	21.2	0.48	0.07	0.87	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Selenium	4	4	0.92	0.39	0.66	0.765	1.5	0.52	4.1	0.8	1.77	0.23	1.15	Fail	Pass	Fail
Wetlands Beach	Hueneme Parcel	2 ft	Selenium	4	4	0.91	0.47	0.59	0.715	1.6	0.52	4.1	0.8	1.74	0.22	1.13	Fail	Pass	Fail
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Selenium	4	4	0.75	0.10	0.64	0.75	0.86	0.52	4.1	0.8	1.44	0.18	0.94	Fail	Pass	Pass
Wetlands Beach	Hueneme Parcel	0-6 in	Thallium	4	4	0.22	0.07	0.14	0.225	0.3	1	--	0.27	0.22	--	0.82	Pass	Uncertainty	BL
Wetlands Beach	Hueneme Parcel	0-6 in	Vanadium	4	4	32.25	4.83	25.8	33.05	37.1	2	--	32.5	16.13	--	0.99	Fail	Uncertainty	Pass
Wetlands Beach	Hueneme Parcel	2 ft	Vanadium	4	4	33.05	7.93	22.5	34.85	40	2	--	32.5	16.53	--	1.02	Fail	Uncertainty	Fail
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Vanadium	4	4	37.70	8.07	30.7	35.4	49.3	2	--	32.5	18.85	--	1.16	Fail	Uncertainty	Fail
Wetlands Beach	Hueneme Parcel	0-6 in	Zinc	4	4	190.70	103.08	98.8	170	324	160	120	69.7	1.19	1.59	2.74	Fail	Fail	BL
Wetlands Beach	Hueneme Parcel	2 ft	Zinc	4	4	186.50	113.39	93	159.5	334	160	120	69.7	1.17	1.55	2.68	Fail	Fail	BL
Wetlands Beach	Hueneme Parcel	2 to 6 ft	Zinc	4	4	59.03	11.61	48	56.35	75.4	160	120	69.7	0.37	0.49	0.85	Pass	Pass	BL
Wetlands Beach	Wetland - East	0-6 in	Aluminum	10	10	4188.00	4151.70	1200	3115	15300	50	--	12100	83.76	--	0.35	Fail	Uncertainty	Pass
Wetlands Beach	Wetland - East	2 ft	Aluminum	9	9	1397.22	199.14	965	1410	1720	50	--	12100	27.94	--	0.12	Fail	Uncertainty	Pass
Wetlands Beach	Wetland - East	0-6 in	Antimony	8	10	0.60	0.64	0.065	0.37	2.1	5	78	0.37	0.12	0.01	1.61	Pass	Pass	BL
Wetlands Beach	Wetland - East	0-6 in	Barium	9	10	82.62	70.93	16.7	71.8	253	500	330	149	0.17	0.25	0.55	Pass	Pass	BL
Wetlands Beach	Wetland - East	2 ft	Barium	6	9	25.72	8.71	10.4	27.2	37.5	500	330	149	0.05	0.08	0.17	Pass	Pass	BL
Wetlands Beach	Wetland - East	0-6 in	Beryllium	5	10	0.41	0.45	0.07	0.285	1.6	10	40	0.6	0.04	0.01	0.68	Pass	Pass	BL
Wetlands Beach	Wetland - East	0-6 in	Chromium	10	10	10.50	9.09	3.1	7.5	32.1	1	0.4	17	10.50	26.25	0.62	Fail	Fail	Pass
Wetlands Beach	Wetland - East	2 ft	Chromium	9	9	3.16	1.02	2.1	2.8	5.2	1	0.4	17	3.16	7.89	0.19	Fail	Fail	Pass
Wetlands Beach	Wetland - East	0-6 in	Cobalt	0	10	1.35	0.77	0.73	1.05	3.4	13	--	8.1	0.10	--	0.17	Pass	Uncertainty	BL
Wetlands Beach	Wetland - East	0-6 in	Copper	10	10	65.61	97.93	2.3	39.45	327	70	80	20.2	0.94	0.82	3.25	Pass	Pass	BL
Wetlands Beach	Wetland - East	2 ft	Copper	9	9	2.27	0.85	1.4	2.2	3.7	70	80	20.2	0.03	0.03	0.11	Pass	Pass	BL
Wetlands Beach	Wetland - East	0-6 in	Lead	10	10	10.20	11.13	1.6	7.7	39.2	120	1700	14.4	0.09	0.01	0.71	Pass	Pass	BL
Wetlands Beach	Wetland - East	0-6 in	Manganese	10	10	97.26	61.71	42.5	79.9	262	220	450	399	0.44	0.22	0.24	Pass	Pass	Pass
Wetlands Beach	Wetland - East	2 ft	Manganese	9	9	48.14	16.67	35.2	42.6	91.6	220	450	399	0.22	0.11	0.12	Pass	Pass	Pass
Wetlands Beach	Wetland - East	0-6 in	Mercury	0	10	0.05	0.04	0.011	0.03	0.11	0.3	0.1	0.05	0.18	0.55	1.09	Pass	Pass	BL
Wetlands Beach	Wetland - East	2 ft	Mercury	0	9	0.08	0.05	0.011	0.12	0.13	0.3	0.1	0.05	0.26	0.79	1.58	Pass	Pass	BL
Wetlands Beach	Wetland - East	0-6 in	Nickel	10	10	5.87	3.48	2.4	5.2	15	38	280	21.2	0.15	0.02	0.28	Pass	Pass	BL
Wetlands Beach	Wetland - East	2 ft	Nickel	9	9	2.97	0.62	2.3	2.7	4.1	38	280	21.2	0.08	0.01	0.14	Pass	Pass	BL
Wetlands Beach	Wetland - East	0-6 in	Selenium	4	7	0.42	0.17	0.22	0.39	0.69	0.52	4.1	0.8	0.80	0.10	0.52	Pass	Pass	Pass
Wetlands Beach	Wetland - East	2 ft	Selenium	0	3	0.63	0.04	0.59	0.65	0.66	0.52	4.1	0.8	1.22	0.15	0.79	Fail	Pass	Pass
Wetlands Beach	Wetland - East	0-6 in	Thallium	9	10	0.06	0.10	0.025	0.0285	0.34	1	--	0.27	0.06	--	0.23	Pass	Uncertainty	BL
Wetlands Beach	Wetland - East	0-6 in	Vanadium	10	10	7.76	3.57	4.2	7.2	16.5	2	--	32.5	3.88	--	0.24	Fail	Uncertainty	Pass
Wetlands Beach	Wetland - East	2 ft	Vanadium	9	9	4.70	0.87	3.4	4.5	6.1	2	--	32.5	2.35	--	0.14	Fail	Uncertainty	Pass
Wetlands Beach	Wetland - East	0-6 in	Zinc	10	10	59.72	68.18	9.5	42.75	237	160	120	69.7	0.37	0.50	0.86	Pass	Pass	BL
Wetlands Beach	Wetland - East	2 ft	Zinc	7	9	7.82	1.70	6	7.4	11.8	160	120	69.7	0.05	0.07	0.11	Pass	Pass	BL
Wetlands Beach	Wetland - West	0-6 in	Aluminum	14	14	2154.93	1041.42	679	1885	4290	50	--	12100	43.10	--	0.18	Fail	Uncertainty	Pass
Wetlands Beach	Wetland - West	2 ft	Aluminum	13	13	1858.46	928.27	1280	1510	4780	50	--	12100	37.17	--	0.15	Fail	Uncertainty	Pass
Wetlands Beach	Wetland - West	0-6 in	Antimony	13	14	0.28	0.21	0.093	0.205	0.78	5	78	0.37	0.06	0.00	0.75	Pass	Pass	BL
Wetlands Beach	Wetland - West	0-6 in	Barium	11	14	46.11	34.96	14.1	38.6	138	500	330	149	0.09	0.14	0.31	Pass	Pass	BL
Wetlands Beach	Wetland - West	2 ft	Barium	9	13	27.39	11.56	14.8	23.8	45.6	500	330	149	0.05	0.08	0.18	Pass	Pass	BL
Wetlands Beach	Wetland - West	0-6 in	Beryllium	3	14	0.24	0.18	0.07	0.16	0.56	10	40	0.6	0.02	0.01	0.40	Pass	Pass	BL
Wetlands Beach	Wetland - West	0-6 in	Chromium	14	14	6.89	4.73	2.6	5.1	19	1	0.4	17	6.89	17.23	0.41	Fail	Fail	Pass
Wetlands Beach	Wetland - West	2 ft	Chromium	13	13	6.09	3.43	3.2	4.9	14.1	1	0.4	17	6.09	15.23	0.36	Fail	Fail	Pass
Wetlands Beach	Wetland - West	0-6 in	Cobalt	0	14	1.40	0.68	0.62	1.25	3.5	13	--	8.1	0.11	--	0.17	Pass	Uncertainty	BL
Wetlands Beach	Wetland - West	0-6 in	Copper	13	14	12.40	15.23	2.3	5.8	57	70	80	20.2	0.18	0.16	0.61	Pass	Pass	BL
Wetlands Beach	Wetland - West	2 ft	Copper	8	13	4.48	3.64	1.5	2.5	13.1	70	80	20.2	0.06	0.06	0.22	Pass	Pass	BL
Wetlands Beach	Wetland - West	0-6 in	Lead	14	14	5.94	3.62	2.4	4.5	12.1	120	1700	14.4	0.05	0.00	0.41	Pass	Pass	BL
Wetlands Beach	Wetland - West	0-6 in	Manganese	14	14	75.75	28.49	50.1	66.2	132	220	450	399	0.34	0.17	0.19	Pass	Pass	Pass
Wetlands Beach	Wetland - West	2 ft	Manganese	13	13	75.25	50.60	36	61.8	230	220	450	399	0.34	0.17	0.19	Pass	Pass	Pass
Wetlands Beach	Wetland - West	0-6 in	Mercury	1	14	0.08	0.04	0.013	0.1	0.13	0.3	0.1	0.05	0.27	0.81	1.63	Pass	Pass	BL
Wetlands Beach	Wetland - West	2 ft	Mercury	1	12	0.12	0.04	0.012	0.12	0.19	0.3	0.1	0.05	0.39	1.17	2.34	Pass	Fail	BL
Wetlands Beach	Wetland - West	0-6 in	Nickel	5	14	4.32	1.27	3	4.05	7	38	280	21.2	0.11	0.02	0.20	Pass	Pass	BL

TABLE 5-3

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

											Benchmarks			Hazard Quotients			Risk Results		
Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Plant	Invertebrate	Background 95% UTL	Plant	Invertebrate	Background	Plant	Invertebrate	Background
Wetlands Beach	Wetland - West	2 ft	Nickel	1	13	4.02	1.69	2.8	3.4	9.1	38	280	21.2	0.11	0.01	0.19	Pass	Pass	BL
Wetlands Beach	Wetland - West	0-6 in	Selenium	13	14	0.61	0.35	0.25	0.52	1.7	0.52	4.1	0.8	1.17	0.15	0.76	Fail	Pass	Pass
Wetlands Beach	Wetland - West	2 ft	Selenium	13	13	0.73	0.44	0.52	0.63	2.2	0.52	4.1	0.8	1.41	0.18	0.92	Fail	Pass	Pass
Wetlands Beach	Wetland - West	0-6 in	Thallium	13	14	0.05	0.09	0.018	0.028	0.35	1	--	0.27	0.05	--	0.20	Pass	Uncertainty	BL
Wetlands Beach	Wetland - West	0-6 in	Vanadium	14	14	11.80	7.65	4.5	8.6	32	2	--	32.5	5.90	--	0.36	Fail	Uncertainty	Pass
Wetlands Beach	Wetland - West	2 ft	Vanadium	13	13	9.72	5.67	5.3	7.9	23.5	2	--	32.5	4.86	--	0.30	Fail	Uncertainty	Pass
Wetlands Beach	Wetland - West	0-6 in	Zinc	14	14	32.51	24.31	10.3	24.8	80.2	160	120	69.7	0.20	0.27	0.47	Pass	Pass	BL
Wetlands Beach	Wetland - West	2 ft	Zinc	12	13	24.92	26.96	7.3	10.6	88.6	160	120	69.7	0.16	0.21	0.36	Pass	Pass	BL
Wetlands Beach	WMU Ditch	0-6 in	Aluminum	12	12	64763.33	34941.57	3760	69200	112000	50	--	12100	1295.27	--	5.35	Fail	Uncertainty	Fail
Wetlands Beach	WMU Ditch	2 ft	Aluminum	9	9	4920.00	3647.68	1790	3160	12300	50	--	12100	98.40	--	0.41	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch	2 to 6 ft	Aluminum	9	9	5852.22	5170.05	1480	3590	16100	50	--	12100	117.04	--	0.48	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch	0-6 in	Antimony	12	12	5.75	3.32	0.34	6.95	10.4	5	78	0.37	1.15	0.07	15.55	Fail	Pass	BL
Wetlands Beach	WMU Ditch	0-6 in	Barium	12	12	1327.46	843.23	69.5	1200	2880	500	330	149	2.65	4.02	8.91	Fail	Fail	BL
Wetlands Beach	WMU Ditch	2 ft	Barium	6	9	68.92	54.66	13.9	47.5	146	500	330	149	0.14	0.21	0.46	Pass	Pass	BL
Wetlands Beach	WMU Ditch	2 to 6 ft	Barium	8	9	139.03	219.24	16.3	53.3	706	500	330	149	0.28	0.42	0.93	Pass	Pass	BL
Wetlands Beach	WMU Ditch	0-6 in	Beryllium	12	12	6.38	5.60	0.28	4.8	19.9	10	40	0.6	0.64	0.16	10.64	Pass	Pass	BL
Wetlands Beach	WMU Ditch	0-6 in	Chromium	12	12	131.84	116.71	5.4	118.5	472	1	0.4	17	131.84	329.60	7.76	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	2 ft	Chromium	9	9	9.72	6.23	3.7	8.1	19.9	1	0.4	17	9.72	24.31	0.57	Fail	Fail	Pass
Wetlands Beach	WMU Ditch	2 to 6 ft	Chromium	9	9	11.89	6.91	5.4	9.4	24.2	1	0.4	17	11.89	29.72	0.70	Fail	Fail	Pass
Wetlands Beach	WMU Ditch	0-6 in	Cobalt	6	12	6.13	2.08	1.2	6.45	9.2	13	--	8.1	0.47	--	0.76	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch	2 to 6 ft	Cobalt	5	9	2.91	3.08	1.1	1.4	10.2	13	--	8.1	0.22	--	0.36	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch	0-6 in	Copper	12	12	1615.56	1128.03	63.7	1505	3970	70	80	20.2	23.08	20.19	79.98	Fail	Fail	BL
Wetlands Beach	WMU Ditch	2 ft	Copper	9	9	50.40	53.12	6.1	23.3	150	70	80	20.2	0.72	0.63	2.50	Pass	Pass	BL
Wetlands Beach	WMU Ditch	2 to 6 ft	Copper	9	9	47.61	58.69	3	34.4	191	70	80	20.2	0.68	0.60	2.36	Pass	Pass	BL
Wetlands Beach	WMU Ditch	0-6 in	Lead	12	12	167.18	107.54	13.7	135	311	120	1700	14.4	1.39	0.10	11.61	Fail	Pass	BL
Wetlands Beach	WMU Ditch	0-6 in	Manganese	12	12	782.09	372.91	57.1	822.5	1470	220	450	399	3.55	1.74	1.96	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	2 ft	Manganese	9	9	115.10	72.46	39	85.3	270	220	450	399	0.52	0.26	0.29	Pass	Pass	Pass
Wetlands Beach	WMU Ditch	2 to 6 ft	Manganese	9	9	248.62	322.66	51.3	121	1060	220	450	399	1.13	0.55	0.62	Fail	Pass	Pass
Wetlands Beach	WMU Ditch	0-6 in	Mercury	3	11	0.15	0.09	0.019	0.16	0.3	0.3	0.1	0.05	0.50	1.50	2.99	Pass	Fail	BL
Wetlands Beach	WMU Ditch	2 ft	Mercury	0	9	0.12	0.04	0.02	0.13	0.17	0.3	0.1	0.05	0.40	1.20	2.40	Pass	Fail	BL
Wetlands Beach	WMU Ditch	2 to 6 ft	Mercury	1	9	0.12	0.03	0.028	0.12	0.14	0.3	0.1	0.05	0.38	1.15	2.31	Pass	Fail	BL
Wetlands Beach	WMU Ditch	0-6 in	Nickel	12	12	73.39	41.64	6	68.9	148	38	280	21.2	1.93	0.26	3.46	Fail	Pass	BL
Wetlands Beach	WMU Ditch	2 ft	Nickel	9	9	7.49	5.09	3.1	6.6	19.1	38	280	21.2	0.20	0.03	0.35	Pass	Pass	BL
Wetlands Beach	WMU Ditch	0-6 in	Selenium	10	12	2.77	2.03	0.3	2.6	7.7	0.52	4.1	0.8	5.33	0.68	3.47	Fail	Pass	Fail
Wetlands Beach	WMU Ditch	2 ft	Selenium	7	9	0.54	0.25	0.3	0.41	0.95	0.52	4.1	0.8	1.03	0.13	0.67	Fail	Pass	Pass
Wetlands Beach	WMU Ditch	2 to 6 ft	Selenium	7	9	0.51	0.21	0.27	0.48	0.82	0.52	4.1	0.8	0.98	0.12	0.64	Pass	Pass	Pass
Wetlands Beach	WMU Ditch	0-6 in	Thallium	9	12	0.31	0.40	0.023	0.125	1.4	1	--	0.27	0.31	--	1.15	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch	0-6 in	Vanadium	12	12	39.40	16.74	6.6	40.45	74.7	2	--	32.5	19.70	--	1.21	Fail	Uncertainty	Fail
Wetlands Beach	WMU Ditch	2 ft	Vanadium	9	9	11.32	9.62	5.2	9.3	36.3	2	--	32.5	5.66	--	0.35	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch	2 to 6 ft	Vanadium	9	9	16.81	12.82	7.3	10.2	45.9	2	--	32.5	8.41	--	0.52	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch	0-6 in	Zinc	12	12	1289.36	666.15	81.3	1370	2100	160	120	69.7	8.06	10.74	18.50	Fail	Fail	BL
Wetlands Beach	WMU Ditch	2 ft	Zinc	9	9	53.99	44.03	17	28.7	131	160	120	69.7	0.34	0.45	0.77	Pass	Pass	BL
Wetlands Beach	WMU Ditch	2 to 6 ft	Zinc	9	9	80.74	137.26	7.8	36.7	441	160	120	69.7	0.50	0.67	1.16	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Aluminum	9	9	57604.44	47043.00	4240	53600	166000	50	--	12100	1152.09	--	4.76	Fail	Uncertainty	Fail
Wetlands Beach	WMU Ditch - 05' South	2 ft	Aluminum	9	9	7547.78	11718.06	1620	2720	37400	50	--	12100	150.96	--	0.62	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Antimony	9	9	4.18	3.19	0.42	2.9	9.4	5	78	0.37	0.84	0.05	11.30	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Barium	9	9	894.71	899.49	67.4	691	3110	500	330	149	1.79	2.71	6.00	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 05' South	2 ft	Barium	9	9	107.47	181.17	18.3	43.7	578	500	330	149	0.21	0.33	0.72	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Beryllium	9	9	3.51	1.76	0.26	4.2	5.9	10	40	0.6	0.35	0.09	5.84	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Chromium	9	9	91.24	82.37	9.3	68.4	274	1	0.4	17	91.24	228.11	5.37	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 05' South	2 ft	Chromium	9	9	14.46	16.92	3.6	9.1	58	1	0.4	17	14.46	36.14	0.85	Fail	Fail	Pass
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Cobalt	4	9	3.63	1.94	1.1	3.4	6.6	13	--	8.1	0.28	--	0.45	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Copper	9	9	1166.84	865.05	55.6	1240	3070	70	80	20.2	16.67	14.59	57.76	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 05' South	2 ft	Copper	9	9	111.27	248.10	8.4	29.3	772	70	80	20.2	1.59	1.39	5.51	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Lead	9	9	149.44	189.44	13.7	113	641	120	1700	14.4	1.25	0.09	10.38	Fail	Pass	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Manganese	9	9	461.74	337.35	66.7	384	1030	220	450	399	2.10	1.03	1.16	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 05' South	2 ft	Manganese	9	9	139.52	202.02	33.8	47.9	626	220	450	399	0.63	0.31	0.35	Pass	Pass	Pass

TABLE 5-3

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

											Benchmarks			Hazard Quotients			Risk Results		
Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Plant	Invertebrate	Background 95% UTL	Plant	Invertebrate	Background	Plant	Invertebrate	Background
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Mercury	0	9	0.18	0.08	0.03	0.17	0.29	0.3	0.1	0.05	0.61	1.82	3.64	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 05' South	2 ft	Mercury	0	9	0.12	0.04	0.026	0.12	0.18	0.3	0.1	0.05	0.40	1.20	2.39	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Nickel	9	9	60.66	41.57	8.8	60.6	154	38	280	21.2	1.60	0.22	2.86	Fail	Pass	BL
Wetlands Beach	WMU Ditch - 05' South	2 ft	Nickel	9	9	10.60	15.89	2.7	3.8	50.4	38	280	21.2	0.28	0.04	0.50	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Selenium	9	9	2.36	2.44	0.34	1.5	8.1	0.52	4.1	0.8	4.54	0.58	2.95	Fail	Pass	Fail
Wetlands Beach	WMU Ditch - 05' South	2 ft	Selenium	6	9	0.59	0.29	0.3	0.64	1.2	0.52	4.1	0.8	1.14	0.14	0.74	Fail	Pass	Pass
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Thallium	9	9	0.05	0.03	0.025	0.045	0.12	1	--	0.27	0.05	--	0.19	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Vanadium	9	9	28.19	18.33	8.4	22.3	66.3	2	--	32.5	14.09	--	0.87	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch - 05' South	2 ft	Vanadium	9	9	14.39	9.85	5	9.2	34.1	2	--	32.5	7.19	--	0.44	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Zinc	9	9	1066.16	1035.05	93.4	869	3670	160	120	69.7	6.66	8.88	15.30	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 05' South	2 ft	Zinc	9	9	2143.09	6321.37	13.8	31.3	19000	160	120	69.7	13.39	17.86	30.75	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Aluminum	14	14	63601.43	67977.47	2630	32500	225000	50	--	12100	1272.03	--	5.26	Fail	Uncertainty	Fail
Wetlands Beach	WMU Ditch - 15' South	2 ft	Aluminum	8	8	2021.25	517.09	1470	1815	3020	50	--	12100	40.43	--	0.17	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Antimony	13	14	5.78	6.58	0.46	2.95	23.2	5	78	0.37	1.16	0.07	15.63	Fail	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Barium	14	14	878.65	1047.49	42.3	466.5	3810	500	330	149	1.76	2.66	5.90	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	2 ft	Barium	3	8	24.41	14.20	11.5	17.8	46.7	500	330	149	0.05	0.07	0.16	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Beryllium	14	14	4.63	5.35	0.25	2.1	18.1	10	40	0.6	0.46	0.12	7.71	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Chromium	14	14	122.29	128.46	7	70.85	423	1	0.4	17	122.29	305.71	7.19	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	2 ft	Chromium	8	8	7.19	3.07	4.2	6.15	13.7	1	0.4	17	7.19	17.97	0.42	Fail	Fail	Pass
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Cobalt	5	14	5.05	2.97	2.5	3.8	13.8	13	--	8.1	0.39	--	0.62	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Copper	14	14	1463.64	1651.89	54.9	741	5480	70	80	20.2	20.91	18.30	72.46	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	2 ft	Copper	8	8	15.75	11.48	4.1	14.1	37.2	70	80	20.2	0.23	0.20	0.78	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Lead	14	14	159.05	169.23	16.2	85.15	505	120	1700	14.4	1.33	0.09	11.05	Fail	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Manganese	14	14	707.21	603.85	161	521	1870	220	450	399	3.21	1.57	1.77	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	2 ft	Manganese	8	8	40.24	7.01	28.5	39.35	50.9	220	450	399	0.18	0.09	0.10	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Mercury	1	13	0.10	0.07	0.015	0.09	0.21	0.3	0.1	0.05	0.35	1.04	2.07	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	2 ft	Mercury	0	8	0.13	0.01	0.12	0.13	0.14	0.3	0.1	0.05	0.43	1.29	2.58	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Nickel	14	14	72.99	66.26	11.2	48.95	204	38	280	21.2	1.92	0.26	3.44	Fail	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	2 ft	Nickel	4	8	3.13	0.64	2.3	2.85	4.2	38	280	21.2	0.08	0.01	0.15	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Selenium	9	14	1.83	1.44	0.55	1.15	5.2	0.52	4.1	0.8	3.52	0.45	2.29	Fail	Pass	Fail
Wetlands Beach	WMU Ditch - 15' South	2 ft	Selenium	2	8	0.57	0.16	0.3	0.65	0.68	0.52	4.1	0.8	1.09	0.14	0.71	Fail	Pass	Pass
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Thallium	8	14	0.21	0.19	0.026	0.082	0.55	1	--	0.27	0.21	--	0.76	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Vanadium	14	14	47.35	19.84	16.4	48.5	71.9	2	--	32.5	23.68	--	1.46	Fail	Uncertainty	Fail
Wetlands Beach	WMU Ditch - 15' South	2 ft	Vanadium	8	8	9.34	2.13	6.1	9.5	12.6	2	--	32.5	4.67	--	0.29	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Zinc	14	14	1204.14	1189.80	147	687	3800	160	120	69.7	7.53	10.03	17.28	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	2 ft	Zinc	8	8	21.58	12.06	10.1	18.35	37	160	120	69.7	0.13	0.18	0.31	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Aluminum	9	9	8793.33	6364.61	2360	6060	17500	50	--	12100	175.87	--	0.73	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch - 30' South	2 ft	Aluminum	9	9	1886.67	620.83	1440	1580	3380	50	--	12100	37.73	--	0.16	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Antimony	6	9	1.37	0.82	0.38	1.5	2.5	5	78	0.37	0.27	0.02	3.70	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Barium	9	9	78.22	65.99	22	50.3	229	500	330	149	0.16	0.24	0.52	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	2 ft	Barium	2	9	22.97	5.98	18.1	20	35.7	500	330	149	0.05	0.07	0.15	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Beryllium	9	9	0.57	0.32	0.19	0.47	1.1	10	40	0.6	0.06	0.01	0.94	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Chromium	9	9	22.01	14.99	5.7	18.1	50.4	1	0.4	17	22.01	55.03	1.29	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 30' South	2 ft	Chromium	9	9	6.93	2.02	4.5	6.2	10.1	1	0.4	17	6.93	17.33	0.41	Fail	Fail	Pass
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Cobalt	9	9	1.29	0.35	0.97	1.1	1.9	13	--	8.1	0.10	--	0.16	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Copper	9	9	156.90	123.19	16.1	102	322	70	80	20.2	2.24	1.96	7.77	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 30' South	2 ft	Copper	9	9	13.34	13.00	2.9	9.4	45.6	70	80	20.2	0.19	0.17	0.66	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Lead	9	9	23.86	17.11	3	23.2	53.1	120	1700	14.4	0.20	0.01	1.66	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Manganese	9	9	125.90	58.47	72.8	105	250	220	450	399	0.57	0.28	0.32	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 30' South	2 ft	Manganese	9	9	46.43	11.86	36.1	42.4	73.2	220	450	399	0.21	0.10	0.12	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Mercury	0	9	0.12	0.02	0.09	0.12	0.14	0.3	0.1	0.05	0.39	1.17	2.33	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 30' South	2 ft	Mercury	0	9	0.12	0.01	0.11	0.12	0.13	0.3	0.1	0.05	0.39	1.18	2.36	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Nickel	9	9	15.10	10.59	3.7	14.6	38.7	38	280	21.2	0.40	0.05	0.71	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	2 ft	Nickel	9	9	3.37	0.68	2.5	3.2	4.5	38	280	21.2	0.09	0.01	0.16	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Selenium	8	9	0.23	0.24	0.033	0.15	0.76	0.52	4.1	0.8	0.44	0.06	0.29	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 30' South	2 ft	Selenium	2	9	0.79	0.44	0.029	0.95	1.3	0.52	4.1	0.8	1.53	0.19	0.99	Fail	Pass	Pass
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Thallium	0	9	0.53	0.29	0.36	0.45	1.3	1	--	0.27	0.53	--	1.98	Pass	Uncertainty	BL

TABLE 5-3

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by Subarea

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

											Benchmarks			Hazard Quotients			Risk Results		
Area	Subarea	Depth	Analyte	Number of Detects	N	Mean	Standard Deviation	Minimum	Median	Maximum	Plant	Invertebrate	Background 95% UTL	Plant	Invertebrate	Background	Plant	Invertebrate	Background
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Vanadium	9	9	45.97	8.54	35.1	44.1	61.8	2	--	32.5	22.98	--	1.41	Fail	Uncertainty	Fail
Wetlands Beach	WMU Ditch - 30' South	2 ft	Vanadium	9	9	47.80	8.55	34.3	47.4	67.1	2	--	32.5	23.90	--	1.47	Fail	Uncertainty	Fail
Wetlands Beach	WMU Ditch - 30' South	0-6 in	Zinc	9	9	213.46	149.77	28.4	253	471	160	120	69.7	1.33	1.78	3.06	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 30' South	2 ft	Zinc	9	9	22.77	12.10	11.8	18.3	50.1	160	120	69.7	0.14	0.19	0.33	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Aluminum	9	9	7015.56	4453.60	1650	5330	13700	50	--	12100	140.31	--	0.58	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch - 50' South	2 ft	Aluminum	9	9	1728.89	469.37	1330	1660	2920	50	--	12100	34.58	--	0.14	Fail	Uncertainty	Pass
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Antimony	6	9	0.59	0.26	0.37	0.44	0.95	5	78	0.37	0.12	0.01	1.60	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Barium	9	9	59.57	27.93	23.1	58.8	97.6	500	330	149	0.12	0.18	0.40	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	2 ft	Barium	1	9	18.78	2.15	16.9	18.4	24	500	330	149	0.04	0.06	0.13	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Beryllium	9	9	0.44	0.21	0.18	0.49	0.73	10	40	0.6	0.04	0.01	0.74	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Chromium	9	9	18.30	9.64	6.2	17.9	31.4	1	0.4	17	18.30	45.75	1.08	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 50' South	2 ft	Chromium	9	9	5.78	1.15	4.6	5.3	7.9	1	0.4	17	5.78	14.44	0.34	Fail	Fail	Pass
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Cobalt	9	9	1.27	0.26	0.95	1.2	1.7	13	--	8.1	0.10	--	0.16	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Copper	9	9	120.56	88.47	11.8	120	226	70	80	20.2	1.72	1.51	5.97	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 50' South	2 ft	Copper	9	9	6.49	6.88	2.2	3.9	24.4	70	80	20.2	0.09	0.08	0.32	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Lead	9	9	16.31	12.83	3.7	12.6	37.2	120	1700	14.4	0.14	0.01	1.13	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Manganese	9	9	123.01	48.28	62.7	119	193	220	450	399	0.56	0.27	0.31	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 50' South	2 ft	Manganese	9	9	53.59	16.75	33.6	53.8	89.8	220	450	399	0.24	0.12	0.13	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Mercury	1	9	0.16	0.19	0.09	0.1	0.66	0.3	0.1	0.05	0.53	1.60	3.20	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 50' South	2 ft	Mercury	2	9	0.15	0.14	0.03	0.11	0.53	0.3	0.1	0.05	0.50	1.51	3.02	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Nickel	9	9	9.46	4.70	3.9	8.5	15.7	38	280	21.2	0.25	0.03	0.45	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	2 ft	Nickel	9	9	3.12	0.50	2.5	3.1	4.1	38	280	21.2	0.08	0.01	0.15	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Selenium	2	9	0.61	0.31	0.049	0.76	0.81	0.52	4.1	0.8	1.18	0.15	0.77	Fail	Pass	Pass
Wetlands Beach	WMU Ditch - 50' South	2 ft	Selenium	0	9	0.91	0.04	0.85	0.9	0.97	0.52	4.1	0.8	1.74	0.22	1.13	Fail	Pass	Fail
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Thallium	0	9	0.39	0.03	0.35	0.38	0.47	1	--	0.27	0.39	--	1.45	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Vanadium	9	9	41.10	15.84	4.7	43.9	60.8	2	--	32.5	20.55	--	1.26	Fail	Uncertainty	Fail
Wetlands Beach	WMU Ditch - 50' South	2 ft	Vanadium	9	9	47.54	2.78	42.8	48.2	50.4	2	--	32.5	23.77	--	1.46	Fail	Uncertainty	Fail
Wetlands Beach	WMU Ditch - 50' South	0-6 in	Zinc	9	9	119.62	77.80	27.8	92.7	228	160	120	69.7	0.75	1.00	1.72	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	2 ft	Zinc	9	9	15.90	7.03	11.9	13.4	34.1	160	120	69.7	0.10	0.13	0.23	Pass	Pass	BL

Notes:

-- = plant or invertebrate benchmark is unavailable

95% UTL = 95 percent upper tolerance limit

BL = background concentration is lower than the plant and invertebrate benchmarks

Fail = mean concentration exceeds the plant or invertebrate benchmarks and background; therefore, this analyte was considered to pose potential risk.

mg/kg = milligrams per kilogram

N = sample size

NA = not available

Pass = mean concentration was less than the plant or invertebrate benchmarks or less than background; therefore, there are no risks to the terrestrial invertebrate or plant community

Uncertainty = benchmark value not available; therefore, this analyte retained as an uncertainty

Shading indicates cases where the mean soil concentration exceeds the plant, invertebrate, or background value.

Background is only used in the risk results if it is greater than the plant and/or invertebrate benchmark; otherwise the background risk result is marked as BL.

TABLE 5-4

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by WMU Stepouts in NCL - East (<8' Elev)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						Benchmarks			Hazard Quotients			Risk Results		
Area	**Subarea**	**Stepout[a]**	**Depth**	**Analyte**	**Mean**	**Plant**	**Invert**	**Background 95% UTL**	**Plant**	**Invert**	**Background**	**Plant**	**Invert**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Aluminum	86545.5	50	--	12100	1730.91	--	7.15	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Aluminum	12334.4	50	--	12100	246.69	--	1.02	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Antimony	8.8	5	78	0.37	1.76	0.11	23.78	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Antimony	0.4	5	78	0.37	0.09	0.01	1.21	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Arsenic	9.3	18	60	4	0.51	0.15	2.31	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Arsenic	4.5	18	60	4	0.25	0.08	1.13	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Barium	2057.1	500	330	149	4.11	6.23	13.81	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Barium	170.3	500	330	149	0.34	0.52	1.14	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Beryllium	7.7	10	40	0.6	0.77	0.19	12.81	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Beryllium	0.6	10	40	0.6	0.06	0.02	1.07	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Cadmium	3.2	32	140	0.87	0.10	0.02	3.72	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Cadmium	1.1	32	140	0.87	0.03	0.01	1.21	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Chromium	172.0	1	0.4	17	172.01	430.02	10.12	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Chromium	23.8	1	0.4	17	23.79	59.47	1.40	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Cobalt	9.1	13	--	8.1	0.70	--	1.12	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Cobalt	7.4	13	--	8.1	0.57	--	0.92	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Copper	1994.4	70	80	20.2	28.49	24.93	98.73	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Copper	58.5	70	80	20.2	0.84	0.73	2.90	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Lead	242.1	120	1700	14.4	2.02	0.14	16.81	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Lead	14.0	120	1700	14.4	0.12	0.01	0.97	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Manganese	1119.9	220	450	399	5.09	2.49	2.81	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Manganese	371.3	220	450	399	1.69	0.83	0.93	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Mercury	0.1	0.3	0.1	0.05	0.19	0.57	1.13	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Mercury	0.1	0.3	0.1	0.05	0.22	0.67	1.34	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Nickel	99.5	38	280	21.2	2.62	0.36	4.69	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Nickel	24.1	38	280	21.2	0.64	0.09	1.14	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Selenium	2.4	0.52	4.1	0.8	4.59	0.58	2.98	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Selenium	1.0	0.52	4.1	0.8	1.85	0.24	1.21	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Silver	2.9	560	--	--	0.005	--	NA	Pass	Uncertainty	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Silver	0.3	560	--	--	0.001	--	NA	Pass	Uncertainty	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Thallium	0.2	1	--	0.27	0.17	--	0.65	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Thallium	0.3	1	--	0.27	0.27	--	1.00	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Vanadium	62.6	2	--	32.5	31.32	--	1.93	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Vanadium	36.4	2	--	32.5	18.22	--	1.12	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Zinc	1845.7	160	120	69.7	11.54	15.38	26.48	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	2 ft	Zinc	109.5	160	120	69.7	0.68	0.91	1.57	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Aluminum	25557.0	50	--	12100	511.14	--	2.11	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Aluminum	8968.9	50	--	12100	179.38	--	0.74	Fail	Uncertainty	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Antimony	1.7	5	78	0.37	0.34	0.02	4.57	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Antimony	0.3	5	78	0.37	0.05	0.00	0.69	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Arsenic	3.9	18	60	4	0.22	0.06	0.97	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Arsenic	3.9	18	60	4	0.22	0.07	0.99	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Barium	293.8	500	330	149	0.59	0.89	1.97	Pass	Pass	BL

TABLE 5-4

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by WMU Stepouts in NCL - East (<8' Elev)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						Benchmarks			Hazard Quotients			Risk Results		
Area	**Subarea**	**Stepout[a]**	**Depth**	**Analyte**	**Mean**	**Plant**	**Invert**	**Background 95% UTL**	**Plant**	**Invert**	**Background**	**Plant**	**Invert**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Barium	131.2	500	330	149	0.26	0.40	0.88	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Beryllium	1.2	10	40	0.6	0.12	0.03	2.03	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Beryllium	0.4	10	40	0.6	0.04	0.01	0.67	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Cadmium	1.1	32	140	0.87	0.03	0.01	1.22	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Cadmium	0.7	32	140	0.87	0.02	0.01	0.84	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Chromium	44.9	1	0.4	17	44.85	112.13	2.64	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Chromium	16.0	1	0.4	17	16.03	40.08	0.94	Fail	Fail	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Cobalt	6.5	13	--	8.1	0.50	--	0.80	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Cobalt	5.9	13	--	8.1	0.46	--	0.73	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Copper	400.1	70	80	20.2	5.72	5.00	19.81	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Copper	18.9	70	80	20.2	0.27	0.24	0.94	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Lead	69.7	120	1700	14.4	0.58	0.04	4.84	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Lead	6.3	120	1700	14.4	0.05	0.00	0.44	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Manganese	346.8	220	450	399	1.58	0.77	0.87	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Manganese	321.1	220	450	399	1.46	0.71	0.80	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Mercury	0.1	0.3	0.1	0.05	0.18	0.54	1.07	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Mercury	0.1	0.3	0.1	0.05	0.19	0.57	1.14	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Nickel	35.7	38	280	21.2	0.94	0.13	1.68	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Nickel	16.3	38	280	21.2	0.43	0.06	0.77	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Selenium	1.4	0.52	4.1	0.8	2.61	0.33	1.70	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Selenium	0.6	0.52	4.1	0.8	1.21	0.15	0.79	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Silver	0.6	560	--	--	0.001	--	NA	Pass	Uncertainty	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Silver	0.3	560	--	--	0.001	--	NA	Pass	Uncertainty	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Thallium	0.2	1	--	0.27	0.22	--	0.81	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Thallium	0.2	1	--	0.27	0.22	--	0.81	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Vanadium	40.5	2	--	32.5	20.24	--	1.25	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Vanadium	30.9	2	--	32.5	15.43	--	0.95	Fail	Uncertainty	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Zinc	348.5	160	120	69.7	2.18	2.90	5.00	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	2 ft	Zinc	49.3	160	120	69.7	0.31	0.41	0.71	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Aluminum	12865.0	50	--	12100	257.30	--	1.06	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Aluminum	13392.5	50		12100	267.85	--	1.11	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Antimony	0.9	5	78	0.37	0.18	0.01	2.48	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Antimony	0.3	5	78	0.37	0.06	0.00	0.87	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Arsenic	3.9	18	60	4	0.22	0.06	0.97	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Arsenic	5.1	18	60	4	0.28	0.08	1.27	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Barium	201.8	500	330	149	0.40	0.61	1.35	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Barium	162.8	500	330	149	0.33	0.49	1.09	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Beryllium	0.8	10	40	0.6	0.08	0.02	1.34	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Beryllium	0.6	10	40	0.6	0.06	0.01	0.98	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Cadmium	1.1	32	140	0.87	0.03	0.01	1.24	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Cadmium	1.2	32	140	0.87	0.04	0.01	1.33	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Chromium	24.1	1	0.4	17	24.14	60.34	1.42	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Chromium	22.5	1	0.4	17	22.51	56.28	1.32	Fail	Fail	Fail

TABLE 5-4

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by WMU Stepouts in NCL - East (<8' Elev)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						Benchmarks			Hazard Quotients			Risk Results		
Area	**Subarea**	**Stepout[a]**	**Depth**	**Analyte**	**Mean**	**Plant**	**Invert**	**Background 95% UTL**	**Plant**	**Invert**	**Background**	**Plant**	**Invert**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Cobalt	6.1	13	--	8.1	0.47	--	0.75	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Cobalt	8.3	13	--	8.1	0.64	--	1.02	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Copper	88.2	70	80	20.2	1.26	1.10	4.37	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Copper	22.3	70	80	20.2	0.32	0.28	1.11	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Lead	23.3	120	1700	14.4	0.19	0.01	1.62	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Lead	8.9	120	1700	14.4	0.07	0.01	0.62	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Manganese	325.3	220	450	399	1.48	0.72	0.82	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Manganese	406.0	220	450	399	1.85	0.90	1.02	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Mercury	0.0	0.3	0.1	0.05	0.13	0.40	0.81	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Mercury	0.1	0.3	0.1	0.05	0.17	0.50	1.00	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Nickel	22.0	38	280	21.2	0.58	0.08	1.04	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Nickel	21.9	38	280	21.2	0.58	0.08	1.03	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Selenium	1.4	0.52	4.1	0.8	2.74	0.35	1.78	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Selenium	0.8	0.52	4.1	0.8	1.50	0.19	0.97	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Silver	0.3	560	--	--	0.001	--	NA	Pass	Uncertainty	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Silver	0.3	560	--	--	0.001	--	NA	Pass	Uncertainty	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Thallium	0.2	1	--	0.27	0.21	--	0.79	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Thallium	0.3	1	--	0.27	0.29	--	1.08	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Vanadium	36.4	2	--	32.5	18.20	--	1.12	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Vanadium	42.0	2	--	32.5	20.98	--	1.29	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Zinc	115.2	160	120	69.7	0.72	0.96	1.65	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	2 ft	Zinc	63.9	160	120	69.7	0.40	0.53	0.92	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Aluminum	10877.5	50	--	12100	217.55	--	0.90	Fail	Uncertainty	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Aluminum	7697.5	50	--	12100	153.95	--	0.64	Fail	Uncertainty	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Antimony	0.7	5	78	0.37	0.14	0.01	1.87	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Antimony	0.2	5	78	0.37	0.04	0.00	0.56	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Arsenic	3.5	18	60	4	0.19	0.06	0.86	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Arsenic	3.3	18	60	4	0.18	0.05	0.81	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Barium	170.0	500	330	149	0.34	0.52	1.14	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Barium	122.5	500	330	149	0.25	0.37	0.82	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Beryllium	0.4	10	40	0.6	0.04	0.01	0.64	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Beryllium	0.3	10	40	0.6	0.03	0.01	0.42	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Cadmium	0.8	32	140	0.87	0.03	0.01	0.92	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Cadmium	0.5	32	140	0.87	0.01	0.00	0.53	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Chromium	17.9	1	0.4	17	17.85	44.63	1.05	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Chromium	12.9	1	0.4	17	12.93	32.31	0.76	Fail	Fail	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Cobalt	3.7	13	--	8.1	0.28	--	0.45	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Cobalt	3.3	13	--	8.1	0.25	--	0.40	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Copper	60.2	70	80	20.2	0.86	0.75	2.98	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Copper	12.4	70	80	20.2	0.18	0.15	0.61	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Lead	40.9	120	1700	14.4	0.34	0.02	2.84	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Lead	5.4	120	1700	14.4	0.05	0.00	0.38	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Manganese	316.5	220	450	399	1.44	0.70	0.79	Fail	Pass	Pass

TABLE 5-4

Mean Concentrations of Inorganic Analytes in Soils (mg/kg, dry weight) Compared to Literature-derived Plant and Invertebrate Benchmarks and Background by WMU Stepouts in NCL - East (<8' Elev)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						Benchmarks			Hazard Quotients			Risk Results		
Area	**Subarea**	**Stepout[a]**	**Depth**	**Analyte**	**Mean**	**Plant**	**Invert**	**Background 95% UTL**	**Plant**	**Invert**	**Background**	**Plant**	**Invert**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Manganese	255.0	220	450	399	1.16	0.57	0.64	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Mercury	0.0	0.3	0.1	0.05	0.13	0.40	0.81	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Mercury	0.0	0.3	0.1	0.05	0.07	0.22	0.44	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Nickel	18.9	38	280	21.2	0.50	0.07	0.89	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Nickel	12.6	38	280	21.2	0.33	0.05	0.60	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Selenium	1.3	0.52	4.1	0.8	2.48	0.31	1.61	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Selenium	0.6	0.52	4.1	0.8	1.11	0.14	0.72	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Silver	0.3	560	--	--	0.001	--	NA	Pass	Uncertainty	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Silver	0.3	560	--	--	0.001	--	NA	Pass	Uncertainty	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Thallium	0.2	1	--	0.27	0.22	--	0.81	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Thallium	0.2	1	--	0.27	0.17	--	0.64	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Vanadium	32.7	2	--	32.5	16.34	--	1.01	Fail	Uncertainty	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Vanadium	24.8	2	--	32.5	12.40	--	0.76	Fail	Uncertainty	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Zinc	85.3	160	120	69.7	0.53	0.71	1.22	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	2 ft	Zinc	37.6	160	120	69.7	0.24	0.31	0.54	Pass	Pass	BL

Notes:

-- = invertebrate benchmark is unavailable

95% UTL = 95 percent upper tolerance limit

BL = background concentration is lower than the plant and invertebrate benchmarks

Fail = mean concentration exceeds the plant or invertebrate benchmarks and background; therefore, this analyte was considered to pose potential risk.

mg/kg = milligrams per kilogram

NA = not available

Pass = mean concentration was less than the plant or invertebrate benchmarks or was less than background; therefore, there are no risks to the terrestrial invertebrate or plant community and no further evaluation was necessary

Uncertainty = benchmark value not available; therefore, this analyte retained as an uncertainty

[a] The four stepouts to the east of the Waste Management Unit include the following samples:

WMU - 1st Stepout = sample locations NEL-4 through NEL-11

WMU - 2nd Stepout = sample locations NEL-15 through NEL-22

WMU - 3rd Stepout = sample locations NEL-27 and NEL-29 through NEL-34

WMU - 4th Stepout = sample locations NEL-44 through NEL-47

Shading indicates cases where the mean soil concentration exceeds the plant, invertebrate, or background value.

Background is only used in the risk results if it is greater than the plant and/or invertebrate benchmark; otherwise the background risk result is marked as BL.

TABLE 5-5

Inorganic Analytes in Whole-body Terrestrial Invertebrate Tissue Concentrations (mg/kg, wet weight) Compared on a Point-by-Point Basis to Literature-derived Benchmarks

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Location ID	Concentration Rage	Biota Type	Taxa	Analyte	Tissue Result	NOEC	LOEC	HQ - NOEC	HQ - LOEC	Result
NCL - East	NCL - East (> 8' Elev)	NEL-028	Medium	Arthropods	beach hoppers, sow bugs, beetles	Chromium	1	9.2	--	0.16	--	Pass
NCL - East	NCL - East (> 8' Elev)	NEL-028	Medium	Arthropods	beach hoppers, sow bugs, beetles	Copper	16	--	29.2	--	0.56	Pass
NCL - East	NCL - East (> 8' Elev)	NEL-028	Medium	Arthropods	beach hoppers, sow bugs, beetles	Zinc	24	--	24	--	0.99	Pass
NCL - East	NCL - East (> 8' Elev)	NEL-025	Medium	Arthropods	beach hoppers, sow bugs, beetles	Chromium	1	9.2	--	0.14	--	Pass
NCL - East	NCL - East (> 8' Elev)	NEL-025	Medium	Arthropods	beach hoppers, sow bugs, beetles	Copper	18	--	29.2	--	0.62	Pass
NCL - East	NCL - East (> 8' Elev)	NEL-025	Medium	Arthropods	beach hoppers, sow bugs, beetles	Zinc	28	--	24	--	**1.16**	Fail
NCL - North	NCL - Background	NNB-001	Low	Arthropods	mixed insects	Chromium	2	9.2	--	0.18	--	Pass
NCL - North	NCL - Background	NNB-001	Low	Arthropods	mixed insects	Copper	88	--	140.4	--	0.62	Pass
NCL - North	NCL - Background	NNB-006	Low	Mollusc	snails	Copper	18	--	29.2	--	0.63	Pass
NCL - North	NCL - Background	NNB-001	Low	Arthropods	mixed insects	Zinc	84	524	--	0.16	--	Pass
NCL - North	NCL - Background	NNB-006	Low	Mollusc	snails	Zinc	29	--	24	--	**1.21**	Fail
NCL - North	NCL - North	NNL-002	Low	Mollusc	snails	Copper	9	--	29.2	--	0.31	Pass
NCL - North	NCL - North	NNL-002	Low	Mollusc	snails	Zinc	30	--	24	--	**1.24**	Fail
Wetlands Beach	Wetland - East	WLE-007	Low	Mollusc	snails	Copper	40	--	29.2	--	**1.36**	Fail
Wetlands Beach	Wetland - East	WLE-007	Low	Mollusc	snails	Zinc	32	--	24	--	**1.31**	Fail
Wetlands Beach	Wetland - West	WLW-008	Low	Arthropods	sow bugs/mixed insects	Copper	40	--	140.4	--	0.28	Pass
Wetlands Beach	Wetland - West	WLW-008	Low	Arthropods	sow bugs/mixed insects	Zinc	52	524	--	0.10	--	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-005	High	Arthropods	mixed insects	Chromium	11	9.2	--	**1.22**	--	Fail
Wetlands Beach	WMU Ditch - 15' South	DSC-002	High	Arthropods	spiders/beetles/beach hoppers	Chromium	7	9.2	--	0.72	--	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-003	High	Arthropods	spiders/cricket	Chromium	4	9.2	--	0.43	--	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-005	High	Arthropods	mixed insects	Copper	106	--	140.4	--	0.75	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-004	High	Arthropods	spiders/beetles	Copper	135	--	140.4	--	0.96	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-008	High	Arthropods	spiders/beetles	Copper	31	--	140.4	--	0.22	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-002	High	Arthropods	spiders/beetles/beach hoppers	Copper	230	--	29.2	--	**7.88**	Fail
Wetlands Beach	WMU Ditch - 15' South	DSC-003	High	Arthropods	spiders/cricket	Copper	97	--	140.4	--	0.69	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-005	High	Arthropods	mixed insects	Zinc	85	524	--	0.16	--	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-004	High	Arthropods	spiders/beetles	Zinc	105	524	--	0.20	--	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-008	High	Arthropods	spiders/beetles	Zinc	83	524	--	0.16	--	Pass
Wetlands Beach	WMU Ditch - 15' South	DSC-002	High	Arthropods	spiders/beetles/beach hoppers	Zinc	115	--	24	--	**5**	Fail
Wetlands Beach	WMU Ditch - 15' South	DSC-003	High	Arthropods	spiders/cricket	Zinc	96	524	--	0.18	--	Pass

Notes:

-- benchmark not available

Fail = concentration exceeds the tissue benchmarks; therefore, this analyte was considered to pose potential risk.

HQ = hazard quotient

LOEC = lowest observed effect concentration

mg/kg = milligrams per kilogram

NOEC = no observed effect concentration

Pass = concentration was less than the tissue benchmarks; therefore, there are no risks to the terrestrial invertebrate community and no further evaluation was necessary

Shading indicates exceedances of the tissue-based benchmarks.

TABLE 5-6

Weight-of-Evidence Summary for Risks to the Terrestrial Plant Community

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Risk Result and COPEC Risk Driver by Line of Evidence[a]			
Area	**Subarea**	**Depth**	**Single-chemical Toxicity Data**	**Tissue-based Toxicity Data**	**Explanation**	**Weight-of-Evidence**
NCL - East	McWane - 5' South	0-6 in	(Al), (Cr), Cu, Mn		Multiple analytes in soil across multiple subareas exceeded literature-based benchmarks for terrestrial plants. In all subareas of NCL - East, the number of analytes of potential risk to plants decreased with depth and in many cases no risks to plants were observed at depth. There was also a decreasing number of risk drivers with stepout distance from the WMU. Due to very low bioavailability at higher pH ranges, EPA (2003b) indicates that aluminum is only considered to be a contaminant of concern at sites with pH values less than 5.5. The pH in this area ranged between 7.6 and 8.0. The plant soil benchmark for chromium (1 mg/kg) is based on a highly available form of chromium. Risk conclusions based on this value are generally considered to have high uncertainty because most background values (including those at this and other sites) exceed this benchmark. Mean chromium concentrations, except at NCL - East (< 8' Elev), were less than two times background. Within NCL - East (< 8' Elev), chromium was about ten times greater than background at the 1st stepout, but decreased to less than two times background by the 3rd and 4th stepouts.	Although aluminum concentrations in many areas of the site exceeded both the plant benchmark and background UTL, the pH of the soils at the site (range of 7.6 to 8.2) are greater than 5.5; therefore, aluminum is not considered a contaminant of concern due to very low bioavailability (EPA 2003b). Risks to the terrestrial plant community from exposure to aluminum are not predicted. Although mercury concentrations at the Hueneme Parcel exceeded the plant benchmark, these elevated concentrations are not considered to be site-related and therefore, risks to the terrestrial plant community are not site-related. Given the uncertainty associated with the plant benchmark for chromium and low exceedance of the chromium background UTL across many subareas, chromium is likely only a risk at the first two WMU stepouts in NCL - East (< 8' Elev), Hueneme Parcel, and WMU Ditch to the 15' South stepout. In all but two subareas (NCL - Pond, and Hueneme Parcel), the number of analytes of potential risk to plants decreased with depth and in many cases no risks to plants were observed at depth. The number of risk drivers was also observed to decrease with stepout distance to the east of the Waste Management Unit, and with distance to the south of the WMU Ditch, particularly by the 30- and 50-foot stepouts. Therefore, the weight-of-evidence is that there are no risks to the terrestrial plant community in the NCL - Background, NCL - North, Beach - Background, Beach - Breach, Breach Background, Wetland - East, and Wetland - West subareas. In all other subareas, multiple analytes are a potential risk to the plant community, though these risks tend to decrease with soil depth and with distance to the east of the Waste Management Unit and to the South of the WMU Ditch. Risks from barium, copper, manganese, selenium, vanadium, and zinc were widespread, whereas risks from antimony, chromium, and nickel were limited to certain subareas.
		2 ft	No Risk			
NCL - East	McWane - Center	0-6 in	(Cr), Cu, Se			
		2 ft	No Risk			
NCL - East	NCL - East (< 8' Elev)	0-6 in	(Al), Ba, Cr, Cu, Mn, Ni, Se, V, Zn			
		2 ft	Cr, V			
	• WMU - 1st Stepout	0-6 in	(Al), Sb, Ba, Cr, Cu, Pb, Mn, Ni, Se, V, Zn			
		2 ft	(Al), Cr, Se, V			
	• WMU - 2nd Stepout	0-6 in	(Al), Cr, Cu, Se, V, Zn			
		2 ft	No Risk			
	• WMU - 3rd Stepout	0-6 in	(Al), (Cr), Cu, Se, V			
		2 ft	(Al), (Cr), Mn, V			
	• WMU - 4th Stepout	0-6 in	(Cr), Se, V			
		2 ft	No Risk			
NCL - East	NCL - East (> 8' Elev)	0-6 in	(Cr), Cu, Se, Zn			
		2 ft	No Risk			
NCL - North	NCL - Background	0-6 in	No Risk		Multiple analytes in soil at NCL - Ditch and NCL - Pond exceeded plant benchmarks. The pH in this area ranged between 8.0 and 8.2. Mean chromium at NCL - Background and NCL - North are less than the background UTL. Those at the other two subareas are less than two times background.	
NCL - North	NCL - Ditch	0-6 in	(Cr), Cu, Pb, Se, V, Zn			
NCL - North	NCL - North	0-6 in	No Risk			
		2 ft	No Risk			
NCL - North	NCL - Pond	0-6 in	(Al), (Cr), Se, V, Zn			
		2 ft	(Al), (Cr), Mn, Se, V			
Wetlands Beach	Beach - Background	0-6 in	No Risk		No risks to plants were observed in background areas, Beach-Breach, Wetland - East, and Wetland - West based on measured soil concentrations. Multiple analytes across multiple subareas exceeded plant benchmarks. In all subareas but the Hueneme Parcel, the number of analytes of potential risk to plants decreased or was not present with depth. A decreasing number of risk drivers with stepout distance to the south of the WMU Ditch was also generally observed. The one exception was the 15' South stepout, which had the same number of risk drivers as WMU Ditch. However, concentrations of all of the risk drivers, except vanadium, were lower at WMU Ditch - 15' South than at WMU Ditch. The pH in this area ranged between 7.6 to 7.9. Mean chromium at Beach - Background, Beach - Breach, Breach - Background, Wetland - East, and Wetland - West are less than the background UTL. Those at the other subareas, except the Hueneme Parcel and WMU Ditch out to the 15' South stepout are less than two times background. Mercury exceeded plant benchmarks at Beach-Breach, Hueneme Parcel, and WMU Ditch and all stepouts south of the WMU Ditch; however, as previously indicated elevated mercury at onsite locations is not site-related (i.e., not from the Halaco process waste).	
Wetlands Beach	Beach - Breach	2 to 6	No Risk			
Wetlands Beach	Breach - Background	0-6 in	No Risk			
Wetlands Beach	Hueneme Parcel	0-6 in	Cr, (Hg), Se, Zn			
		2 ft	Cr, (Hg), Se, V, Zn			
		2 to 6	Cr, V			
Wetlands Beach	Wetland - East	0-6 in	No Risk			
		2 ft	No Risk			
Wetlands Beach	Wetland - West	0-6 in	No Risk			
		2 ft	No Risk			
Wetlands Beach	WMU Ditch	0-6 in	(Al), Ba, Cr, Cu, Pb, Mn, Ni, Se, V, Zn			
		2 ft	No Risk			
		2 to 6	No Risk			
Wetlands Beach	WMU Ditch - 05' South	0-6 in	(Al), Ba, Cr, Cu, Pb, Mn, Ni, Se, Zn			
		2 ft	Cu, Zn			
Wetlands Beach	WMU Ditch - 15' South	0-6 in	(Al), Ba, Cr, Cu, Pb, Mn, Ni, Se, V, Zn			
		2 ft	V			
Wetlands Beach	WMU Ditch - 30' South	0-6 in	(Cr), Cu, V, Zn			
		2 ft	V			
Wetlands Beach	WMU Ditch - 50' South	0-6 in	(Cr), Cu, V			
		2 ft	Se, V			

Notes:

EPA = U.S. Environmental Protection Agency

No Risk = mean concentrations of all analytes do not exceed plant community benchmarks or are less than the background UTL

mg/kg = milligram per kilograms

UTL = upper tolerance limit

[a] Results are listed for each line of evidence, and risk drivers are listed on the basis of the weight-of-evidence analysis/summary.

Analytes in parenthesis are not considered risk drivers as discussed in the "Explanation" and "Weight-of-Evidence" columns.

Shading indicates a lack of line-of-evidence data within an area.

TABLE 5-7

Weight-of-Evidence Summary for Risks to the Terrestrial Invertebrate Community

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Risk Result and COPEC Risk Driver by Line of Evidence[a]			
Area	**Subarea**	**Depth**	**Single-chemical Toxicity Data**	**Tissue-based Toxicity Data**	**Explanation**	**Weight-of-Evidence**
NCL - East	McWane - 5' South	0-6 in	(Cr), Cu, Zn		Mean values of multiple analytes in soil across multiple subareas exceeded literature-based benchmarks for terrestrial invertebrates. In all subareas of NCL - East, the number of analytes of potential risk to invertebrates decreased with depth and in many cases no risks to invertebrates were observed at depth. There was also a decreasing number of risk drivers with stepout distance from the WMU. The invertebrate soil benchmark for chromium (0.4 mg/kg) is based on a highly available form of chromium. Risk conclusions based on this value are generally considered to have high uncertainty because most background values (including those at this and other sites) exceed this benchmark. Mean chromium at all subareas in this area, except NCL - East (< 8' Elev) were less than two times background. Within NCL - East (< 8' Elev), chromium was about ten times greater than background at the 1st stepout, but rapidly decreased to less than two times background by the 3rd and 4th stepouts. Invertebrate tissue data were available for NCL - East (> 8' Elev). Concentrations of zinc in in one arthropod (beach hoppers, sow bugs, beetles) sample from this area exceeded the tissue benchmark.	Although mercury concentrations at several locations in NCL-North and Wetlands Beach subareas exceeded the soil invertebrate benchmark, these elevated concentrations are not considered to be site-related and therefore, risks to the soil invertebrate community are not site-related. Given the uncertainty associated with the invertebrate benchmark for chromium and low exceedance of the chromium background UTL across many subareas, chromium is likely only a risk at the first two WMU stepouts in NCL - East (< 8' Elev), Hueneme Parcel, and WMU Ditch to the 15' South stepout. Chromium risks in the WMU Ditch - 15' South subarea are supported by the invertebrate tissue data in which chromium was observed to be a risk in the mixed invertebrate sample. Risks to terrestrial invertebrates from zinc in NCL-East (> 8' Elev) were based on exceedances in arthropod tissue; however, zinc concentrations in soil did not exceed soil invertebrate benchmarks in this area. Risks to terrestrial invertebrates from zinc in the NCL - Background and NCL - North subareas and zinc and copper in the Wetland - East subarea were based on exceedances in mollusc tissue collected from these subareas. However, literature-based toxicity data for molluscs was not available and data for other types of terrestrial invertebrates were used as a surrogate. Because no risks were predicted in these areas based on screening of the soils, it is likely that the surrogate data over-estimate risks to molluscs. Therefore, these predicted tissue-based risks were considered uncertain and given less weight than the media-based risk estimates. In all but two subareas (Hueneme Parcel and Wetland - West), the number of analytes of potential risk to invertebrates decreased with depth and in many cases no risks to soil invertebrates were observed at depth. The number of risk drivers was also observed to decrease with stepout distance to the east of the Waste Management Unit, and with distance to the south of the WMU Ditch, particularly by the 30- and 50-foot stepouts. Media-based risks from chromium, copper, and zinc predicted in WMU Ditch - 15' South were supported by the tissue-based risks for terrestrial invertebrates in this subarea.
		2 ft	No Risk			
NCL - East	McWane - Center	0-6 in	(Cr), Cu, Zn			
		2 ft	No Risk			
NCL - East	NCL - East (< 8' Elev)	0-6 in	Ba, Cr, Cu, Mn, Zn			
		2 ft	Cr			
	• WMU - 1st Stepout	0-6 in	Ba, Cr, Cu, Mn, Zn			
		2 ft	Cr			
	• WMU - 2nd Stepout	0-6 in	Cr, Cu, Se, Zn			
		2 ft	No Risk			
	• WMU - 3rd Stepout	0-6 in	(Cr), Cu			
		2 ft	(Cr)			
	• WMU - 4th Stepout	0-6 in	(Cr)			
		2 ft	No Risk			
NCL - East	NCL - East (> 8' Elev)	0-6 in	(Cr)	Zn - arthropods		
		2 ft	No Risk			
NCL - North	NCL - Background	0-6 in	No Risk	(Zn) - snails	Multiple analytes at NCL - Ditch and NCL - Pond exceeded invertebrate benchmarks. Mean chromium at NCL - Background and NCL - North are less than the background UTL. Those at the other two subareas are less than two times background. Mercury exceeded soil invertebrate benchmarks at NCL-Pond; however, elevated mercury at onsite locations is not site-related (i.e., not from the Halaco process waste). Invertebrate tissue data were available for the NCL-Background and NCL-North subareas. Risks to snails from zinc were predicted. However, it should be noted that zinc toxicity data were not available for any mollusc species and data for the test species *Daphnia magna* were used as a surrogate (lowest LOEC of the developed benchmarks for zinc). This may over- or under-estimate risks to molluscs from zinc.	
NCL - North	NCL - Ditch	0-6 in	(Cr), Cu, Zn			
NCL - North	NCL - North	0-6 in	No Risk	(Zn) - snails		
		2 ft	No Risk			
NCL - North	NCL - Pond	0-6 in	Ba, (Cr), (Hg), Zn			
		2 ft	(Cr), (Hg)			

TABLE 5-7

Weight-of-Evidence Summary for Risks to the Terrestrial Invertebrate Community

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Risk Result and COPEC Risk Driver by Line of Evidence[a]			
Area	**Subarea**	**Depth**	**Single-chemical Toxicity Data**	**Tissue-based Toxicity Data**	**Explanation**	**Weight-of-Evidence**
Wetlands Beach	Beach - Background	0-6 in	No Risk		No risks to invertebrates were observed at background areas and Wetland - East based on measured soil concentrations. Multiple analytes across multiple subareas exceeded invertebrate benchmarks. The number of analytes of potential risk to invertebrates generally decreased with depth. A decreasing number of risk drivers with stepout distance to the south of the WMU Ditch was also generally observed beginning with the 30' South stepout. Mean chromium at Beach - Background, Beach - Breach, Breach - Background, Wetland - East, and Wetland - West are less than the background UTL. Those at the other subareas, except the Hueneme Parcel and WMU Ditch out to the 15' South stepout are less than two times background. Mercury exceeded plant benchmarks at Beach-Breach, Hueneme Parcel, and WMU Ditch and all stepouts south of the WMU Ditch; however, as previously indicated elevated mercury at onsite locations is not site-related (i.e., not from the Halaco process waste). Invertebrate tissue data were available for Wetland - East, Wetland - West and WMU Ditch - 15' South. Risks to terrestrial insects were not observed at Wetland - West. Copper and zinc tissue concentrations in snails were determined to be a risk in the Wetland - East subarea; however, these risks are uncertain because mollusc toxicity data were not available for copper or zinc (as was previously discussed for zinc; see Table 4-2). Chromium, copper, and zinc exceedances in whole-body terrestrial invertebrate tissue collected at WMU Ditch - 15' South are consistent with risks predicted from soil concentrations in surface soils in this subarea.	Therefore, the weight-of-evidence is that there are no risks to the terrestrial invertebrate community in the Beach - Background and Breach Background subareas. Although tissue-based risks from zinc, or zinc and copper were predicted at NCL - Background, NCL - North, and Wetland - East, uncertainty associated with the surrogate species toxicity data indicate that more weight should be given to the media-based risk results in which no risks were observed at these three subareas. Tissue-based risks from zinc were predicted in NCL-East (>8' Elev), though these results were not supported by the media-based risk estimates which showed no risk in this subarea. In all other subareas, multiple analytes are a potential risk to the terrestrial invertebrate community, though these risks tend to decrease with soil depth and with distance to the east of the Waste Management Unit and to the South of the WMU Ditch. Risks from barium, copper, manganese, and zinc were widespread, whereas risks from chromium and selenium were limited to certain subareas.
Wetlands Beach	Beach - Breach	2 to 6	(Hg)			
Wetlands Beach	Breach - Background	0-6 in	No Risk			
Wetlands Beach	Hueneme Parcel	0-6 in	Cr, (Hg), Zn			
		2 ft	Cr, (Hg), Zn			
		2 to 6	Cr			
Wetlands Beach	Wetland - East	0-6 in	No Risk	Cu, (Zn) - snails		
		2 ft	No Risk			
Wetlands Beach	Wetland - West	0-6 in	No Risk	No Risk		
		2 ft	(Hg)			
Wetlands Beach	WMU Ditch	0-6 in	Ba, Cr, Cu, Mn, (Hg), Zn			
		2 ft	No Risk			
		2 to 6	No Risk			
Wetlands Beach	WMU Ditch - 05' South	0-6 in	Ba, Cr, Cu, Mn, (Hg), Zn			
		2 ft	Cu, (Hg), Zn			
Wetlands Beach	WMU Ditch - 15' South	0-6 in	Ba, Cr, Cu, Mn, (Hg), Zn	Cr - mixed insects		
		2 ft	(Hg)	Cu, Zn - spiders/		
Wetlands Beach	WMU Ditch - 30' South	0-6 in	(Cr), Cu, (Hg), Zn			
		2 ft	(Hg)			
Wetlands Beach	WMU Ditch - 50' South	0-6 in	(Cr), Cu, (Hg)			
		2 ft	(Hg)			

Notes:

EPA = U.S. Environmental Protection Agency

mg/kg = milligrams per kilogram

No Risk = mean concentrations of all analytes do not exceed invertebrate community benchmarks or are less than the background UTL

UTL = upper tolerance limit

[a] Results are listed for each line of evidence, and risk drivers are listed on the basis of the weight-of-evidence analysis/summary.

Analytes in parenthesis are not considered risk drivers as discussed in the "Explanation" and "Weight-of-Evidence" columns.

Shading indicates a lack of line-of-evidence data within an area.

TABLE 6-1
Exposure Parameters for Wildlife Receptors
Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Exposure Factors									Feeding Habits and Foraging Range												
	Body Weight			Ingestion Rate - Food Dry Wt.			Ingestion Rate - Water			Biotic Dietary Items (% Diet)					Abiotic Media Ingestion (% diet)				Foraging Range			
Species	Mean (kg)	Notes	Reference	Mean (kg/kg BW-d)	Notes	Reference	L/kg bw -d	Notes	Reference	Plants	Terrestrial Invertebrates	Aquatic Invertebrates	Fish	Reference	Soil	Sediment	Notes	Reference	Hectares (Acres)	Other	Reference	Notes
Birds																						
California Least Tern	Both: 0.0398	Values for birds from coastal California	Thompson et al. 1997	0.22	Estimated using allometric estimation for charadriiforms and a body weight of 0.0398 kg.	Nagy 2001	0.17	Estimated using allometric equation for birds and a body weight of 0.0398 kg	Calder and Braun 1983	0	0	0	100	Thompson et al. 1997	--	0	As a piscivore, soil ingestion is assumed to be negligible.			1.2 km	Thompson et al. 1997	75% of terns foraging in Southern California
Western Snowy Plover	Range 0.034 - 0.058 kg Mean = 0.046		USFWS 2001	0.22	Estimated using allometric estimation for charadriiforms and a body weight of 0.046 kg.	Nagy 2001	0.16	Estimated using allometric equation for birds and a body weight of 0.046 kg	Calder and Braun 1983	0	0	100	0	USFWS 2001	--	16.5	Data not available for snowy plover. Value represents mean for five other charadriiform birds.	Beyer et al. 1994		up to 7 km	Page et al. 1995	Adults with broods nesting in Monterey Bay, CA
Belding's Savannah Sparrow	0.0187	Data from San Diego, CA	Wheelwright and Rising 1993	0.25	Estimated using allometric estimation for passerines and a body weight of 0.0187 kg.	Nagy 2001	0.22	Estimated using allometric equation for birds and a body weight of 0.0187 kg	Calder and Braun 1983	50	*	50		Wheelwright and Rising 1993	*	2	Wheelright and Rising (1993) report that foraging is primarily by gleaning. Minimum soil ingestion assumed.	Adapted from Beyer et al. 1994	< 1 (<2.5)		Wheelwright and Rising 1993	good habitat
Mammals																						
Ornate Shrew (Mammalian Terrestrial Insectivore)	Male: 0.0052 Female: 0.0048 Mean: 0.005	Values reported for California	Silva and Downing 1995	0.26	Estimated using allometric equation for mammals and the mean body weight of 0.005 kg.	Nagy 2001	0.17	Estimated using allometric equation for mammals and a body weight of 0.005 kg	Calder and Braun 1983	--	100	--		Harris 1990	3		Data not available for ornate shrew. Assumed to be similar to short-tailed shrew. This is the 90th percentile value.	EPA 2007a (EcoSSLs)	--	--		no data available, but likely less than 1 ha based on data for other shrews (e.g., dusky shrew home range in Southern California ranges between 0.12 and 0.6 ha; Smith and Belk 1996)
California Vole (Mammalian Terrestrial Herbivore)	Male (breeding): 0.04-0.06 Male: (non-breeding): 0.03-0.05 Female (breeding): 0.04-0.05 Female (non-breeding) 0.03-0.04 Mean: 0.043		Cockburn and Lidicker (1983) in Cal Ecotox Database	0.206 (6SE) fed rabbit pellets 0.254 (8SE) fed bromegrass 0.157 (5SE) fed ryegr. Seed Mean: 0.206		Batzli and Cole 1979 in Cal Ecotox Database	0.14	Estimated using allometric equation for mammals and a body weight of 0.043 kg	Calder and Braun 1983	100	--	--		Batzli and Pitelka 1971 in Cal Ecotox Database	2.4		Data not available for California vola. Assumed to be similar to meadow vole.	Adapted from Beyer et al. 1994	0.007-0.023 (0.02-0.06)	68-231 m^2	Heske 1987 Ostfeld 1986 in Cal Ecotox Database	

Notes:
*For this BERA, sparrows were assumed to forage in both upland and marsh habitats. For upland exposure estimates, a diet of 50 percent terrestrial invertebrates (45 percent arthropods and 5 percent terrestrial snails) and 50 percent plants was used.
For marsh exposure estimates, a diet of 50 percent aquatic invertebrates and 50 percent marsh plants was used. A soil/sediment ingestion rate of 2 percent of diet was applied to both habitats.

TABLE 6-2

Summary of Bioaccumulation Models for Uptake from Sediment to Benthic Invertebrates

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Regression Models[a]				Bioaccumulation Factors			
Analyte	**B0**	**B1**	**Source**	**Notes**	**BAF**	**Source**	**Notes**	**Surrogate (Yes/No)[b]**
Aluminum					0.011	Site-specific	Median	No
Antimony					1	EPA 2007a	Assumed earthworm conc = soil conc as per EPA 2007a (Table 4a)	Yes
Arsenic					0.373	Bechtel Jacobs 1998b	Median (Dep.) from Table 2	No
Barium					0.086	Site-specific	Median	No
Beryllium					0.194	Site-specific	Median	No
Boron					1	Default Value		No
Cadmium					0.459	Bechtel Jacobs 1998b	Median (Dep.) from Table 2	No
Calcium					1.22	Site-specific	Median	No
Chromium					0.057	Site-specific	Median	No
Cobalt					0.122	Sample et al. 1998	Median; as was used in EPA 2007a	Yes
Copper					0.105	Site-specific	Median	No
Cyanide					1	Default Value		No
Iron					0.03	Site-specific	Median	No
Lead					0.084	Site-specific	Median	No
Magnesium					0.181	Site-specific	Median	No
Manganese					0.328	Site-specific	Median	No
Mercury					2.837	Bechtel Jacobs 1998b	Median (Dep.) from Table 2	No
Molybdenum					0.953	Sample et al. 1998	Median - Table C.1 ORR Ufs	Yes
Nickel					0.139	Site-specific	Median	No
Potassium					2.42	Site-specific	Median	No
Selenium					3.607	Site-specific	Median	No
Silver					2.045	Sample et al. 1998	Median; as was used in EPA 2007a	Yes
Sodium					2.304	Site-specific	Median	No
Strontium					1	Default Value		No
Thallium					0.0541	USACHPPM 2004	Median - Table 4-5 (Insecta)	Yes
Vanadium					0.056	Site-specific	Median	No
Zinc					0.842	Site-specific	Median	No
p,p'-DDE	**2.4771**	**0.8804**	EPA 2007a					Yes

Notes:

Bold indicates regression or BAF selected for use in the wildlife exposure calculation

[a] Regression models are in the form of LN (invertebrate concentration) = B0 + B1(LN (sediment concentration))

[b] BAFs developed for terrestrial invertebrates were used as surrogates for analytes that lacked aquatic invertebrate BAFs

BAF data for benthic invertebrates considered to represent all aquatic invertebrates

BAF = bioaccumulation factor

DDE = dichlorodiphenyldichloroethene

EPA = U.S. Environmental Protection Agency

USACHPPM = U.S. Army Center for Health Promotion and Preventive Medicine

TABLE 6-3

Summary of Bioaccumulation Models for Uptake from Soil to Plants

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Regression Models [a]				Bioaccumulation Factors		
Analyte	**B0**	**B1**	**Source**	**Notes**	**Plant BAF**	**Source**	**Notes**
Aluminum					**0.00287**	Bechtel-Jacobs 1998a	Median - Table D-1 validation data
Antimony	**-3.233**	**0.938**	EPA 2007a	Derived from measured data in Appendix A	0.0102	Bechtel-Jacobs 1998a	Median - Table D-1 validation data
Arsenic	-1.992	0.564	Bechtel Jacobs 1998a	Single variable regression	**0.0375**	Bechtel-Jacobs 1998a	Median as used in EPA 2007a
Barium					**0.156**	Bechtel-Jacobs 1998a	Median as used in EPA 2007a
Beryllium	**-0.5361**	**0.7345**	EPA 2007a	Derived from measured data in Appendix A			
Boron					**5.7143**	USACHPPM 2004	Median - Table 4-6 leaf tissue
Cadmium	**-0.476**	**0.546**	Bechtel Jacobs 1998a	Cited in EPA 2007a (Table 4a)	0.3538	USACHPPM 2004	Median - Table 4-6 leaf tissue
Calcium					**1.1850**	Bechtel-Jacobs 1998a	Median - Table D-1 validation data
Chromium					**0.041**	Bechtel-Jacobs 1998a	Median as used in EPA 2007a
Cobalt					**0.0075**	Bechtel-Jacobs 1998a	Median as used in EPA 2007a
Copper	**0.669**	**0.394**	Bechtel Jacobs 1998a	Cited in EPA 2007a (Table 4a)	0.2745	USACHPPM 2004	Median - Table 4-6 leaf tissue
Cyanide					**1**	Default	
Iron					**0.00425**	Bechtel-Jacobs 1998a	Median - Table D-1 validation data
Lead	**-1.328**	**0.561**		Cited in EPA 2007a (Table 4a)	0.05129	USACHPPM 2004	Median - Table 4-6 leaf tissue
Magnesium					**0.81**	Bechtel-Jacobs 1998a	Median - Table D-1 validation data
Manganese					**0.079**	Bechtel-Jacobs 1998a	Median as used in EPA 2007a
Mercury	**-0.996**	**0.544**	Bechtel Jacobs 1998a	Single variable regression			
Molybdenum					**1.25035**	USACHPPM 2004	Median - Table 4-6 leaf tissue
Nickel	**-2.224**	**0.748**	Bechtel Jacobs 1998a	Cited in EPA 2007a (Table 4a)	0.667	USACHPPM 2004	Median - Table 4-6 leaf tissue
Potassium					**5.5900**	Bechtel-Jacobs 1998a	Median - Table D-1 validation data
Selenium	**-0.678**	**1.104**	Bechtel Jacobs 1998a	Cited in EPA 2007a (Table 4a)	0.58049	USACHPPM 2004	Median - Table 4-6 leaf tissue
Silver					**0.014**	Bechtel-Jacobs 1998a	Median - Table D-1 validation data
Sodium					**0.1920**	Bechtel-Jacobs 1998a	Median - Table D-1 validation data
Thallium					**0.004**	ORNL RAIS 2005	
Vanadium					**0.00485**	Bechtel-Jacobs 1998a	Median - Table D-1 validation data
Zinc	**1.575**	**0.555**	Bechtel Jacobs 1998a	Cited in EPA 2007a (Table 4a)	0.33513	USACHPPM 2004	Median - Table 4-6 leaf tissue

Notes:

[a] Regression models are in the form of LN(plant concentration) = B0 + B1(LN (soil concentration))

BAF = bioaccumulation factor

EPA = U.S. Environmental Protection Agency

USACHPPM = U.S. Army Center for Health Promotion and Preventive Medicine

TABLE 6-4

Summary of Bioaccumulation Models for Uptake from Soil to Terrestrial Invertebrates - Arthropods

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Regression Models[a]				Bioaccumulation Factors		
Analyte	**B0**	**B1**	**Invertebrate Regression Reference**	**Notes**	**Invertebrate BAF**	**Source**	**Notes**
Aluminum					0.308	Site-specific	Median
Antimony					1	EPA 2007a	Assumed earthworm conc = soil conc as per EPA 2007a (Table 4a)
Arsenic					0.06146	USACHPPM 2004	Median - Table 4-5 (Insecta)
Barium					1.148	Site-specific	Median
Beryllium					0.045	Sample et al. 1998	Median; as was used in EPA 2007a
Boron					1	Default	
Cadmium					3.371	Site-specific	Median
Calcium					7.288	Site-specific	Median
Chromium					0.44	Site-specific	Median
Cobalt					0.122	Sample et al. 1998	Median; as was used in EPA 2007a
Copper					2.113	Site-specific	Median
Cyanide					1	Default	
Iron					0.28	Site-specific	Median
Lead					0.613	Site-specific	Median
Magnesium					1.34	Site-specific	Median
Manganese					0.361	Site-specific	Median
Mercury					2.25	Site-specific	Median
Molybdenum					0.953	Sample et al. 1998	Median - Table C.1 ORR UFs
Nickel					1.189	Site-specific	Median
Potassium					9.789	Site-specific	Median
Selenium	-0.075	0.733	Sample et al. 1998	Sample et al. 1999 cited in EPA 2007a (Table 4a)			
Silver					2.045	Sample et al. 1998	Median; as was used in EPA 2007a
Sodium					13.271	Site-specific	Median
Thallium					0.0541	USACHPPM 2004	Median - Table 4-5 (Insecta)
Vanadium					0.187	Site-specific	Median
Zinc					1.195	Site-specific	Median

Notes:

[a] Regression models are in the form of LN(invertebrate concentration) = B0 + B1(LN (soil concentration))

BAF = bioaccumulation factor

EPA = U.S. Environmental Protection Agency

USACHPPM = U.S. Army Center for Health Promotion and Preventive Medicine

TABLE 6-5

Summary of Bioaccumulation Models for Uptake from Soil to Terrestrial Invertebrates - Molluscs

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Regression Models[a]				Bioaccumulation Factors		
Analyte	**B0**	**B1**	**Invertebrate Regression Reference**	**Notes**	**Invertebrate BAF**	**Source**	**Notes**
Aluminum					0.219	Site-specific	Median
Antimony					1	EPA 2007a	Assumed earthworm conc = soil conc as per EPA 2007a (Table 4a)
Arsenic					0.31429	USACHPPM 2004	Median - Table 4-5 (Mollusca)
Barium					2.84	Site-specific	Median
Beryllium					0.045	Sample et al. 1998	Median; as was used in EPA 2007a
Boron					1	Default	
Cadmium					6.837	Site-specific	Median
Calcium					3.635	Site-specific	Median
Chromium					0.44	Site-specific	Median
Cobalt					0.122	Sample et al. 1998	Median; as was used in EPA 2007a
Copper					7.681	Site-specific	Median
Cyanide					1	Default	
Iron					0.143	Site-specific	Median
Lead					0.5	Site-specific	Median
Magnesium					1.259	Site-specific	Median
Manganese					0.421	Site-specific	Median
Mercury					2.25	Site-specific	Median
Molybdenum					0.953	Sample et al. 1998	Median - Table C.1 ORR UFs
Nickel					1.189	Site-specific	Median
Potassium					2.145	Site-specific	Median
Selenium	**-0.075**	**0.733**	Sample et al. 1998	Sample et al. 1999 cited in EPA 2007a (Table 4a)			
Silver					2.045	Sample et al. 1998	Median; as was used in EPA 2007a
Sodium					27.831	Site-specific	Median
Thallium					0.0541	USACHPPM 2004	Median - Table 4-5 (Insecta)
Vanadium					0.317	Site-specific	Median
Zinc					3.122	Site-specific	Median

Notes:

[a] Regression models are in the form of LN(invertebrate concentration) = B0 + B1(LN (soil concentration))

BAF = bioaccumulation factor

EPA = U.S. Environmental Protection Agency

USACHPPM = U.S. Army Center for Health Promotion and Preventive Medicine

TABLE 6-6
Toxicity Reference Values for Birds and Mammals
Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied[a]	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source[a]	Notes
Birds														
Aluminum	Al2(SO4)3	Carriere et al. 1986	Ringed dove	0.155	4 months	oral in diet	reproduction				**109.7**	NA	Sample et al. 1996	
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Arsenic	Sodium arsenate	Stanley et al. 1994	Mallard	1	>10 weeks	oral in diet	reproduction				**9.3**	**40.3**		
Barium	Barium hydroxide	Johnson et al. 1960	1-day old chicks	0.121	4 weeks	oral in diet	mortality		0.1	acute-chronic	**20.8**	**41.7**	Sample et al. 1996	
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Boron	Boric acid	Smith and Anders 1989	Mallard	1	3 weeks pre-, during, and 3 weeks post-reproduction	oral in diet	reproduction	egg fertility, duckling growth, embryo and duckling mortality			**28.8**	**100**	Sample et al. 1996	
Cadmium	Multiple forms	*Multiple studies	Multiple species								**1.47**	---	EPA 2005e	Geometric mean of NOAELs for reproduction and growth
Cadmium	Cadmium sulfate	*Leach et al. 1979	Chicken	1.6	12 weeks during egg laying	oral in diet	reproduction	egg production, progeny count			0.593	**2.37**	EPA 2005e	Lowest bounded reproductive LOAEL above the geometric mean NOAEL from EPA (2005e)
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Chromium (3+)	Multiple forms	*Multiple studies	Chicken				reproduction and growth				**2.66**	---	EPA 2008	Geometric mean of NOAELs for reproduction and growth
Chromium (3+)	Chrome alum doceahydrate	*Haseltine et al. 1985 (unpublished)	Black duck	1.17	180-190 days	oral in diet	reproduction	reproductive success			0.569	**2.78**	EPA 2008	Lowest bounded reproductive LOAEL above the geometric mean NOAEL from EPA (2008)
Cobalt	Multiple forms	*Multiple studies	Multiple species				growth	body weight			**7.61**		EPA 2005f	Geometric mean of NOAELs for reproduction and growth
Cobalt	Cobalt chloride	*Hill 1979	Chicken	0.328	5 weeks	oral in diet	growth	body weight			3.89	**7.8**	EPA 2005f	Lowest bounded reproductive LOAEL above the geometric mean NOAEL from EPA (2005f)
Copper	Copper	*al Ankari et al. 1998	Chicken	1.5161	84 days during egg laying	oral in diet	reproduction	eggs per nest			**4.05**	**12.1**	EPA 2007b	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Lead	Lead acetate	*Edens and Garlich 1983	Chicken	1.81	4 weeks during egg laying	oral in diet	reproduction	progeny count			**1.63**	**3.26**	EPA 2005g	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Manganese	Multiple forms	*Multiple studies	Multiple species				reproduction and growth				**179**	---	EPA 2007c	Geometric mean of NOAELs for reproduction and growth
Manganese	Manganese chloride tetrahydrate	*Southern and Baker 1983	Chicken	0.316	14 days	oral in diet	growth	body weight			261	**348**	EPA 2007c	Lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EPA (2007c)
Mercury	Methyl mercury	Heinz and Hoffman 1998; Heinz 1976	Mallard	1	2.5 months to two generations	oral in diet	reproduction				**0.068**	**0.37**		
Molybdenum	Sodium molybdate	Lepore and Miller 1965	Chicken	1.5	21 days through reproduction	oral in diet	reproduction	embryonic viability	0.1	LOAEL-NOAEL	**3.53**	**35.3**	Sample et al. 1996	
Nickel	Multiple forms	*Multiple studies	Multiple species				reproduction and growth				**6.71**	---	EPA 2007d	Geometric mean of reproduction and growth studies
Nickel	Nickel chloride hexahydrate	*Martinez and Diaz 1996	Chicken	1.8901	42 days	oral in diet	growth	body weight			5.76	**11.5**	EPA 2007d	Lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EPA (2007d)
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Selenium	Sodium selenite	*El-Begearmi and Combs 1982	Chicken	0.328	2 weeks	oral in diet	survival	mortality			**0.29**	**0.579**	EPA 2007e	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Silver	Silver acetate	*Jensen et al. 1974	Turkey	0.662	5 weeks	oral in diet		growth	0.1	LOAEL-NOAEL	**2.02**	**20.2**	EPA 2006	Lowest growth, reproduction, or survival LOAEL, with NOAEL estimated by application of UF
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

TABLE 6-6
Toxicity Reference Values for Birds and Mammals
Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied[a]	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source[a]	Notes
Vanadium	Sodium metavanadate	*Hill 1979	Chicken	1.042	5 weeks	oral in diet	growth	body weight			**0.344**	**0.688**	EPA 2005h	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Zinc	Multiple forms	*Multiple studies	Multiple species				reproduction and growth				**66.1**	---	EPA 2007f	Geometric mean of reproduction and growth studies
Zinc	Zinc acetate	*Gibson et al. 1986	Chicken	2	10 weeks	oral in diet	reproduction	progeny count			57.3	**66.5**	EPA 2007f	Lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EPA (2007f)
Mammals														
Aluminum	AlCl3	Ondreicka et al. 1966	Mouse	0.03	three generations	oral in water	reproduction		0.1	LOAEL-NOAEL	**1.93**	**19.3**	Sample et al. 1996	
Antimony		Rossi et al. 1987	Rat	0.35	31 days		reproduction				**0.059**	**0.59**	EPA 2005a	
Arsenic	Sodium arsenite	*Neiger and Osweiler 1989	Dog	10.1	8 weeks	oral in diet	growth	reduced body weight			**1.04**	**1.66**	EPA 2005b	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Barium	Multiple forms	*Multiple studies	Multiple species								**51.8**		EPA 2005c	Geometric mean of NOAELs for reproduction and growth
Barium	Barium chloride	NTP 1994	Rat	0.35	105 weeks	oral in water	nephrotoxicity	increased kidney weight			45	**75**		Study selected because NOAEL is similar to EcoSSL, study is of long duration, and a LOAEL was identified.
Beryllium	Beryllium sulfate	*Schroeder and Mitchener 1975	Rat	0.486	lifetime	oral in water	longevity				**0.532**	---	EPA 2005d	Same study as Sample et al. 1996, but used different body weight in calculation of NOAEL
Boron	Boric acid or Borax	Weir and Fischer 1972	Rat	0.35	three generations	oral in diet	reproduction	sterility			**28**	**93.6**	Sample et al. 1996	
Cadmium	Cadmium acetate	*Yuhas et al. 1979	Rat	0.43	2 weeks	oral in water	growth	body weight			**0.77**	**7.7**	EPA 2005e	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Chromium (3+)	Multiple forms	*Multiple studies	Multiple species				reproduction and growth				**2.4**	---	EPA 2008	Geometric mean of NOAELs for reproduction and growth
Chromium (3+)	Chromium sulfate	*Zahid et al. 1990	Mouse	0.0249	35 days	oral in diet	reproduction	sperm cell counts	0.1	LOAEL-NOAEL	0.962	**9.62**	EPA 2008	Lowest reproductive LOAEL above the geometric mean NOAEL from EPA (2008)
Cobalt	Multiple forms	*Multiple studies	Multiple species				reproduction and growth				**7.33**	---	EPA 2005f	Geometric mean of NOAELs for reproduction and growth
Cobalt	Cobalt chloride	*Domingo et al. 1985	Rat	0.3	28 days	gavage	reproduction	progeny body weight			5.45	**10.9**	EPA 2005f	Lowest bounded reproductive LOAEL above the geometric mean NOAEL from EPA (2005f)
Copper	Copper sulfate pentahydrate	*Allcroft et al. 1961	pig	100	4 weeks	oral in diet	growth	body weight			**5.6**	**9.34**	EPA 2007b	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Lead	Lead acetate	*Kimmel et al. 1980	Rat	0.3	7 weeks during gestation	oral in water	growth	body weight			**4.7**	**8.9**	EPA 2005g	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Manganese	Multiple forms	*Multiple studies	Multiple species				reproduction and growth				**51.5**	---	EPA 2007c	Geometric mean of NOAELs for reproduction and growth
Manganese	Manganese oxide	*Rehnberg et al. 1980	Rat	0.0566	20 days	gavage	reproduction, growth	reproductive organ histology, body weight			21	**71**	EPA 2007c	Lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EPA (2007c)
Mercury	Methylmercury chloride	Verschuuren et al. 1976	Rat	0.35	three generations	oral in diet	reproduction	pup viability			**0.032**	**0.16**	Sample et al. 1996	

TABLE 6-6
Toxicity Reference Values for Birds and Mammals
Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	Form/Surrogate Analyte	Primary Study	Test Species	Test Species Body Weight (kg)	Duration	Exposure Route	General Effect Endpoint	Specific Effect Endpoint	Uncertainty Factors Applied[a]	Uncertainty Factor Type	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Secondary Source[a]	Notes
Molybdenum	Molybdate (MoO4)	Schroeder and Mitchener 1971	Mouse	0.03	three generations	oral in water	reproduction	reproductive success, number of runts	0.1	LOAEL-NOAEL	**0.26**	**2.6**	Sample et al. 1996	
Nickel	Nickelous chloride	*Pandey and Srivastava 2000	Mouse	0.025	35 days	oral (other)	reproduction	sperm cell counts			**1.7**	**3.4**	EPA 2007d	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Selenium	Sodium selenite	*Mahan and Moxon 1984	pig	17.8	37 days	oral in diet	growth	body weight			**0.143**	**0.215**	EPA 2007e	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Silver	Silver acetate	*Van Vleet 1976	pig	8.86	40 days	oral in diet	growth	body weight	0.1	LOAEL-NOAEL	**6.02**	**60.2**	EPA 2006	Lowest growth, reproduction, or survival LOAEL, with NOAEL estimated by application of UF
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Thallium	Thallium sulfate	Formigli et al. 1986	Rat	0.365	60 days	drinking water	reproduction	sperm motility	0.05 and 0.25	subchronic LOAEL-chronic NOAEL; subchronic LOAEL-chronic LOAEL	**0.015**	**0.075**	Sample et al. 1996; USACHPPM 2007	Study and value selected based on an extensive review of available literature - documented in USACHPPM 2007
Vanadium	Sodium orthovanadate	*Sanchez et al. 1991	Mouse	0.047	12 days during gestation	gavage	reproduction	ODVP			**4.16**	**8.31**	EPA 2005h	Value is highest bounded NOAEL lower than the lowest bounded LOAEL value for reproduction, growth or survival; LOAEL is from same study
Zinc	Various forms	*Multiple studies	Multiple species				reproduction and growth				**75.4**	---	EPA2007f	Geometric mean of NOAELs for reproduction and growth
Zinc	Zinc sulfate	*Miller et al. 1989	cattle	580	14 weeks	oral in diet	reproduction	progeny body weight			37.9	**75.9**	EPA 2007f	Lowest bounded growth or reproductive LOAEL above the geometric mean NOAEL from EPA (2007f)

Notes:
kg = kilogram
mg/kg/d = milligram analyte per kilogram body weight per day
LOAEL = lowest observed adverse effect level
NA = not available
NOAEL = no observed adverse effect level
*Study information and calculated NOAELs and LOAELs for these sources were taken directly from the cited EcoSSL report developed by the EPA. All other primary sources were obtained, reviewed, and TRVs were extracted or developed from the study.
[a] Uncertainty factors were used to adjust all measured effect concentrations to chronic NOAELS and chronic LOAELs as follows:
NOAEL to LOAEL = 0.1
Subchronic to chronic = 0.1
LD50 to chronic = 0.01
subacute to chronic = 0.01
acute to chronic = 0.01
Where:
chronic = >12 weeks or during critical lifestage
subchronic = 4 to 12 weeks
subacute = <4 weeks, multiple doses
acute = only one dose
Bold values were selected as the toxicity reference values.

TABLE 6-7

Exposure Estimates for the Aquatic-Feeding Belding's Savannah Sparrow Based on Maximum Surface Sediment (0-6 inches) Concentrations by Area and Compared to Literature-Based Avian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Plant Uptake				Benthic Invertebrate Uptake				Sediment Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Sediment Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Soil to Plant BAF[a]	Plant Concentration (mg/kg)	Plant Dose (mg/kg-BW/day)	Diet Proportion	Sed to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Sediment Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	NOAEL	LOAEL	NOAEL-Based	LOAEL-Based	Result
Aluminum	NCL - East	159000	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.011	1749	217.73	0.02	791.76	1009.62	109.7	NA	**9.20**	**NA**	Retain
Aluminum	NCL - North	27800	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.011	305.8	38.07	0.02	138.43	176.63	109.7	NA	**1.61**	**NA**	Retain
Aluminum	OID Lagoon	23900	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.011	262.9	32.73	0.02	119.01	151.87	109.7	NA	**1.38**	**NA**	Retain
Aluminum	Wetlands Beach	166000	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.011	1826	227.32	0.02	826.62	1054.06	109.7	NA	**9.61**	**NA**	Retain
Antimony	NCL - East	20.1	0.249	1	0.249	0.5	Regression	0.66	0.1	0.5	1	20.1	2.50	0.02	0.100	2.68	--	--	**--**	**--**	Uncertainty
Antimony	NCL - North	2.2	0.249	1	0.249	0.5	Regression	0.08	0.0	0.5	1	2.2	0.27	0.02	0.011	0.30	--	--	**--**	**--**	Uncertainty
Antimony	OID Lagoon	1.7	0.249	1	0.249	0.5	Regression	0.06	0.0	0.5	1	1.7	0.21	0.02	0.008	0.23	--	--	**--**	**--**	Uncertainty
Antimony	Wetlands Beach	10.4	0.249	1	0.249	0.5	Regression	0.35	0.0	0.5	1	10.4	1.29	0.02	0.052	1.39	--	--	**--**	**--**	Uncertainty
Arsenic	NCL - East	33.7	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.373	12.5701	1.56	0.02	0.168	1.86	9.3	40.3	0.20	0.05	Pass
Arsenic	NCL - North	7.2	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.373	2.6856	0.33	0.02	0.036	0.49	9.3	40.3	0.05	0.01	Pass
Arsenic	OID Lagoon	7.5	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.373	2.7975	0.35	0.02	0.037	0.51	9.3	40.3	0.05	0.01	Pass
Arsenic	Wetlands Beach	10.7	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.373	3.9911	0.50	0.02	0.053	0.67	9.3	40.3	0.07	0.02	Pass
Barium	NCL - East	5040	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.086	433.44	53.96	0.02	25.10	79.18	20.8	41.7	**3.81**	**1.90**	Retain
Barium	NCL - North	5060	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.086	435.16	54.17	0.02	25.20	79.49	20.8	41.7	**3.82**	**1.91**	Retain
Barium	OID Lagoon	410	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.086	35.26	4.39	0.02	2.04	6.56	20.8	41.7	0.32	0.16	Pass
Barium	Wetlands Beach	3110	0.249	1	0.249	0.5	Regression	1.00	0.1	0.5	0.086	267.46	33.30	0.02	15.49	48.91	20.8	41.7	**2.35**	**1.17**	Retain
Beryllium	NCL - East	16.8	0.249	1	0.249	0.5	Regression	4.65	0.6	0.5	0.194	3.2592	0.41	0.02	0.084	1.07	--	--	**--**	**--**	Uncertainty
Beryllium	NCL - North	18.7	0.249	1	0.249	0.5	Regression	5.03	0.6	0.5	0.194	3.6278	0.45	0.02	0.093	1.17	--	--	**--**	**--**	Uncertainty
Beryllium	OID Lagoon	1.4	0.249	1	0.249	0.5	Regression	0.75	0.1	0.5	0.194	0.2716	0.03	0.02	0.007	0.13	--	--	**--**	**--**	Uncertainty
Beryllium	Wetlands Beach	19.9	0.249	1	0.249	0.5	Regression	5.26	0.7	0.5	0.194	3.8606	0.48	0.02	0.099	1.23	--	--	**--**	**--**	Uncertainty
Cadmium	NCL - East	6.7	0.249	1	0.249	0.5	Regression	1.76	0.2	0.5	0.459	3.0753	0.38	0.02	0.033	0.63	1.47	2.37	0.43	0.27	Pass
Cadmium	NCL - North	3.7	0.249	1	0.249	0.5	Regression	1.27	0.2	0.5	0.459	1.6983	0.21	0.02	0.018	0.39	1.47	2.37	0.26	0.16	Pass
Cadmium	OID Lagoon	3.5	0.249	1	0.249	0.5	Regression	1.23	0.2	0.5	0.459	1.6065	0.20	0.02	0.017	0.37	1.47	2.37	0.25	0.16	Pass
Cadmium	Wetlands Beach	4.1	0.249	1	0.249	0.5	Regression	1.34	0.2	0.5	0.459	1.8819	0.23	0.02	0.020	0.42	1.47	2.37	0.29	0.18	Pass
Chromium	NCL - East	342	0.249	1	0.249	0.5	0.041	14.02	1.7	0.5	0.057	19.494	2.43	0.02	1.70	5.88	2.66	2.78	**2.21**	**2.11**	Retain
Chromium	NCL - North	51.3	0.249	1	0.249	0.5	0.041	2.10	0.3	0.5	0.057	2.9241	0.36	0.02	0.26	0.88	2.66	2.78	0.33	0.32	Pass
Chromium	OID Lagoon	41.2	0.249	1	0.249	0.5	0.041	1.69	0.2	0.5	0.057	2.3484	0.29	0.02	0.21	0.71	2.66	2.78	0.27	0.25	Pass
Chromium	Wetlands Beach	472	0.249	1	0.249	0.5	0.041	19.35	2.4	0.5	0.057	26.904	3.35	0.02	2.35	8.11	2.66	2.78	**3.05**	**2.92**	Retain
Cobalt	NCL - East	13.7	0.249	1	0.249	0.5	0.0075	0.10	0.01	0.5	0.122	1.6714	0.21	0.02	0.068	0.29	7.61	7.8	0.04	0.04	Pass
Cobalt	NCL - North	11.5	0.249	1	0.249	0.5	0.0075	0.09	0.01	0.5	0.122	1.403	0.17	0.02	0.057	0.24	7.61	7.8	0.03	0.03	Pass
Cobalt	OID Lagoon	18.8	0.249	1	0.249	0.5	0.0075	0.14	0.02	0.5	0.122	2.2936	0.29	0.02	0.094	0.40	7.61	7.8	0.05	0.05	Pass
Cobalt	Wetlands Beach	9.2	0.249	1	0.249	0.5	0.0075	0.07	0.01	0.5	0.122	1.1224	0.14	0.02	0.046	0.19	7.61	7.8	0.03	0.02	Pass
Copper	NCL - East	3950	0.249	1	0.249	0.5	Regression	51.00	6.3	0.5	0.105	414.75	51.63	0.02	19.67	77.65	4.05	12.1	**19.17**	**6.42**	Retain
Copper	NCL - North	270	0.249	1	0.249	0.5	Regression	17.72	2.2	0.5	0.105	28.35	3.53	0.02	1.34	7.08	4.05	12.1	**1.75**	0.59	Retain
Copper	OID Lagoon	119	0.249	1	0.249	0.5	Regression	12.83	1.6	0.5	0.105	12.495	1.56	0.02	0.59	3.75	4.05	12.1	0.92	0.31	Pass
Copper	Wetlands Beach	3970	0.249	1	0.249	0.5	Regression	51.11	6.4	0.5	0.105	416.85	51.89	0.02	19.77	78.03	4.05	12.1	**19.27**	**6.45**	Retain
Iron	NCL - East	24400	0.249	1	0.249	0.5	0.00425	103.70	12.9	0.5	0.03	732	91.13	0.02	121.50	225.54	--	--	**--**	**--**	Uncertainty
Iron	NCL - North	34500	0.249	1	0.249	0.5	0.00425	146.63	18.3	0.5	0.03	1035	128.85	0.02	171.80	318.90	--	--	**--**	**--**	Uncertainty
Iron	OID Lagoon	43200	0.249	1	0.249	0.5	0.00425	183.60	22.9	0.5	0.03	1296	161.34	0.02	215.12	399.32	--	--	**--**	**--**	Uncertainty
Iron	Wetlands Beach	16900	0.249	1	0.249	0.5	0.00425	71.83	8.9	0.5	0.03	507	63.12	0.02	84.16	156.21	--	--	**--**	**--**	Uncertainty
Lead	NCL - East	616	0.249	1	0.249	0.5	Regression	9.73	1.2	0.5	0.084	51.744	6.44	0.02	3.07	10.72	1.63	3.26	**6.58**	**3.29**	Retain
Lead	NCL - North	306	0.249	1	0.249	0.5	Regression	6.57	0.8	0.5	0.084	25.704	3.20	0.02	1.52	5.54	1.63	3.26	**3.40**	**1.70**	Retain
Lead	OID Lagoon	46.8	0.249	1	0.249	0.5	Regression	2.29	0.3	0.5	0.084	3.9312	0.49	0.02	0.23	1.01	1.63	3.26	0.62	0.31	Pass
Lead	Wetlands Beach	641	0.249	1	0.249	0.5	Regression	9.95	1.2	0.5	0.084	53.844	6.70	0.02	3.19	11.13	1.63	3.26	**6.83**	**3.42**	Retain
Manganese	NCL - East	2100	0.249	1	0.249	0.5	0.079	165.90	20.7	0.5	0.328	688.8	85.75	0.02	10.46	116.86	179	348	0.65	0.34	Pass
Manganese	NCL - North	986	0.249	1	0.249	0.5	0.079	77.89	9.7	0.5	0.328	323.408	40.26	0.02	4.91	54.87	179	348	0.31	0.16	Pass
Manganese	OID Lagoon	989	0.249	1	0.249	0.5	0.079	78.13	9.7	0.5	0.328	324.392	40.38	0.02	4.92	55.04	179	348	0.31	0.16	Pass
Manganese	Wetlands Beach	1470	0.249	1	0.249	0.5	0.079	116.13	14.5	0.5	0.328	482.16	60.02	0.02	7.32	81.80	179	348	0.46	0.24	Pass
Mercury	NCL - East	0.18	0.249	1	0.249	0.5	Regression	0.15	0.02	0.5	2.837	0.51066	0.06	0.02	0.0009	0.08	0.068	0.37	**1.21**	0.22	Retain
Mercury	NCL - North	0.23	0.249	1	0.249	0.5	Regression	0.17	0.02	0.5	2.837	0.65251	0.08	0.02	0.0011	0.10	0.068	0.37	**1.52**	0.28	Retain

TABLE 6-7

Exposure Estimates for the Aquatic-Feeding Belding's Savannah Sparrow Based on Maximum Surface Sediment (0-6 inches) Concentrations by Area and Compared to Literature-Based Avian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Plant Uptake				Benthic Invertebrate Uptake				Sediment Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Sediment Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Soil to Plant BAF[a]	Plant Concentration (mg/kg)	Plant Dose (mg/kg-BW/day)	Diet Proportion	Sed to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Sediment Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	NOAEL	LOAEL	NOAEL-Based	LOAEL-Based	Result
Mercury	OID Lagoon	0.58	0.249	1	0.249	0.5	Regression	0.27	0.03	0.5	2.837	1.64546	0.20	0.02	0.0029	0.24	0.068	0.37	**3.56**	0.65	Retain
Mercury	Wetlands Beach	0.6	0.249	1	0.249	0.5	Regression	0.28	0.03	0.5	2.837	1.7022	0.21	0.02	0.0030	0.25	0.068	0.37	**3.67**	0.67	Retain
Nickel	NCL - East	179	0.249	1	0.249	0.5	Regression	5.24	0.7	0.5	0.139	24.881	3.10	0.02	0.89	4.64	6.71	11.5	0.69	0.40	Pass
Nickel	NCL - North	42.9	0.249	1	0.249	0.5	Regression	1.80	0.2	0.5	0.139	5.9631	0.74	0.02	0.21	1.18	6.71	11.5	0.18	0.10	Pass
Nickel	OID Lagoon	49.5	0.249	1	0.249	0.5	Regression	2.00	0.2	0.5	0.139	6.8805	0.86	0.02	0.25	1.35	6.71	11.5	0.20	0.12	Pass
Nickel	Wetlands Beach	154	0.249	1	0.249	0.5	Regression	4.68	0.6	0.5	0.139	21.406	2.66	0.02	0.77	4.01	6.71	11.5	0.60	0.35	Pass
Selenium	NCL - East	5.6	0.249	1	0.249	0.5	Regression	3.40	0.4	0.5	3.607	20.1992	2.51	0.02	0.028	2.97	0.29	0.579	**10.23**	**5.12**	Retain
Selenium	NCL - North	15.2	0.249	1	0.249	0.5	Regression	10.24	1.3	0.5	3.607	54.8264	6.83	0.02	0.076	8.18	0.29	0.579	**28.19**	**14.12**	Retain
Selenium	OID Lagoon	6.8	0.249	1	0.249	0.5	Regression	4.21	0.5	0.5	3.607	24.5276	3.05	0.02	0.034	3.61	0.29	0.579	**12.45**	**6.24**	Retain
Selenium	Wetlands Beach	8.1	0.249	1	0.249	0.5	Regression	5.11	0.6	0.5	3.607	29.2167	3.64	0.02	0.040	4.31	0.29	0.579	**14.88**	**7.45**	Retain
Silver	NCL - East	4.9	0.249	1	0.249	0.5	0.014	0.07	0.01	0.5	2.045	10.0205	1.25	0.02	0.024	1.28	2.02	20.2	0.63	0.06	Pass
Silver	NCL - North	1.2	0.249	1	0.249	0.5	0.014	0.02	0.002	0.5	2.045	2.454	0.31	0.02	0.006	0.31	2.02	20.2	0.16	0.02	Pass
Silver	OID Lagoon	2.8	0.249	1	0.249	0.5	0.014	0.04	0.005	0.5	2.045	5.726	0.71	0.02	0.014	0.73	2.02	20.2	0.36	0.04	Pass
Silver	Wetlands Beach	3.6	0.249	1	0.249	0.5	0.014	0.05	0.01	0.5	2.045	7.362	0.92	0.02	0.018	0.94	2.02	20.2	0.47	0.05	Pass
Thallium	NCL - East	0.71	0.249	1	0.249	0.5	0.004	0.003	0.0004	0.5	0.0541	0.038411	0.0048	0.02	0.004	0.009	--	--	**--**	**--**	Uncertainty
Thallium	NCL - North	0.67	0.249	1	0.249	0.5	0.004	0.003	0.0003	0.5	0.0541	0.036247	0.0045	0.02	0.003	0.008	--	--	**--**	**--**	Uncertainty
Thallium	OID Lagoon	0.69	0.249	1	0.249	0.5	0.004	0.003	0.0003	0.5	0.0541	0.037329	0.0046	0.02	0.003	0.008	--	--	**--**	**--**	Uncertainty
Thallium	Wetlands Beach	1.4	0.249	1	0.249	0.5	0.004	0.01	0.001	0.5	0.0541	0.07574	0.0094	0.02	0.007	0.017	--	--	**--**	**--**	Uncertainty
Vanadium	NCL - East	125	0.249	1	0.249	0.5	0.00485	0.61	0.1	0.5	0.056	7	0.87	0.02	0.62	1.57	0.344	0.688	**4.56**	**2.28**	Retain
Vanadium	NCL - North	62.7	0.249	1	0.249	0.5	0.00485	0.30	0.04	0.5	0.056	3.5112	0.44	0.02	0.31	0.79	0.344	0.688	**2.29**	**1.14**	Retain
Vanadium	OID Lagoon	72.1	0.249	1	0.249	0.5	0.00485	0.35	0.04	0.5	0.056	4.0376	0.50	0.02	0.36	0.91	0.344	0.688	**2.63**	**1.32**	Retain
Vanadium	Wetlands Beach	74.7	0.249	1	0.249	0.5	0.00485	0.36	0.05	0.5	0.056	4.1832	0.52	0.02	0.37	0.94	0.344	0.688	**2.73**	**1.36**	Retain
Zinc	NCL - East	4570	0.249	1	0.249	0.5	Regression	519.12	64.6	0.5	0.842	3847.94	479.03	0.02	22.76	566.41	66.1	66.5	**8.57**	**8.52**	Retain
Zinc	NCL - North	790	0.249	1	0.249	0.5	Regression	195.97	24.4	0.500	0.842	665.18	82.81	0.02	3.93	111.14	66.1	66.5	**1.68**	**1.67**	Retain
Zinc	OID Lagoon	427	0.249	1	0.249	0.5	Regression	139.28	17.3	0.5	0.842	359.534	44.76	0.02	2.13	64.22	66.1	66.5	0.97	0.97	Pass
Zinc	Wetlands Beach	3670	0.249	1	0.249	0.5	Regression	459.62	57.2	0.5	0.842	3090.14	384.69	0.02	18.28	460.19	66.1	66.5	**6.96**	**6.92**	Retain
TEQ-Bird	NCL - East	2.98E-06	0.249	1	0.249	0.5	0.26	7.76E-07	9.66E-08	0.5	0.85	2.54E-06	3.16E-07	0.02	1.49E-08	4.27E-07	0.0000143	0.000143	0.03	0.0030	Pass
TEQ-Bird	NCL - North	2.15E-07	0.249	1	0.249	0.5	0.26	5.60E-08	6.97E-09	0.5	0.85	1.83E-07	2.28E-08	0.02	1.07E-09	3.08E-08	0.0000143	0.000143	0.002	0.0002	Pass
TEQ-Bird	OID Lagoon	4.19E-05	0.249	1	0.249	0.5	0.26	1.09E-05	1.36E-06	0.5	0.85	3.56E-05	4.43E-06	0.02	2.09E-07	6.00E-06	0.0000143	0.000143	0.42	0.04	Pass
TEQ-Bird	Wetlands Beach	1.22E-04	0.249	1	0.249	0.5	0.26	3.16E-05	3.93E-06	0.5	0.85	1.03E-04	1.29E-05	0.02	6.05E-07	1.74E-05	0.0000143	0.000143	**1.22**	0.12	Retain

Notes:

-- no TRVs available

BAF = bioaccumulation factor

kg = kilogram(s)

kg/kg-BW/day = kilograms per kilogram body weight per day

LOAEL = lowest observed adverse effect level

mg/kg = milligrams per kilogram

mg/kg-BW/day = milligrams per kilogram body weight per day

NOAEL = no observed adverse effect level

Pass = dose based on maximum sediment concentration was less than the NOAEL; therefore, there are no risks to individual Belding's savannah sparrows and no further evaluation was necessary

Regression = bioaccumulation represented by a linear regression equation

Retain = dose based on maximum sediment concentration exceeded the NOAEL; therefore, this analyte was Retained for further evaluation

TEQ-Bird = Toxic Equivalency Quotient for Birds (calculated using avian toxic equivalency factors)

TRV = toxicity reference value

[a] Soil-to-plant regression and BAF models were used as a surrogate for estimating uptake from sediment to aquatic plants.

Uncertainty = benchmark value not available; therefore, this analyte Retained as an Uncertainty

Shading and bold indicates exceedances of the benchmarks.

TABLE 6-8

Exposure Estimates for the Western Snowy Plover Based on Maximum Surface Sediment (0-6 inches) Concentrations by Area and Compared to Literature-Based Avian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Invertebrate Uptake				Sediment Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Sediment Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Sed to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Sediment Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	NOAEL	LOAEL	NOAEL-Based	LOAEL-Based	Result
Aluminum	NCL - East	159000	0.216	1	0.216	1	0.011	1749	377.02	0.165	5655.29	6032.30	109.7	--	**54.99**	**--**	Retain
Aluminum	NCL - North	27800	0.216	1	0.216	1	0.011	305.8	65.92	0.165	988.79	1054.70	109.7	--	**9.61**	**--**	Retain
Aluminum	OID Lagoon	23900	0.216	1	0.216	1	0.011	262.9	56.67	0.165	850.07	906.74	109.7	--	**8.27**	**--**	Retain
Aluminum	Wetlands Beach	166000	0.216	1	0.216	1	0.011	1826	393.62	0.165	5904.26	6297.88	109.7	--	**57.41**	**--**	Retain
Antimony	NCL - East	20.1	0.216	1	0.216	1	1	20.1	4.33	0.165	0.71	5.05	--	--	**--**	**--**	Uncertainty
Antimony	NCL - North	2.2	0.216	1	0.216	1	1	2.2	0.47	0.165	0.08	0.55	--	--	**--**	**--**	Uncertainty
Antimony	OID Lagoon	1.7	0.216	1	0.216	1	1	1.7	0.37	0.165	0.06	0.43	--	--	**--**	**--**	Uncertainty
Antimony	Wetlands Beach	10.4	0.216	1	0.216	1	1	10.4	2.24	0.165	0.37	2.61	--	--	**--**	**--**	Uncertainty
Arsenic	NCL - East	33.7	0.216	1	0.216	1	0.373	12.57	2.71	0.165	1.20	3.91	9.3	40.3	0.42	0.10	Pass
Arsenic	NCL - North	7.2	0.216	1	0.216	1	0.373	2.69	0.58	0.165	0.26	0.84	9.3	40.3	0.09	0.02	Pass
Arsenic	OID Lagoon	7.5	0.216	1	0.216	1	0.373	2.80	0.60	0.165	0.27	0.87	9.3	40.3	0.09	0.02	Pass
Arsenic	Wetlands Beach	10.7	0.216	1	0.216	1	0.373	3.99	0.86	0.165	0.38	1.24	9.3	40.3	0.13	0.03	Pass
Barium	NCL - East	5040	0.216	1	0.216	1	0.086	433.44	93.43	0.165	179.26	272.70	20.8	41.7	**13.11**	**6.54**	Retain
Barium	NCL - North	5060	0.216	1	0.216	1	0.086	435.16	93.80	0.165	179.97	273.78	20.8	41.7	**13.16**	**6.57**	Retain
Barium	OID Lagoon	410	0.216	1	0.216	1	0.086	35.26	7.60	0.165	14.58	22.18	20.8	41.7	**1.07**	0.53	Retain
Barium	Wetlands Beach	3110	0.216	1	0.216	1	0.086	267.46	57.65	0.165	110.62	168.27	20.8	41.7	**8.09**	**4.04**	Retain
Beryllium	NCL - East	16.8	0.216	1	0.216	1	0.194	3.26	0.70	0.165	0.60	1.30	--	--	**--**	**--**	Uncertainty
Beryllium	NCL - North	18.7	0.216	1	0.216	1	0.194	3.63	0.78	0.165	0.67	1.45	--	--	**--**	**--**	Uncertainty
Beryllium	OID Lagoon	1.4	0.216	1	0.216	1	0.194	0.27	0.06	0.165	0.05	0.11	--	--	**--**	**--**	Uncertainty
Beryllium	Wetlands Beach	19.9	0.216	1	0.216	1	0.194	3.86	0.83	0.165	0.71	1.54	--	--	**--**	**--**	Uncertainty
Cadmium	NCL - East	6.7	0.216	1	0.216	1	0.459	3.08	0.66	0.165	0.24	0.90	1.47	2.37	0.61	0.38	Pass
Cadmium	NCL - North	3.7	0.216	1	0.216	1	0.459	1.70	0.37	0.165	0.13	0.50	1.47	2.37	0.34	0.21	Pass
Cadmium	OID Lagoon	3.5	0.216	1	0.216	1	0.459	1.61	0.35	0.165	0.12	0.47	1.47	2.37	0.32	0.20	Pass
Cadmium	Wetlands Beach	4.1	0.216	1	0.216	1	0.459	1.88	0.41	0.165	0.15	0.55	1.47	2.37	0.38	0.23	Pass
Chromium	NCL - East	342	0.216	1	0.216	1	0.057	19.49	4.20	0.165	12.16	16.37	2.66	2.78	**6.15**	**5.89**	Retain
Chromium	NCL - North	51.3	0.216	1	0.216	1	0.057	2.92	0.63	0.165	1.82	2.45	2.66	2.78	0.92	0.88	Pass
Chromium	OID Lagoon	41.2	0.216	1	0.216	1	0.057	2.35	0.51	0.165	1.47	1.97	2.66	2.78	0.74	0.71	Pass
Chromium	Wetlands Beach	472	0.216	1	0.216	1	0.057	26.90	5.80	0.165	16.79	22.59	2.66	2.78	**8.49**	**8.13**	Retain
Cobalt	NCL - East	13.7	0.216	1	0.216	1	0.122	1.67	0.36	0.165	0.49	0.85	7.61	7.8	0.11	0.11	Pass
Cobalt	NCL - North	11.5	0.216	1	0.216	1	0.122	1.40	0.30	0.165	0.41	0.71	7.61	7.8	0.09	0.09	Pass
Cobalt	OID Lagoon	18.8	0.216	1	0.216	1	0.122	2.29	0.49	0.165	0.67	1.16	7.61	7.8	0.15	0.15	Pass
Cobalt	Wetlands Beach	9.2	0.216	1	0.216	1	0.122	1.12	0.24	0.165	0.33	0.57	7.61	7.8	0.07	0.07	Pass
Copper	NCL - East	3950	0.216	1	0.216	1	0.105	414.75	89.40	0.165	140.49	229.90	4.05	12.1	**56.76**	**19.00**	Retain
Copper	NCL - North	270	0.216	1	0.216	1	0.105	28.35	6.11	0.165	9.60	15.71	4.05	12.1	**3.88**	**1.30**	Retain
Copper	OID Lagoon	119	0.216	1	0.216	1	0.105	12.50	2.69	0.165	4.23	6.93	4.05	12.1	**1.71**	0.57	Retain
Copper	Wetlands Beach	3970	0.216	1	0.216	1	0.105	416.85	89.86	0.165	141.20	231.06	4.05	12.1	**57.05**	**19.10**	Retain
Iron	NCL - East	24400	0.216	1	0.216	1	0.03	732.00	157.79	0.165	867.86	1025.65	--	--	**--**	**--**	Uncertainty
Iron	NCL - North	34500	0.216	1	0.216	1	0.03	1035.00	223.11	0.165	1227.09	1450.20	--	--	**--**	**--**	Uncertainty
Iron	OID Lagoon	43200	0.216	1	0.216	1	0.03	1296.00	279.37	0.165	1536.53	1815.90	--	--	**--**	**--**	Uncertainty
Iron	Wetlands Beach	16900	0.216	1	0.216	1	0.03	507.00	109.29	0.165	601.10	710.39	--	--	**--**	**--**	Uncertainty

TABLE 6-8

Exposure Estimates for the Western Snowy Plover Based on Maximum Surface Sediment (0-6 inches) Concentrations by Area and Compared to Literature-Based Avian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Invertebrate Uptake				Sediment Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Sediment Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Sed to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Sediment Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	NOAEL	LOAEL	NOAEL-Based	LOAEL-Based	Result
Lead	NCL - East	616	0.216	1	0.216	1	0.084	51.74	11.15	0.165	21.91	33.06	1.63	3.26	**20.28**	**10.14**	Retain
Lead	NCL - North	306	0.216	1	0.216	1	0.084	25.70	5.54	0.165	10.88	16.42	1.63	3.26	**10.08**	**5.04**	Retain
Lead	OID Lagoon	46.8	0.216	1	0.216	1	0.084	3.93	0.85	0.165	1.66	2.51	1.63	3.26	**1.54**	0.77	Retain
Lead	Wetlands Beach	641	0.216	1	0.216	1	0.084	53.84	11.61	0.165	22.80	34.41	1.63	3.26	**21.11**	**10.55**	Retain
Manganese	NCL - East	2100	0.216	1	0.216	1	0.328	688.80	148.48	0.165	74.69	223.17	179	348	**1.25**	0.64	Retain
Manganese	NCL - North	986	0.216	1	0.216	1	0.328	323.41	69.71	0.165	35.07	104.78	179	348	0.59	0.30	Pass
Manganese	OID Lagoon	989	0.216	1	0.216	1	0.328	324.39	69.93	0.165	35.18	105.10	179	348	0.59	0.30	Pass
Manganese	Wetlands Beach	1470	0.216	1	0.216	1	0.328	482.16	103.94	0.165	52.28	156.22	179	348	0.87	0.45	Pass
Mercury	NCL - East	0.18	0.216	1	0.216	1	2.837	0.51	0.11	0.165	0.006	0.12	0.068	0.37	**1.71**	0.31	Retain
Mercury	NCL - North	0.23	0.216	1	0.216	1	2.837	0.65	0.14	0.165	0.008	0.15	0.068	0.37	**2.19**	0.40	Retain
Mercury	OID Lagoon	0.58	0.216	1	0.216	1	2.837	1.65	0.35	0.165	0.021	0.38	0.068	0.37	**5.52**	**1.01**	Retain
Mercury	Wetlands Beach	0.6	0.216	1	0.216	1	2.837	1.70	0.37	0.165	0.021	0.39	0.068	0.37	**5.71**	**1.05**	Retain
Nickel	NCL - East	179	0.216	1	0.216	1	0.139	24.88	5.36	0.165	6.37	11.73	6.71	11.5	**1.75**	**1.02**	Retain
Nickel	NCL - North	42.9	0.216	1	0.216	1	0.139	5.96	1.29	0.165	1.53	2.81	6.71	11.5	0.42	0.24	Pass
Nickel	OID Lagoon	49.5	0.216	1	0.216	1	0.139	6.88	1.48	0.165	1.76	3.24	6.71	11.5	0.48	0.28	Pass
Nickel	Wetlands Beach	154	0.216	1	0.216	1	0.139	21.41	4.61	0.165	5.48	10.09	6.71	11.5	**1.50**	0.88	Retain
Selenium	NCL - East	5.6	0.216	1	0.216	1	3.607	20.20	4.35	0.165	0.20	4.55	0.29	0.579	**15.70**	**7.86**	Retain
Selenium	NCL - North	15.2	0.216	1	0.216	1	3.607	54.83	11.82	0.165	0.54	12.36	0.29	0.579	**42.62**	**21.35**	Retain
Selenium	OID Lagoon	6.8	0.216	1	0.216	1	3.607	24.53	5.29	0.165	0.24	5.53	0.29	0.579	**19.07**	**9.55**	Retain
Selenium	Wetlands Beach	8.1	0.216	1	0.216	1	3.607	29.22	6.30	0.165	0.29	6.59	0.29	0.579	**22.71**	**11.38**	Retain
Silver	NCL - East	4.9	0.216	1	0.216	1	2.045	10.02	2.16	0.165	0.17	2.33	2.02	20.2	**1.16**	0.12	Retain
Silver	NCL - North	1.2	0.216	1	0.216	1	2.045	2.45	0.53	0.165	0.04	0.57	2.02	20.2	0.28	0.03	Pass
Silver	OID Lagoon	2.8	0.216	1	0.216	1	2.045	5.73	1.23	0.165	0.10	1.33	2.02	20.2	0.66	0.07	Pass
Silver	Wetlands Beach	3.6	0.216	1	0.216	1	2.045	7.36	1.59	0.165	0.13	1.72	2.02	20.2	0.85	0.08	Pass
Thallium	NCL - East	0.71	0.216	1	0.216	1	0.0541	0.04	0.01	0.165	0.025	0.034	--	--	**--**	**--**	Uncertainty
Thallium	NCL - North	0.67	0.216	1	0.216	1	0.0541	0.04	0.01	0.165	0.024	0.032	--	--	**--**	**--**	Uncertainty
Thallium	OID Lagoon	0.69	0.216	1	0.216	1	0.0541	0.04	0.01	0.165	0.025	0.033	--	--	**--**	**--**	Uncertainty
Thallium	Wetlands Beach	1.4	0.216	1	0.216	1	0.0541	0.08	0.02	0.165	0.050	0.066	--	--	**--**	**--**	Uncertainty
Vanadium	NCL - East	125	0.216	1	0.216	1	0.056	7.00	1.51	0.165	4.45	5.95	0.344	0.688	**17.31**	**8.66**	Retain
Vanadium	NCL - North	62.7	0.216	1	0.216	1	0.056	3.51	0.76	0.165	2.23	2.99	0.344	0.688	**8.68**	**4.34**	Retain
Vanadium	OID Lagoon	72.1	0.216	1	0.216	1	0.056	4.04	0.87	0.165	2.56	3.43	0.344	0.688	**9.98**	**4.99**	Retain
Vanadium	Wetlands Beach	74.7	0.216	1	0.216	1	0.056	4.18	0.90	0.165	2.66	3.56	0.344	0.688	**10.34**	**5.17**	Retain
Zinc	NCL - East	4570	0.216	1	0.216	1	0.842	3847.94	829.47	0.165	162.54	992.02	66.1	66.5	**15.01**	**14.92**	Retain
Zinc	NCL - North	790	0.216	1	0.216	1	0.842	665.18	143.39	0.165	28.10	171.49	66.1	66.5	**2.59**	**2.58**	Retain
Zinc	OID Lagoon	427	0.216	1	0.216	1	0.842	359.53	77.50	0.165	15.19	92.69	66.1	66.5	**1.40**	**1.39**	Retain
Zinc	Wetlands Beach	3670	0.216	1	0.216	1	0.842	3090.14	666.12	0.165	130.53	796.65	66.1	66.5	**12.05**	**11.98**	Retain
TEQ-Bird	NCL - East	2.98E-06	0.216	1	0.216	1	0.85	2.54E-06	5.47E-07	0.165	1.06E-07	6.53E-07	0.0000143	0.000143	0.05	0.005	Pass
TEQ-Bird	NCL - North	2.15E-07	0.216	1	0.216	1	0.85	1.83E-07	3.95E-08	0.165	7.66E-09	4.71E-08	0.0000143	0.000143	0.003	0.0003	Pass
TEQ-Bird	OID Lagoon	4.19E-05	0.216	1	0.216	1	0.85	3.56E-05	7.68E-06	0.165	1.49E-06	9.17E-06	0.0000143	0.000143	0.64	0.06	Pass
TEQ-Bird	Wetlands Beach	1.22E-04	0.216	1	0.216	1	0.85	1.03E-04	2.23E-05	0.165	4.32E-06	2.66E-05	0.0000143	0.000143	**1.86**	0.19	Retain

TABLE 6-8

Exposure Estimates for the Western Snowy Plover Based on Maximum Surface Sediment (0-6 inches) Concentrations by Area and Compared to Literature-Based Avian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Invertebrate Uptake				Sediment Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Sediment Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Sed to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Sediment Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	**NOAEL**	**LOAEL**	**NOAEL-Based**	**LOAEL-Based**	**Result**

Notes:

-- no TRVs available

BAF = bioaccumulation factor

kg = kilogram(s)

kg/kg-BW/day = kilograms per kilogram body weight per day

LOAEL = lowest observed adverse effect level

mg/kg = milligrams per kilogram

mg/kg-BW/day = milligrams per kilogram body weight per day

NOAEL = no observed adverse effect level

Pass = dose based on maximum sediment concentration was less than the NOAEL; therefore, there are no risks to individual western snowy plover and no further evaluation was necessary

Regression = bioaccumulation represented by a linear regression equation

Retain = dose based on maximum sediment concentration exceeded the NOAEL; therefore, this analyte was Retained for further evaluation

TEQ-Bird = Toxic Equivalency Quotient for Birds (calculated using avian toxic equivalency factors)

TRV = toxicity reference value

Uncertainty = benchmark value not available; therefore, this analyte Retained as an Uncertainty

Shading or bold indicates exceedances of the benchmarks.

TABLE 6-9

Exposure Estimates for the California Least Tern Based on Overall Maximum Measured Fish Tissue Concentrations and Compared to Literature-Based Avian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Analyte	N	Maximum Fish Concentration (mg/kg dw)	Food Intake (kg/kg-BW/day dw)	Proportion Fish in Diet	Total Dose (mg/kg-BW/day)	TRVs (mg/kg-BW/day)		Hazard Quotients		Result
						NOAEL	LOAEL	NOAEL-Based	LOAEL-Based	
Aluminum	9	365	0.22	1	80.3	109.7	--	0.73	--	Pass
Barium	4	31	0.22	1	6.82	20.8	41.7	0.33	0.16	Pass
Calcium	29	61682	0.22	1	13570.04	--	--	--	--	Uncertainty
Chromium	6	9	0.22	1	1.98	2.66	2.78	0.74	0.71	Pass
Copper	5	14	0.22	1	3.08	4.05	12.1	0.76	0.25	Pass
Iron	29	367	0.22	1	80.74	--	--	--	--	Uncertainty
Magnesium	29	2449	0.22	1	538.78	--	--	--	--	Uncertainty
Manganese	29	140	0.22	1	30.8	179	348	0.17	0.09	Pass
Mercury	16	0.021	0.22	1	0.00462	0.068	0.37	0.07	0.01	Pass
Potassium	29	17617	0.22	1	3875.74	--	--	--	--	Uncertainty
Selenium	21	8	0.22	1	1.76	0.29	0.579	**6.07**	**3.04**	Retain
Sodium	29	5093	0.22	1	1120.46	--	--	--	--	Uncertainty
Zinc	29	359	0.22	1	78.98	66.1	66.5	**1.19**	**1.19**	Retain

Notes:

-- no TRVs available

kg/kg-BW/day dw = kilograms per kilogram body weight per day, dry weight

LOAEL = lowest observed adverse effect level

mg/kg dw = milligrams per kilogram, dry weight

mg/kg-BW/day = milligrams per kilogram body weight per day

NOAEL = no observed adverse effect level

Pass = dose based on overall maximum fish tissue concentrations was less than the NOAEL; therefore, there are no risks to individual California least terns and no further evaluation was necessary

Retain = dose based on overall maximum fish tissue concentration exceeded the NOAEL; therefore, this analyte was Retained for further evaluation

TRV = toxicity reference value

Uncertainty = benchmark value not available; therefore, this analyte Retained as an Uncertainty

Dioxins/furans were not detected in fish tissue collected at the Site.

Shading or bold indicates exceedances of the benchmarks.

TABLE 6-10

Exposure Estimates for the Terrestrial-Feeding Belding's Savannah Sparrow Based on Maximum Surface Soil (0-6 inches) Concentrations by Area and Compared to Literature-Based Avian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Plant Uptake				Arthropod				Mollusc				Soil Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Soil Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Soil to Plant BAF	Plant Concentration (mg/kg)	Plant Dose (mg/kg-BW/day)	Diet Proportion	Soil to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Soil to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Soil Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	NOAEL	LOAEL	NOAEL-Based	LOAEL-Based	Result
Aluminum	NCL - East	159000	0.249	1	0.249	0.5	Regression	1.00	0.1	0.45	0.308	48972.00	5486.9	0.05	0.219	34821.00	433.49	0.02	791.76	6712.27	109.7	NA	61.19	NA	Retain
Aluminum	NCL - North	27800	0.249	1	0.249	0.5	Regression	1.00	0.1	0.45	0.308	8562.40	959.3	0.05	0.219	6088.20	75.79	0.02	138.43	1173.70	109.7	NA	10.70	NA	Retain
Aluminum	Wetlands Beach	225000	0.249	1	0.249	0.5	Regression	1.00	0.1	0.45	0.308	69300.00	7764.5	0.05	0.219	49275.00	613.43	0.02	1120.42	9498.45	109.7	NA	86.59	NA	Retain
Antimony	NCL - East	20.1	0.249	1	0.249	0.5	Regression	0.66	0.1	0.45	1	20.10	2.3	0.05	1	20.10	0.25	0.02	0.100	2.68	--	--	--	--	Uncertainty
Antimony	NCL - North	2.2	0.249	1	0.249	0.5	Regression	0.08	0.0	0.45	1	2.20	0.2	0.05	1	2.20	0.03	0.02	0.011	0.30	--	--	--	--	Uncertainty
Antimony	Wetlands Beach	23.2	0.249	1	0.249	0.5	Regression	0.75	0.1	0.45	1	23.20	2.6	0.05	1	23.20	0.29	0.02	0.116	3.10	--	--	--	--	Uncertainty
Arsenic	NCL - East	33.7	0.249	1	0.249	0.5	Regression	1.00	0.1	0.45	0.06146	2.07	0.2	0.05	0.31429	10.59	0.13	0.02	0.17	0.66	9.3	40.3	0.07	0.02	Pass
Arsenic	NCL - North	7.2	0.249	1	0.249	0.5	Regression	1.00	0.1	0.45	0.06146	0.44	0.0	0.05	0.31429	2.26	0.03	0.02	0.04	0.24	9.3	40.3	0.03	0.01	Pass
Arsenic	Wetlands Beach	13.6	0.249	1	0.249	0.5	Regression	1.00	0.1	0.45	0.06146	0.84	0.1	0.05	0.31429	4.27	0.05	0.02	0.07	0.34	9.3	40.3	0.04	0.01	Pass
Barium	NCL - East	5040	0.249	1	0.249	0.5	Regression	1.00	0.1	0.45	1.148	5785.92	648.3	0.05	2.84	14313.60	178.19	0.02	25.10	851.68	20.8	41.7	40.95	20.42	Retain
Barium	NCL - North	5060	0.249	1	0.249	0.5	Regression	1.00	0.1	0.45	1.148	5808.88	650.8	0.05	2.84	14370.40	178.90	0.02	25.20	855.06	20.8	41.7	41.11	20.50	Retain
Barium	Wetlands Beach	3810	0.249	1	0.249	0.5	Regression	1.00	0.1	0.45	1.148	4373.88	490.1	0.05	2.84	10820.40	134.70	0.02	18.97	643.86	20.8	41.7	30.95	15.44	Retain
Beryllium	NCL - East	16.8	0.249	1	0.249	0.5	Regression	4.65	0.6	0.45	0.045	0.76	0.1	0.05	0.045	0.76	0.009	0.02	0.08	0.76	--	--	--	--	Uncertainty
Beryllium	NCL - North	18.7	0.249	1	0.249	0.5	Regression	5.03	0.6	0.45	0.045	0.84	0.1	0.05	0.045	0.84	0.010	0.02	0.09	0.82	--	--	--	--	Uncertainty
Beryllium	Wetlands Beach	19.9	0.249	1	0.249	0.5	Regression	5.26	0.7	0.45	0.045	0.90	0.1	0.05	0.045	0.90	0.011	0.02	0.10	0.87	--	--	--	--	Uncertainty
Cadmium	NCL - East	6.7	0.249	1	0.249	0.5	Regression	1.76	0.2	0.45	3.371	22.59	2.5	0.05	6.837	45.81	0.57	0.02	0.03	3.35	1.47	2.37	2.28	1.41	Retain
Cadmium	NCL - North	3.7	0.249	1	0.249	0.5	Regression	1.27	0.2	0.45	3.371	12.47	1.4	0.05	6.837	25.30	0.31	0.02	0.02	1.89	1.47	2.37	1.28	0.80	Retain
Cadmium	Wetlands Beach	11.3	0.249	1	0.249	0.5	Regression	2.33	0.3	0.45	3.371	38.09	4.3	0.05	6.837	77.26	0.96	0.02	0.06	5.58	1.47	2.37	3.79	2.35	Retain
Chromium	NCL - East	342	0.249	1	0.249	0.5	0.041	14.02	1.7	0.45	0.44	150.48	16.9	0.05	0.44	150.48	1.87	0.02	1.70	22.18	2.66	2.78	8.34	7.98	Retain
Chromium	NCL - North	51.3	0.249	1	0.249	0.5	0.041	2.10	0.3	0.45	0.44	22.57	2.5	0.05	0.44	22.57	0.28	0.02	0.26	3.33	2.66	2.78	1.25	1.20	Retain
Chromium	Wetlands Beach	472	0.249	1	0.249	0.5	0.041	19.35	2.4	0.45	0.44	207.68	23.3	0.05	0.44	207.68	2.59	0.02	2.35	30.61	2.66	2.78	11.51	11.01	Retain
Cobalt	NCL - East	13.7	0.249	1	0.249	0.5	0.0075	0.10	0.0	0.45	0.122	1.67	0.2	0.05	0.122	1.67	0.021	0.02	0.07	0.29	7.61	7.8	0.04	0.04	Pass
Cobalt	NCL - North	11.5	0.249	1	0.249	0.5	0.0075	0.09	0.0	0.45	0.122	1.40	0.2	0.05	0.122	1.40	0.017	0.02	0.06	0.24	7.61	7.8	0.03	0.03	Pass
Cobalt	Wetlands Beach	13.8	0.249	1	0.249	0.5	0.0075	0.10	0.0	0.45	0.122	1.68	0.2	0.05	0.122	1.68	0.021	0.02	0.07	0.29	7.61	7.8	0.04	0.04	Pass
Copper	NCL - East	3950	0.249	1	0.249	0.5	Regression	51.00	6.3	0.45	2.113	8346.35	935.1	0.05	7.681	30339.95	377.70	0.02	19.67	1338.86	4.05	12.1	330.58	110.65	Retain
Copper	NCL - North	270	0.249	1	0.249	0.5	Regression	17.72	2.2	0.45	2.113	570.51	63.9	0.05	7.681	2073.87	25.82	0.02	1.34	93.29	4.05	12.1	23.03	7.71	Retain
Copper	Wetlands Beach	5480	0.249	1	0.249	0.5	Regression	58.03	7.2	0.45	2.113	11579.24	1297.4	0.05	7.681	42091.88	524.00	0.02	27.29	1855.87	4.05	12.1	458.24	153.38	Retain
Iron	NCL - East	36400	0.249	1	0.249	0.5	0.00425	154.70	19.3	0.45	0.28	10192.00	1141.9	0.05	0.143	5205.20	64.80	0.02	181.26	1407.24	--	--	--	--	Uncertainty
Iron	NCL - North	34500	0.249	1	0.249	0.5	0.00425	146.63	18.3	0.45	0.28	9660.00	1082.3	0.05	0.143	4933.50	61.42	0.02	171.80	1333.79	--	--	--	--	Uncertainty
Iron	Wetlands Beach	22800	0.249	1	0.249	0.5	0.00425	96.90	12.1	0.45	0.28	6384.00	715.3	0.05	0.143	3260.40	40.59	0.02	113.54	881.46	--	--	--	--	Uncertainty
Lead	NCL - East	616	0.249	1	0.249	0.5	Regression	9.73	1.2	0.45	0.613	377.61	42.3	0.05	0.5	308.00	3.83	0.02	3.07	50.42	1.63	3.26	30.93	15.47	Retain
Lead	NCL - North	306	0.249	1	0.249	0.5	Regression	6.57	0.8	0.45	0.613	187.58	21.0	0.05	0.5	153.00	1.90	0.02	1.52	25.26	1.63	3.26	15.50	7.75	Retain
Lead	Wetlands Beach	641	0.249	1	0.249	0.5	Regression	9.95	1.2	0.45	0.613	392.93	44.0	0.05	0.5	320.50	3.99	0.02	3.19	52.45	1.63	3.26	32.18	16.09	Retain
Manganese	NCL - East	2100	0.249	1	0.249	0.5	0.079	165.90	20.7	0.45	0.361	758.10	84.9	0.05	0.421	884.10	11.01	0.02	10.46	127.06	179	348	0.71	0.37	Pass
Manganese	NCL - North	986	0.249	1	0.249	0.5	0.079	77.89	9.7	0.45	0.361	355.95	39.9	0.05	0.421	415.11	5.17	0.02	4.91	59.66	179	348	0.33	0.17	Pass
Manganese	Wetlands Beach	1870	0.249	1	0.249	0.5	0.079	147.73	18.4	0.45	0.361	675.07	75.6	0.05	0.421	787.27	9.80	0.02	9.31	113.14	179	348	0.63	0.33	Pass
Mercury	NCL - East	0.18	0.249	1	0.249	0.5	Regression	0.15	0.0	0.45	2.25	0.41	0.0	0.05	2.25	0.41	0.01	0.02	0.00	0.07	0.068	0.37	1.02	0.19	Retain
Mercury	NCL - North	0.23	0.249	1	0.249	0.5	Regression	0.17	0.0	0.45	2.25	0.52	0.1	0.05	2.25	0.52	0.01	0.02	0.00	0.09	0.068	0.37	1.27	0.23	Retain
Mercury	Wetlands Beach	1.3	0.249	1	0.249	0.5	Regression	0.43	0.1	0.45	2.25	2.93	0.3	0.05	2.25	2.93	0.04	0.02	0.01	0.42	0.068	0.37	6.23	1.14	Retain
Nickel	NCL - East	179	0.249	1	0.249	0.5	Regression	5.24	0.7	0.45	1.189	212.83	23.8	0.05	1.189	212.83	2.65	0.02	0.89	28.04	6.71	11.5	4.18	2.44	Retain
Nickel	NCL - North	42.9	0.249	1	0.249	0.5	Regression	1.80	0.2	0.45	1.189	51.01	5.7	0.05	1.189	51.01	0.64	0.02	0.21	6.79	6.71	11.5	1.01	0.59	Retain
Nickel	Wetlands Beach	204	0.249	1	0.249	0.5	Regression	5.78	0.7	0.45	1.189	242.56	27.2	0.05	1.189	242.56	3.02	0.02	1.02	31.93	6.71	11.5	4.76	2.78	Retain
Selenium	NCL - East	5.6	0.249	1	0.249	0.5	Regression	3.40	0.4	0.45	Regression	3.28	0.4	0.05	0	0.00	0.00	0.02	0.03	0.82	0.29	0.579	2.82	1.41	Retain
Selenium	NCL - North	15.2	0.249	1	0.249	0.5	Regression	10.24	1.3	0.45	Regression	6.82	0.8	0.05	0	0.00	0.00	0.02	0.08	2.11	0.29	0.579	7.29	3.65	Retain
Selenium	Wetlands Beach	8.1	0.249	1	0.249	0.5	Regression	5.11	0.6	0.45	Regression	4.30	0.5	0.05	0	0.00	0.00	0.02	0.04	1.16	0.29	0.579	3.99	2.00	Retain
Silver	NCL - East	4.9	0.249	1	0.249	0.5	0.014	0.07	0.0	0.45	2.045	10.02	1.1	0.05	2.045	10.02	0.12	0.02	0.02	1.28	2.02	20.2	0.63	0.06	Pass
Silver	NCL - North	8.3	0.249	1	0.249	0.5	0.014	0.12	0.0	0.45	2.045	16.97	1.9	0.05	2.045	16.97	0.21	0.02	0.04	2.17	2.02	20.2	1.07	0.11	Retain
Silver	Wetlands Beach	6.5	0.249	1	0.249	0.5	0.014	0.09	0.0	0.45	2.045	13.29	1.5	0.05	2.045	13.29	0.17	0.02	0.03	1.70	2.02	20.2	0.84	0.08	Pass
Thallium	NCL - East	0.99	0.249	1	0.249	0.5	0.004	0.00	0.0	0.45	0.0541	0.05	0.0	0.05	0.0541	0.05	0.0007	0.02	0.0049	0.0121	--	--	--	--	Uncertainty
Thallium	NCL - North	0.67	0.249	1	0.249	0.5	0.004	0.00	0.0	0.45	0.0541	0.04	0.0	0.05	0.0541	0.04	0.0005	0.02	0.0033	0.0082	--	--	--	--	Uncertainty
Thallium	Wetlands Beach	1.4	0.249	1	0.249	0.5	0.004	0.01	0.0	0.45	0.0541	0.08	0.0	0.05	0.0541	0.08	0.0009	0.02	0.0070	0.0171	--	--	--	--	Uncertainty
Vanadium	NCL - East	125	0.249	1	0.249	0.5	0.00485	0.61	0.1	0.45	0.187	23.38	2.6	0.05	0.317	39.63	0.49	0.02	0.62	3.81	0.344	0.688	11.08	5.54	Retain
Vanadium	NCL - North	62.7	0.249	1	0.249	0.5	0.00485	0.30	0.0	0.45	0.187	11.72	1.3	0.05	0.317	19.88	0.25	0.02	0.31	1.91	0.344	0.688	5.56	2.78	Retain
Vanadium	Wetlands Beach	74.7	0.249	1	0.249	0.5	0.00485	0.36	0.0	0.45	0.187	13.97	1.6	0.05	0.317	23.68	0.29	0.02	0.37	2.28	0.344	0.688	6.62	3.31	Retain

TABLE 6-10

Exposure Estimates for the Terrestrial-Feeding Belding's Savannah Sparrow Based on Maximum Surface Soil (0-6 inches) Concentrations by Area and Compared to Literature-Based Avian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Plant Uptake				Arthropod				Mollusc				Soil Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Soil Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Soil to Plant BAF	Plant Concentration (mg/kg)	Plant Dose (mg/kg-BW/day)	Diet Proportion	Soil to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Soil to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Soil Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	**NOAEL**	**LOAEL**	**NOAEL-Based**	**LOAEL-Based**	**Result**
Zinc	NCL - East	4570	0.249	1	0.249	0.5	Regression	519.12	64.6	0.45	1.195	5461.15	611.9	0.05	3.122	14267.54	177.62	0.02	22.76	876.88	66.1	66.5	13.27	13.19	Retain
Zinc	NCL - North	790	0.249	1	0.249	0.5	Regression	195.97	24.4	0.45	1.195	944.05	105.8	0.05	3.122	2466.38	30.70	0.02	3.93	164.81	66.1	66.5	2.49	2.48	Retain
Zinc	Wetlands Beach	3800	0.249	1	0.249	0.5	Regression	468.59	58.3	0.45	1.195	4541.00	508.8	0.05	3.122	11863.60	147.69	0.02	18.92	733.73	66.1	66.5	11.10	11.03	Retain

Notes:

-- no TRVs available

BAF = bioaccumulation factor

kg = kilogram(s)

kg/kg-BW/day = kilograms per kilogram body weight per day

LOAEL = lowest observed adverse effect level

mg/kg = milligrams per kilogram

mg/kg-BW/day = milligrams per kilogram body weight per day

NOAEL = no observed adverse effect level

Pass = dose based on maximum soil concentration was less than the NOAEL; therefore, there are no risks to individual Belding's savannah sparrows and no further evaluation was necessary

Regression = bioaccumulation represented by a linear regression equation

Retain = dose based on maximum soil concentration exceeded the NOAEL; therefore, this analyte was Retained for further evaluation

TRV = toxicity reference value

Uncertainty = benchmark value not available; therefore, this analyte Retained as an Uncertainty

Shading and bold indicates exceedances of the benchmarks.

TABLE 6-11

Exposure Estimates for the California Vole and Ornate Shrew Based on Maximum Surface Soil (0-6 inches) Concentrations by Area and Compared to Literature-Based Mammalian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Plant Uptake				Invertebrate Uptake				Soil Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Soil Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Soil to Plant BAF	Plant Concentration (mg/kg)	Plant Dose (mg/kg-BW/day)	Diet Proportion	Soil to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Soil Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	NOAEL	LOAEL	NOAEL-Based	LOAEL-Based	Result
California Vole																					
Aluminum	NCL - East	159000	0.206	1	0.206	1	0.00287	456.33	94.0	0	0.308	48972.00	0.0	0.024	786.10	880.10	1.93	19.3	456.01	45.60	Retain
Aluminum	NCL - North	27800	0.206	1	0.206	1	0.00287	79.79	16.4	0	0.308	8562.40	0.0	0.024	137.44	153.88	1.93	19.3	79.73	7.97	Retain
Aluminum	Wetlands Beach	225000	0.206	1	0.206	1	0.00287	645.75	133.0	0	0.308	69300.00	0.0	0.024	1112.40	1245.42	1.93	19.3	645.30	64.53	Retain
Antimony	NCL - East	20.1	0.206	1	0.206	1	Regression	0.66	0.1	0	1	20.10	0.0	0.024	0.099	0.23	0.059	0.59	3.98	0.40	Pass
Antimony	NCL - North	2.2	0.206	1	0.206	1	Regression	0.08	0.0	0	1	2.20	0.0	0.024	0.011	0.03	0.059	0.59	0.47	0.05	Pass
Antimony	Wetlands Beach	23.2	0.206	1	0.206	1	Regression	0.75	0.2	0	1	23.20	0.0	0.024	0.115	0.27	0.059	0.59	4.57	0.46	Pass
Arsenic	NCL - East	33.7	0.206	1	0.206	1	0.0375	1.26	0.3	0	0.06146	2.07	0.0	0.024	0.17	0.43	1.04	1.66	0.41	0.26	Pass
Arsenic	NCL - North	7.2	0.206	1	0.206	1	0.0375	0.27	0.1	0	0.06146	0.44	0.0	0.024	0.04	0.09	1.04	1.66	0.09	0.05	Pass
Arsenic	Wetlands Beach	13.6	0.206	1	0.206	1	0.0375	0.51	0.1	0	0.06146	0.84	0.0	0.024	0.07	0.17	1.04	1.66	0.17	0.10	Pass
Barium	NCL - East	5040	0.206	1	0.206	1	0.156	786.24	162.0	0	1.148	5785.92	0.0	0.024	24.92	186.88	51.8	75	3.61	2.49	Retain
Barium	NCL - North	5060	0.206	1	0.206	1	0.156	789.36	162.6	0	1.148	5808.88	0.0	0.024	25.02	187.62	51.8	75	3.62	2.50	Retain
Barium	Wetlands Beach	3810	0.206	1	0.206	1	0.156	594.36	122.4	0	1.148	4373.88	0.0	0.024	18.84	141.27	51.8	75	2.73	1.88	Retain
Beryllium	NCL - East	16.8	0.206	1	0.206	1	Regression	4.65	1.0	0	0.045	0.76	0.0	0.024	0.083	1.04	0.532	NA	1.96	NA	Retain
Beryllium	NCL - North	18.7	0.206	1	0.206	1	Regression	5.03	1.0	0	0.045	0.84	0.0	0.024	0.092	1.13	0.532	NA	2.12	NA	Retain
Beryllium	Wetlands Beach	19.9	0.206	1	0.206	1	Regression	5.26	1.1	0	0.045	0.90	0.0	0.024	0.098	1.18	0.532	NA	2.22	NA	Retain
Cadmium	NCL - East	6.7	0.206	1	0.206	1	Regression	1.76	0.4	0	3.371	22.59	0.0	0.024	0.033	0.39	0.77	7.7	0.51	0.05	Pass
Cadmium	NCL - North	3.7	0.206	1	0.206	1	Regression	1.27	0.3	0	3.371	12.47	0.0	0.024	0.018	0.28	0.77	7.7	0.36	0.04	Pass
Cadmium	Wetlands Beach	11.3	0.206	1	0.206	1	Regression	2.33	0.5	0	3.371	38.09	0.0	0.024	0.056	0.54	0.77	7.7	0.70	0.07	Pass
Chromium	NCL - East	342	0.206	1	0.206	1	0.041	14.02	2.9	0	0.44	150.48	0.0	0.024	1.69	4.58	2.4	9.62	1.91	0.48	Pass
Chromium	NCL - North	51.3	0.206	1	0.206	1	0.041	2.10	0.4	0	0.44	22.57	0.0	0.024	0.25	0.69	2.4	9.62	0.29	0.07	Pass
Chromium	Wetlands Beach	472	0.206	1	0.206	1	0.041	19.35	4.0	0	0.44	207.68	0.0	0.024	2.33	6.32	2.4	9.62	2.63	0.66	Pass
Cobalt	NCL - East	13.7	0.206	1	0.206	1	0.0075	0.10	0.0	0	0.122	1.67	0.0	0.024	0.068	0.09	7.33	10.9	0.01	0.01	Pass
Cobalt	NCL - North	11.5	0.206	1	0.206	1	0.0075	0.09	0.0	0	0.122	1.40	0.0	0.024	0.057	0.07	7.33	10.9	0.01	0.01	Pass
Cobalt	Wetlands Beach	13.8	0.206	1	0.206	1	0.0075	0.10	0.0	0	0.122	1.68	0.0	0.024	0.068	0.09	7.33	10.9	0.01	0.01	Pass
Copper	NCL - East	3950	0.206	1	0.206	1	Regression	51.00	10.5	0	2.113	8346.35	0.0	0.024	19.53	30.04	5.6	9.34	5.36	3.22	Retain
Copper	NCL - North	270	0.206	1	0.206	1	Regression	17.72	3.7	0	2.113	570.51	0.0	0.024	1.33	4.99	5.6	9.34	0.89	0.53	Pass
Copper	Wetlands Beach	5480	0.206	1	0.206	1	Regression	58.03	12.0	0	2.113	11579.24	0.0	0.024	27.09	39.05	5.6	9.34	6.97	4.18	Retain
Iron	NCL - East	36400	0.206	1	0.206	1	0.00425	154.70	31.9	0	0.28	10192.00	0.0	0.024	179.96	211.83	--	--	--	--	Uncertainty
Iron	NCL - North	34500	0.206	1	0.206	1	0.00425	146.63	30.2	0	0.28	9660.00	0.0	0.024	170.57	200.77	--	--	--	--	Uncertainty
Iron	Wetlands Beach	22800	0.206	1	0.206	1	0.00425	96.90	20.0	0	0.28	6384.00	0.0	0.024	112.72	132.68	--	--	--	--	Uncertainty
Lead	NCL - East	616	0.206	1	0.206	1	Regression	9.73	2.0	0	0.613	377.61	0.0	0.024	3.05	5.05	4.7	8.9	1.07	0.57	Pass
Lead	NCL - North	306	0.206	1	0.206	1	Regression	6.57	1.4	0	0.613	187.58	0.0	0.024	1.51	2.87	4.7	8.9	0.61	0.32	Pass
Lead	Wetlands Beach	641	0.206	1	0.206	1	Regression	9.95	2.1	0	0.613	392.93	0.0	0.024	3.17	5.22	4.7	8.9	1.11	0.59	Pass
Manganese	NCL - East	2100	0.206	1	0.206	1	0.079	165.90	34.2	0	0.361	758.10	0.0	0.024	10.38	44.56	51.5	71	0.87	0.63	Pass
Manganese	NCL - North	986	0.206	1	0.206	1	0.079	77.89	16.0	0	0.361	355.95	0.0	0.024	4.87	20.92	51.5	71	0.41	0.29	Pass
Manganese	Wetlands Beach	1870	0.206	1	0.206	1	0.079	147.73	30.4	0	0.361	675.07	0.0	0.024	9.25	39.68	51.5	71	0.77	0.56	Pass
Mercury	NCL - East	0.18	0.206	1	0.206	1	Regression	0.15	0.0	0	2.25	0.41	0.0	0.024	0.001	0.03	0.032	0.16	0.96	0.19	Pass
Mercury	NCL - North	0.23	0.206	1	0.206	1	Regression	0.17	0.0	0	2.25	0.52	0.0	0.024	0.001	0.04	0.032	0.16	1.10	0.22	Pass
Mercury	Wetlands Beach	1.3	0.206	1	0.206	1	Regression	0.43	0.1	0	2.25	2.93	0.0	0.024	0.006	0.09	0.032	0.16	2.94	0.59	Pass
Nickel	NCL - East	179	0.206	1	0.206	1	Regression	5.24	1.1	0	1.189	212.83	0.0	0.024	0.88	1.96	1.7	3.4	1.16	0.58	Pass
Nickel	NCL - North	42.9	0.206	1	0.206	1	Regression	1.80	0.4	0	1.189	51.01	0.0	0.024	0.21	0.58	1.7	3.4	0.34	0.17	Pass
Nickel	Wetlands Beach	204	0.206	1	0.206	1	Regression	5.78	1.2	0	1.189	242.56	0.0	0.024	1.01	2.20	1.7	3.4	1.29	0.65	Pass
Selenium	NCL - East	5.6	0.206	1	0.206	1	Regression	3.40	0.7	0	Regression	3.28	0.0	0.024	0.028	0.73	0.143	0.215	5.09	3.39	Retain
Selenium	NCL - North	15.2	0.206	1	0.206	1	Regression	10.24	2.1	0	Regression	6.82	0.0	0.024	0.075	2.18	0.143	0.215	15.28	10.16	Retain
Selenium	Wetlands Beach	8.1	0.206	1	0.206	1	Regression	5.11	1.1	0	Regression	4.30	0.0	0.024	0.040	1.09	0.143	0.215	7.64	5.08	Retain
Silver	NCL - East	4.9	0.206	1	0.206	1	0.014	0.07	0.0	0	2.045	10.02	0.0	0.024	0.024	0.04	6.02	60.2	0.01	0.001	Pass
Silver	NCL - North	8.3	0.206	1	0.206	1	0.014	0.12	0.0	0	2.045	16.97	0.0	0.024	0.041	0.06	6.02	60.2	0.01	0.001	Pass
Silver	Wetlands Beach	6.5	0.206	1	0.206	1	0.014	0.09	0.0	0	2.045	13.29	0.0	0.024	0.032	0.05	6.02	60.2	0.01	0.001	Pass

TABLE 6-11

Exposure Estimates for the California Vole and Ornate Shrew Based on Maximum Surface Soil (0-6 inches) Concentrations by Area and Compared to Literature-Based Mammalian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Plant Uptake				Invertebrate Uptake				Soil Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Soil Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Soil to Plant BAF	Plant Concentration (mg/kg)	Plant Dose (mg/kg-BW/day)	Diet Proportion	Soil to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Soil Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	NOAEL	LOAEL	NOAEL-Based	LOAEL-Based	Result
Thallium	NCL - East	0.99	0.206	1	0.206	1	0.004	0.00	0.0	0	0.0541	0.05	0.0	0.024	0.005	0.01	0.015	0.075	0.38	0.08	Pass
Thallium	NCL - North	0.67	0.206	1	0.206	1	0.004	0.00	0.0	0	0.0541	0.04	0.0	0.024	0.003	0.00	0.015	0.075	0.26	0.05	Pass
Thallium	Wetlands Beach	1.4	0.206	1	0.206	1	0.004	0.01	0.0	0	0.0541	0.08	0.0	0.024	0.007	0.01	0.015	0.075	0.54	0.11	Pass
Vanadium	NCL - East	125	0.206	1	0.206	1	0.00485	0.61	0.1	0	0.187	23.38	0.0	0.024	0.62	0.74	4.16	8.31	0.18	0.09	Pass
Vanadium	NCL - North	62.7	0.206	1	0.206	1	0.00485	0.30	0.1	0	0.187	11.72	0.0	0.024	0.31	0.37	4.16	8.31	0.09	0.04	Pass
Vanadium	Wetlands Beach	74.7	0.206	1	0.206	1	0.00485	0.36	0.1	0	0.187	13.97	0.0	0.024	0.37	0.44	4.16	8.31	0.11	0.05	Pass
Zinc	NCL - East	4570	0.206	1	0.206	1	Regression	519.12	106.9	0	1.195	5461.15	0.0	0.024	22.59	129.53	75.4	75.9	1.72	1.71	Retain
Zinc	NCL - North	790	0.206	1	0.206	1	Regression	195.97	40.4	0	1.195	944.05	0.0	0.024	3.91	44.28	75.4	75.9	0.59	0.58	Pass
Zinc	Wetlands Beach	3800	0.206	1	0.206	1	Regression	468.59	96.5	0	1.195	4541.00	0.0	0.024	18.79	115.32	75.4	75.9	1.53	1.52	Retain
Ornate Shrew																					
Aluminum	NCL - East	159000	0.259	1	0.259	0	Regression	1.00	0.0	1	0.308	48972.00	12696.7	0.03	1236.69	13933.35	1.93	19.3	7219	722	Retain
Aluminum	NCL - North	27800	0.259	1	0.259	0	Regression	1.00	0.0	1	0.308	8562.40	2219.9	0.03	216.23	2436.14	1.93	19.3	1262	126	Retain
Aluminum	Wetlands Beach	225000	0.259	1	0.259	0	Regression	1.00	0.0	1	0.308	69300.00	17967.0	0.03	1750.03	19717.00	1.93	19.3	10216	1022	Retain
Antimony	NCL - East	20.1	0.259	1	0.259	0	Regression	0.66	0.0	1	1	20.10	5.2	0.03	0.16	5.37	0.059	0.59	90.98	9.10	Retain
Antimony	NCL - North	2.2	0.259	1	0.259	0	Regression	0.08	0.0	1	1	2.20	0.6	0.03	0.017	0.59	0.059	0.59	9.96	0.996	Pass
Antimony	Wetlands Beach	23.2	0.259	1	0.259	0	Regression	0.75	0.0	1	1	23.20	6.0	0.03	0.18	6.20	0.059	0.59	105.01	10.50	Retain
Arsenic	NCL - East	33.7	0.259	1	0.259	0	Regression	1.00	0.0	1	0.06146	2.07	0.5	0.03	0.26	0.80	1.04	1.66	0.77	0.48	Pass
Arsenic	NCL - North	7.2	0.259	1	0.259	0	Regression	1.00	0.0	1	0.06146	0.44	0.1	0.03	0.056	0.17	1.04	1.66	0.16	0.10	Pass
Arsenic	Wetlands Beach	13.6	0.259	1	0.259	0	Regression	1.00	0.0	1	0.06146	0.84	0.2	0.03	0.11	0.32	1.04	1.66	0.31	0.19	Pass
Barium	NCL - East	5040	0.259	1	0.259	0	Regression	1.00	0.0	1	1.148	5785.92	1500.1	0.03	39.20	1539.28	51.8	75	29.72	20.52	Retain
Barium	NCL - North	5060	0.259	1	0.259	0	Regression	1.00	0.0	1	1.148	5808.88	1506.0	0.03	39.36	1545.39	51.8	75	29.83	20.61	Retain
Barium	Wetlands Beach	3810	0.259	1	0.259	0	Regression	1.00	0.0	1	1.148	4373.88	1134.0	0.03	29.63	1163.62	51.8	75	22.46	15.51	Retain
Beryllium	NCL - East	16.8	0.259	1	0.259	0	Regression	4.65	0.0	1	0.045	0.76	0.2	0.03	0.13	0.33	0.532	NA	0.61	NA	Pass
Beryllium	NCL - North	18.7	0.259	1	0.259	0	Regression	5.03	0.0	1	0.045	0.84	0.2	0.03	0.15	0.36	0.532	NA	0.68	NA	Pass
Beryllium	Wetlands Beach	19.9	0.259	1	0.259	0	Regression	5.26	0.0	1	0.045	0.90	0.2	0.03	0.15	0.39	0.532	NA	0.73	NA	Pass
Cadmium	NCL - East	6.7	0.259	1	0.259	0	Regression	1.76	0.0	1	3.371	22.59	5.9	0.03	0.052	5.91	0.77	7.7	7.67	0.77	Pass
Cadmium	NCL - North	3.7	0.259	1	0.259	0	Regression	1.27	0.0	1	3.371	12.47	3.2	0.03	0.029	3.26	0.77	7.7	4.24	0.42	Pass
Cadmium	Wetlands Beach	11.3	0.259	1	0.259	0	Regression	2.33	0.0	1	3.371	38.09	9.9	0.03	0.088	9.96	0.77	7.7	12.94	1.29	Retain
Chromium	NCL - East	342	0.259	1	0.259	0	0.041	14.02	0.0	1	0.44	150.48	39.0	0.03	2.66	41.67	2.4	9.62	17.36	4.33	Retain
Chromium	NCL - North	51.3	0.259	1	0.259	0	0.041	2.10	0.0	1	0.44	22.57	5.9	0.03	0.40	6.25	2.4	9.62	2.60	0.65	Retain
Chromium	Wetlands Beach	472	0.259	1	0.259	0	0.041	19.35	0.0	1	0.44	207.68	53.8	0.03	3.67	57.52	2.4	9.62	23.96	5.98	Retain
Cobalt	NCL - East	13.7	0.259	1	0.259	0	0.0075	0.10	0.0	1	0.122	1.67	0.4	0.03	0.11	0.54	7.33	10.9	0.07	0.05	Pass
Cobalt	NCL - North	11.5	0.259	1	0.259	0	0.0075	0.09	0.0	1	0.122	1.40	0.4	0.03	0.089	0.45	7.33	10.9	0.06	0.04	Pass
Cobalt	Wetlands Beach	13.8	0.259	1	0.259	0	0.0075	0.10	0.0	1	0.122	1.68	0.4	0.03	0.11	0.54	7.33	10.9	0.07	0.05	Pass
Copper	NCL - East	3950	0.259	1	0.259	0	Regression	51.00	0.0	1	2.113	8346.35	2163.9	0.03	30.72	2194.63	5.6	9.34	391.90	235	Retain
Copper	NCL - North	270	0.259	1	0.259	0	Regression	17.72	0.0	1	2.113	570.51	147.9	0.03	2.10	150.01	5.6	9.34	26.79	16.1	Retain
Copper	Wetlands Beach	5480	0.259	1	0.259	0	Regression	58.03	0.0	1	2.113	11579.24	3002.1	0.03	42.62	3044.70	5.6	9.34	543.70	326	Retain
Iron	NCL - East	36400	0.259	1	0.259	0	0.00425	154.70	0.0	1	0.28	10192.00	2642.4	0.03	283.12	2925.53	--	--	--	--	Uncertainty
Iron	NCL - North	34500	0.259	1	0.259	0	0.00425	146.63	0.0	1	0.28	9660.00	2504.5	0.03	268.34	2772.82	--	--	--	--	Uncertainty
Iron	Wetlands Beach	22800	0.259	1	0.259	0	0.00425	96.90	0.0	1	0.28	6384.00	1655.1	0.03	177.34	1832.48	--	--	--	--	Uncertainty
Lead	NCL - East	616	0.259	1	0.259	0	Regression	9.73	0.0	1	0.613	377.61	97.9	0.03	4.79	102.69	4.7	8.9	21.8	11.5	Retain
Lead	NCL - North	306	0.259	1	0.259	0	Regression	6.57	0.0	1	0.613	187.58	48.6	0.03	2.38	51.01	4.7	8.9	10.9	5.7	Retain
Lead	Wetlands Beach	641	0.259	1	0.259	0	Regression	9.95	0.0	1	0.613	392.93	101.9	0.03	4.99	106.86	4.7	8.9	22.7	12.0	Retain
Manganese	NCL - East	2100	0.259	1	0.259	0	0.079	165.90	0.0	1	0.361	758.10	196.5	0.03	16.33	212.88	51.5	71	4.13	3.00	Retain
Manganese	NCL - North	986	0.259	1	0.259	0	0.079	77.89	0.0	1	0.361	355.95	92.3	0.03	7.67	99.95	51.5	71	1.94	1.41	Retain
Manganese	Wetlands Beach	1870	0.259	1	0.259	0	0.079	147.73	0.0	1	0.361	675.07	175.0	0.03	14.54	189.57	51.5	71	3.68	2.67	Retain
Mercury	NCL - East	0.18	0.259	1	0.259	0	Regression	0.15	0.0	1	2.25	0.41	0.1	0.03	0.001	0.11	0.032	0.16	3.33	0.67	Pass
Mercury	NCL - North	0.23	0.259	1	0.259	0	Regression	0.17	0.0	1	2.25	0.52	0.1	0.03	0.002	0.14	0.032	0.16	4.25	0.85	Pass
Mercury	Wetlands Beach	1.3	0.259	1	0.259	0	Regression	0.43	0.0	1	2.25	2.93	0.8	0.03	0.010	0.77	0.032	0.16	24.01	4.80	Retain

TABLE 6-11

Exposure Estimates for the California Vole and Ornate Shrew Based on Maximum Surface Soil (0-6 inches) Concentrations by Area and Compared to Literature-Based Mammalian Toxicity Reference Values

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

			Life History Parameters			Plant Uptake				Invertebrate Uptake				Soil Uptake			TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	Area	Maximum Soil Concentration (mg/kg)	Food Intake (kg/kg-BW/day)	Area Use Factor	Daily Food Ingestion from Site (kg/kg-BW/day)	Diet Proportion	Soil to Plant BAF	Plant Concentration (mg/kg)	Plant Dose (mg/kg-BW/day)	Diet Proportion	Soil to Invertebrate BAF	Invertebrate Concentration (mg/kg)	Invertebrate Dose (mg/kg-BW/day)	Diet Proportion	Incidental Soil Dose (mg/kg-BW/day)	Total Dose (mg/kg-BW/day)	**NOAEL**	**LOAEL**	**NOAEL-Based**	**LOAEL-Based**	**Result**
Nickel	NCL - East	179	0.259	1	0.259	0	Regression	5.24	0.0	1	1.189	212.83	55.2	0.03	1.39	56.57	1.7	3.4	33.28	16.64	Retain
Nickel	NCL - North	42.9	0.259	1	0.259	0	Regression	1.80	0.0	1	1.189	51.01	13.2	0.03	0.334	13.56	1.7	3.4	7.98	3.99	Retain
Nickel	Wetlands Beach	204	0.259	1	0.259	0	Regression	5.78	0.0	1	1.189	242.56	62.9	0.03	1.59	64.47	1.7	3.4	37.93	18.96	Retain
Selenium	NCL - East	5.6	0.259	1	0.259	0	Regression	3.40	0.0	1	Regression	3.28	0.9	0.03	0.044	0.89	0.143	0.215	6.25	4.16	Retain
Selenium	NCL - North	15.2	0.259	1	0.259	0	Regression	10.24	0.0	1	Regression	6.82	1.8	0.03	0.12	1.89	0.143	0.215	13.19	8.77	Retain
Selenium	Wetlands Beach	8.1	0.259	1	0.259	0	Regression	5.11	0.0	1	Regression	4.30	1.1	0.03	0.063	1.18	0.143	0.215	8.23	5.48	Retain
Silver	NCL - East	4.9	0.259	1	0.259	0	0.014	0.07	0.0	1	2.045	10.02	2.6	0.03	0.038	2.64	6.02	60.2	0.44	0.04	Pass
Silver	NCL - North	8.3	0.259	1	0.259	0	0.014	0.12	0.0	1	2.045	16.97	4.4	0.03	0.065	4.47	6.02	60.2	0.74	0.07	Pass
Silver	Wetlands Beach	6.5	0.259	1	0.259	0	0.014	0.09	0.0	1	2.045	13.29	3.4	0.03	0.051	3.50	6.02	60.2	0.58	0.06	Pass
Thallium	NCL - East	0.99	0.259	1	0.259	0	0.004	0.00	0.0	1	0.0541	0.05	0.0	0.03	0.008	0.02	0.015	0.075	1.44	0.29	Pass
Thallium	NCL - North	0.67	0.259	1	0.259	0	0.004	0.00	0.0	1	0.0541	0.04	0.0	0.03	0.005	0.01	0.015	0.075	0.97	0.19	Pass
Thallium	Wetlands Beach	1.4	0.259	1	0.259	0	0.004	0.01	0.0	1	0.0541	0.08	0.0	0.03	0.011	0.03	0.015	0.075	2.04	0.41	Pass
Vanadium	NCL - East	125	0.259	1	0.259	0	0.00485	0.61	0.0	1	0.187	23.38	6.1	0.03	0.97	7.03	4.16	8.31	1.69	0.85	Pass
Vanadium	NCL - North	62.7	0.259	1	0.259	0	0.00485	0.30	0.0	1	0.187	11.72	3.0	0.03	0.49	3.53	4.16	8.31	0.85	0.42	Pass
Vanadium	Wetlands Beach	74.7	0.259	1	0.259	0	0.00485	0.36	0.0	1	0.187	13.97	3.6	0.03	0.58	4.20	4.16	8.31	1.01	0.51	Pass
Zinc	NCL - East	4570	0.259	1	0.259	0	Regression	519.12	0.0	1	1.195	5461.15	1415.9	0.03	35.55	1451.42	75.4	75.9	19.25	19.12	Retain
Zinc	NCL - North	790	0.259	1	0.259	0	Regression	195.97	0.0	1	1.195	944.05	244.8	0.03	6.14	250.90	75.4	75.9	3.33	3.31	Retain
Zinc	Wetlands Beach	3800	0.259	1	0.259	0	Regression	468.59	0.0	1	1.195	4541.00	1177.3	0.03	29.56	1206.87	75.4	75.9	16.01	15.90	Retain

Notes:

-- no TRVs available

BAF = bioaccumulation factor

kg = kilogram

kg/kg-BW/day = kilogram per kilogram body weight per day

LOAEL = lowest observed adverse effect level

mg/kg = milligram per kilogram

mg/kg-BW/day = milligram per kilogram body weight per day

NOAEL = no observed adverse effect level

Pass = dose based on maximum soil concentration was less than the LOAEL; therefore, there are no risks to California vole or ornate shrew populations and no further evaluation was necessary

Regression = bioaccumulation represented by a linear regression equation

Retain = dose based on maximum soil concentration exceeded the LOAEL; therefore, this analyte was Retained for further evaluation

TRV = toxicity reference value

Uncertainty = benchmark value not available; therefore, this analyte Retained as an Uncertainty

Shading and bold indicates exceedances of the benchmarks.

TABLE 6-12

Risk-Based Concentrations for Wildlife (mg/kg)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	LOAEL-Based Mammal RBCs		NOAEL-Based Bird RBCs			LOAEL-Based Bird RBCs		
Analyte	**California Vole**	**Ornate Shrew**	**Terrestrial-Feeding Belding's Savannah Sparrow**	**Aquatic-Feeding Belding's Savannah Sparrow**	**Western Snowy Plover**	**Terrestrial-Feeding Belding's Savannah Sparrow**	**Aquatic-Feeding Belding's Savannah Sparrow**	**Western Snowy Plover**
Aluminum	3487	220	2596	17259	2891	--	--	--
Antimony	52.2	2.21	--	--	--	--	--	--
Arsenic	131	70.0	582	178	80.2	2546	781	347
Barium	2023	246	122	1318	384	246	2651	771
Beryllium	6.90	27.4	--	--	--	--	--	--
Cadmium	661	8.73	2.85	17.7	10.9	4.68	30.2	17.6
Chromium	718	78.9	41.0	155	55.58	42.9	162	58.1
Cobalt	1680	277	361	361	123	370	370	126
Copper	773	16.8	10.2	132	69.6	33.0	513	208
Iron	--	--	--	--	--	--	--	--
Lead	1208	53.4	18.3	80.5	30.4	37.6	173	60.7
Manganese	3346	700	2959	3217	1684	5752	6254	3275
Mercury	3.23	0.271	0.176	0.145	0.105	1.13	0.911	0.572
Nickel	337	10.8	42.4	262	102	73.0	457	175
Selenium	1.85	0.824	1.68	0.565	0.357	3.64	1.12	0.712
Silver	7690	112	7.73	7.73	4.24	77.3	77.3	42.4
Thallium	13.0	3.44	--	--	--	--	--	--
Vanadium	1398	148	11.3	27.4	7.22	22.6	54.8	14.4
Zinc	1932	239	293	441	305	295	444	306
TEQ - Bird	na	na	na	0.00009989	0.00006536	na	0.000999	0.00065

Notes:

-- = RBC not calculated due to a lack of TRVs for that receptor/analyte combination

LOAEL = lowest observed adverse effect level

na = not applicable; TEQs were not calculated for soil-associated birds and mammals because dioxin/furans were only a concern in sediment.

NOAEL = no observed adverse effect level

RBC = risk-based concentration; developed by back-calculation of the exposure and risk estimate to obtain a hazard quotient of one (see Appendix H for details)

TEQ-Bird = Toxic Equivalency Quotient for Birds (calculated using avian toxic equivalency factors)

TRV = toxicity reference value

Risk-based concentrations for mammals were calculated using the LOAEL.

Risk-based concentrations for birds were calculated using both the NOAEL and the LOAEL to provide a range of effects for these special-status species.

TABLE 6-13a

Mean Surface Sediment (0-6 inches) Concentrations (mg/kg) of Inorganics by Subarea Compared to NOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
NCL - East	NCL - East (< 8' Elev)	Aluminum	50	50	31294.60	39810.37	17259	2891	12100	**1.81**	**10.82**	**2.59**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Arsenic	50	50	4.74	4.66	178	80.2	4	0.03	0.06	**1.18**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Barium	50	50	672.19	1048.73	1318	384	149	0.51	**1.75**	**4.51**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Cadmium	50	50	1.46	1.55	17.7	10.9	0.87	0.08	0.13	**1.68**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Chromium	50	50	61.10	78.53	155	55.58	17	0.39	**1.10**	**3.59**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Cobalt	27	50	7.06	2.60	361	123	8.1	0.02	0.06	0.87	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Copper	50	50	591.73	1014.51	132	69.6	20.2	**4.48**	**8.50**	**29.29**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Lead	50	50	89.89	119.56	80.5	30.4	14.4	**1.12**	**2.96**	**6.24**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Manganese	50	50	473.50	460.36	3217	1684	399	0.15	0.28	**1.19**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Mercury	18	50	0.09	0.05	0.145	0.105	0.05	0.60	0.82	**1.73**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Nickel	49	50	41.96	41.56	262	102	21.2	0.16	0.41	**1.98**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Selenium	47	50	1.62	1.26	0.565	0.357	0.8	**2.88**	**4.56**	**2.03**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Silver	29	50	1.14	1.24	7.73	4.24	NA	0.15	0.27	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	Vanadium	50	50	41.81	18.51	27.4	7.22	32.5	**1.53**	**5.79**	**1.29**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Zinc	50	50	567.28	943.95	441	305	69.7	**1.29**	**1.86**	**8.14**	Fail	Fail	BL
NCL - North	NCL - Ditch	Aluminum	4	4	12030.00	5589.36	17259	2891	12100	0.70	**4.16**	0.99	Pass	Fail	Pass
NCL - North	NCL - Ditch	Arsenic	4	4	2.82	1.36	178	80.2	4	0.02	0.04	0.71	Pass	Pass	BL
NCL - North	NCL - Ditch	Barium	4	4	283.50	124.76	1318	384	149	0.22	0.74	**1.90**	Pass	Pass	BL
NCL - North	NCL - Ditch	Cadmium	4	4	1.00	0.61	17.7	10.9	0.87	0.06	0.09	**1.15**	Pass	Pass	BL
NCL - North	NCL - Ditch	Chromium	4	4	24.13	8.12	155	55.58	17	0.16	0.43	**1.42**	Pass	Pass	BL
NCL - North	NCL - Ditch	Cobalt	1	4	7.00	3.04	361	123	8.1	0.02	0.06	0.86	Pass	Pass	BL
NCL - North	NCL - Ditch	Copper	4	4	91.90	70.19	132	69.6	20.2	0.70	**1.32**	**4.55**	Pass	Fail	BL
NCL - North	NCL - Ditch	Lead	4	4	160.13	105.43	80.5	30.4	14.4	**1.99**	**5.27**	**11.12**	Fail	Fail	BL
NCL - North	NCL - Ditch	Manganese	4	4	183.70	72.25	3217	1684	399	0.06	0.11	0.46	Pass	Pass	BL
NCL - North	NCL - Ditch	Mercury	0	4	0.09	0.06	0.145	0.105	0.05	0.65	0.89	**1.88**	Pass	Pass	BL
NCL - North	NCL - Ditch	Nickel	4	4	23.05	10.01	262	102	21.2	0.09	0.23	**1.09**	Pass	Pass	BL
NCL - North	NCL - Ditch	Selenium	4	4	2.40	1.35	0.565	0.357	0.8	**4.25**	**6.73**	**3.00**	Fail	Fail	Fail
NCL - North	NCL - Ditch	Silver	4	4	0.44	0.15	7.73	4.24	NA	0.06	0.10	NA	Pass	Pass	NA
NCL - North	NCL - Ditch	Vanadium	4	4	34.40	13.56	27.4	7.22	32.5	**1.26**	**4.76**	**1.06**	Fail	Fail	Fail
NCL - North	NCL - Ditch	Zinc	4	4	269.14	143.73	441	305	69.7	0.61	0.88	**3.86**	Pass	Pass	BL
NCL - North	NCL - Pond	Aluminum	18	18	14296.67	4335.95	17259	2891	12100	0.83	**4.94**	**1.18**	Pass	Fail	Fail
NCL - North	NCL - Pond	Arsenic	18	18	3.83	1.72	178	80.2	4	0.02	0.05	0.96	Pass	Pass	BL
NCL - North	NCL - Pond	Barium	18	18	454.89	1154.83	1318	384	149	0.35	**1.18**	**3.05**	Pass	Fail	BL
NCL - North	NCL - Pond	Cadmium	18	18	1.37	0.77	17.7	10.9	0.87	0.08	0.13	**1.57**	Pass	Pass	BL
NCL - North	NCL - Pond	Chromium	18	18	21.05	9.23	155	55.58	17	0.14	0.38	**1.24**	Pass	Pass	BL
NCL - North	NCL - Pond	Cobalt	16	18	7.91	1.61	361	123	8.1	0.02	0.06	0.98	Pass	Pass	BL
NCL - North	NCL - Pond	Copper	18	18	50.88	63.48	132	69.6	20.2	0.38	0.73	**2.52**	Pass	Pass	BL
NCL - North	NCL - Pond	Lead	18	18	37.15	39.33	80.5	30.4	14.4	0.46	**1.22**	**2.58**	Pass	Fail	BL
NCL - North	NCL - Pond	Manganese	18	18	347.06	198.12	3217	1684	399	0.11	0.21	0.87	Pass	Pass	BL
NCL - North	NCL - Pond	Mercury	3	18	0.14	0.05	0.145	0.105	0.05	0.997	**1.37**	**2.89**	Pass	Fail	BL
NCL - North	NCL - Pond	Nickel	18	18	23.77	6.70	262	102	21.2	0.09	0.23	**1.12**	Pass	Pass	BL
NCL - North	NCL - Pond	Selenium	9	18	2.82	3.31	0.565	0.357	0.8	**4.99**	**7.90**	**3.52**	Fail	Fail	Fail
NCL - North	NCL - Pond	Silver	4	18	0.55	0.19	7.73	4.24	NA	0.07	0.13	NA	Pass	Pass	NA
NCL - North	NCL - Pond	Vanadium	18	18	39.53	13.35	27.4	7.22	32.5	**1.44**	**5.47**	**1.22**	Fail	Fail	Fail
NCL - North	NCL - Pond	Zinc	18	18	180.77	189.50	441	305	69.7	0.41	0.59	**2.59**	Pass	Pass	BL

TABLE 6-13a

Mean Surface Sediment (0-6 inches) Concentrations (mg/kg) of Inorganics by Subarea Compared to NOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
OID Lagoon	Lagoon - Main	Aluminum	13	13	5366.92	2433.94	17259	2891	12100	0.31	**1.86**	0.44	Pass	Fail	Pass
OID Lagoon	Lagoon - Main	Arsenic	13	13	2.88	1.10	178	80.2	4	0.02	0.04	0.72	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Barium	13	13	119.05	54.24	1318	384	149	0.09	0.31	0.80	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Cadmium	13	13	0.85	0.42	17.7	10.9	0.87	0.05	0.08	0.98	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Chromium	13	13	13.89	5.79	155	55.58	17	0.09	0.25	0.82	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Cobalt	1	13	3.41	1.67	361	123	8.1	0.01	0.03	0.42	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Copper	12	13	51.43	33.50	132	69.6	20.2	0.39	0.74	**2.55**	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Lead	13	13	17.41	11.88	80.5	30.4	14.4	0.22	0.57	**1.21**	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Manganese	13	13	322.15	166.66	3217	1684	399	0.10	0.19	0.81	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Mercury	5	13	0.10	0.08	0.145	0.105	0.05	0.70	0.96	**2.02**	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Nickel	11	13	11.55	4.83	262	102	21.2	0.04	0.11	0.54	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Selenium	11	13	1.40	0.61	0.565	0.357	0.8	**2.48**	**3.93**	**1.75**	Fail	Fail	Fail
OID Lagoon	Lagoon - Main	Silver	5	13	0.77	0.31	7.73	4.24	NA	0.10	0.18	NA	Pass	Pass	NA
OID Lagoon	Lagoon - Main	Vanadium	13	13	18.78	6.69	27.4	7.22	32.5	0.69	**2.60**	0.58	Pass	Fail	Pass
OID Lagoon	Lagoon - Main	Zinc	13	13	168.25	98.24	441	305	69.7	0.38	0.55	**2.41**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Aluminum	8	8	2292.50	1696.94	17259	2891	12100	0.13	0.79	0.19	Pass	Pass	Pass
OID Lagoon	Lagoon Finger - West	Arsenic	8	8	2.44	2.74	178	80.2	4	0.01	0.03	0.61	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Barium	7	8	39.24	39.03	1318	384	149	0.03	0.10	0.26	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Cadmium	5	8	0.49	0.56	17.7	10.9	0.87	0.03	0.05	0.57	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Chromium	8	8	8.18	6.57	155	55.58	17	0.05	0.15	0.48	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Cobalt	0	8	2.88	1.70	361	123	8.1	0.01	0.02	0.36	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Copper	6	8	12.73	20.52	132	69.6	20.2	0.10	0.18	0.63	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Lead	7	8	10.15	15.82	80.5	30.4	14.4	0.13	0.33	0.70	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Manganese	8	8	262.75	387.05	3217	1684	399	0.08	0.16	0.66	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Mercury	1	8	0.09	0.09	0.145	0.105	0.05	0.61	0.84	**1.77**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Nickel	8	8	5.83	5.28	262	102	21.2	0.02	0.06	0.27	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Selenium	2	8	1.11	0.71	0.565	0.357	0.8	**1.97**	**3.12**	**1.39**	Fail	Fail	Fail
OID Lagoon	Lagoon Finger - West	Silver	0	8	0.71	0.36	7.73	4.24	NA	0.09	0.17	NA	Pass	Pass	NA
OID Lagoon	Lagoon Finger - West	Vanadium	8	8	28.18	20.30	27.4	7.22	32.5	**1.03**	**3.90**	0.87	Fail	Fail	Pass
OID Lagoon	Lagoon Finger - West	Zinc	8	8	91.49	152.22	441	305	69.7	0.21	0.30	**1.31**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Aluminum	6	6	1930.00	577.79	17259	2891	12100	0.11	0.67	0.16	Pass	Pass	Pass
OID Lagoon	Lagoon Finger - East	Arsenic	6	6	1.40	0.33	178	80.2	4	0.01	0.02	0.35	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Barium	5	6	23.25	5.14	1318	384	149	0.02	0.06	0.16	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Cadmium	3	6	0.27	0.18	17.7	10.9	0.87	0.02	0.02	0.31	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Chromium	6	6	5.28	1.04	155	55.58	17	0.03	0.10	0.31	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Cobalt	0	6	3.52	2.73	361	123	8.1	0.01	0.03	0.43	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Copper	4	6	3.98	2.45	132	69.6	20.2	0.03	0.06	0.20	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Lead	6	6	2.25	0.83	80.5	30.4	14.4	0.03	0.07	0.16	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Manganese	6	6	76.37	21.86	3217	1684	399	0.02	0.05	0.19	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Mercury	0	6	0.13	0.01	0.145	0.105	0.05	0.87	**1.21**	**2.53**	Pass	Fail	BL
OID Lagoon	Lagoon Finger - East	Nickel	3	6	4.10	0.94	262	102	21.2	0.02	0.04	0.19	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Selenium	1	6	0.85	0.40	0.565	0.357	0.8	**1.50**	**2.37**	**1.06**	Fail	Fail	Fail
OID Lagoon	Lagoon Finger - East	Silver	0	6	0.61	0.09	7.73	4.24	NA	0.08	0.14	NA	Pass	Pass	NA
OID Lagoon	Lagoon Finger - East	Vanadium	6	6	23.47	24.74	27.4	7.22	32.5	0.86	**3.25**	0.72	Pass	Fail	Pass
OID Lagoon	Lagoon Finger - East	Zinc	6	6	19.57	9.03	441	305	69.7	0.04	0.06	0.28	Pass	Pass	BL

TABLE 6-13a

Mean Surface Sediment (0-6 inches) Concentrations (mg/kg) of Inorganics by Subarea Compared to NOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
OID Lagoon	Lagoon Finger - Footbridge	Aluminum	7	7	6784.29	4161.27	17259	2891	12100	0.39	**2.35**	0.56	Pass	Fail	Pass
OID Lagoon	Lagoon Finger - Footbridge	Arsenic	7	7	2.56	0.72	178	80.2	4	0.01	0.03	0.64	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Barium	6	7	103.67	47.34	1318	384	149	0.08	0.27	0.70	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Cadmium	7	7	0.78	0.50	17.7	10.9	0.87	0.04	0.07	0.90	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Chromium	7	7	13.40	4.78	155	55.58	17	0.09	0.24	0.79	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Cobalt	2	7	3.27	1.77	361	123	8.1	0.01	0.03	0.40	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Copper	7	7	56.23	30.98	132	69.6	20.2	0.43	0.81	**2.78**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Lead	7	7	19.99	10.14	80.5	30.4	14.4	0.25	0.66	**1.39**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Manganese	7	7	282.59	128.01	3217	1684	399	0.09	0.17	0.71	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Mercury	1	6	0.18	0.13	0.145	0.105	0.05	**1.24**	**1.71**	**3.60**	Fail	Fail	BL
OID Lagoon	Lagoon Finger - Footbridge	Nickel	3	7	12.74	6.55	262	102	21.2	0.05	0.12	0.60	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Selenium	7	7	3.16	2.37	0.565	0.357	0.8	**5.59**	**8.85**	**3.95**	Fail	Fail	Fail
OID Lagoon	Lagoon Finger - Footbridge	Silver	0	7	1.10	0.85	7.73	4.24	NA	0.14	0.26	NA	Pass	Pass	NA
OID Lagoon	Lagoon Finger - Footbridge	Vanadium	7	7	17.20	7.02	27.4	7.22	32.5	0.63	**2.38**	0.53	Pass	Fail	Pass
OID Lagoon	Lagoon Finger - Footbridge	Zinc	7	7	156.80	83.65	441	305	69.7	0.36	0.51	**2.25**	Pass	Pass	BL
OID Lagoon	OID - North	Aluminum	7	7	1948.57	310.77	17259	2891	12100	0.11	0.67	0.16	Pass	Pass	Pass
OID Lagoon	OID - North	Arsenic	7	7	0.89	0.21	178	80.2	4	0.005	0.01	0.22	Pass	Pass	BL
OID Lagoon	OID - North	Barium	3	7	25.13	5.93	1318	384	149	0.02	0.07	0.17	Pass	Pass	BL
OID Lagoon	OID - North	Cadmium	7	7	0.41	0.09	17.7	10.9	0.87	0.02	0.04	0.47	Pass	Pass	BL
OID Lagoon	OID - North	Chromium	7	7	3.83	0.96	155	55.58	17	0.02	0.07	0.23	Pass	Pass	BL
OID Lagoon	OID - North	Cobalt	0	7	1.66	0.30	361	123	8.1	0.005	0.01	0.20	Pass	Pass	BL
OID Lagoon	OID - North	Copper	7	7	11.14	10.08	132	69.6	20.2	0.08	0.16	0.55	Pass	Pass	BL
OID Lagoon	OID - North	Lead	7	7	4.07	1.37	80.5	30.4	14.4	0.05	0.13	0.28	Pass	Pass	BL
OID Lagoon	OID - North	Manganese	7	7	130.66	38.40	3217	1684	399	0.04	0.08	0.33	Pass	Pass	BL
OID Lagoon	OID - North	Mercury	0	7	0.13	0.01	0.145	0.105	0.05	0.89	**1.22**	**2.57**	Pass	Fail	BL
OID Lagoon	OID - North	Nickel	3	7	4.60	1.31	262	102	21.2	0.02	0.04	0.22	Pass	Pass	BL
OID Lagoon	OID - North	Selenium	6	7	0.47	0.11	0.565	0.357	0.8	0.82	**1.31**	0.58	Pass	Fail	Pass
OID Lagoon	OID - North	Silver	3	7	0.64	0.02	7.73	4.24	NA	0.08	0.15	NA	Pass	Pass	NA
OID Lagoon	OID - North	Vanadium	7	7	5.86	1.30	27.4	7.22	32.5	0.21	0.81	0.18	Pass	Pass	Pass
OID Lagoon	OID - North	Zinc	7	7	45.63	6.58	441	305	69.7	0.10	0.15	0.65	Pass	Pass	BL
OID Lagoon	OID - Site	Aluminum	8	8	14088.75	8405.57	17259	2891	12100	0.82	**4.87**	**1.16**	Pass	Fail	Fail
OID Lagoon	OID - Site	Arsenic	8	8	5.08	2.20	178	80.2	4	0.03	0.06	**1.27**	Pass	Pass	BL
OID Lagoon	OID - Site	Barium	8	8	245.13	104.37	1318	384	149	0.19	0.64	**1.65**	Pass	Pass	BL
OID Lagoon	OID - Site	Cadmium	7	8	1.04	1.07	17.7	10.9	0.87	0.06	0.10	**1.20**	Pass	Pass	BL
OID Lagoon	OID - Site	Chromium	8	8	28.56	9.64	155	55.58	17	0.18	0.51	**1.68**	Pass	Pass	BL
OID Lagoon	OID - Site	Cobalt	4	8	9.73	6.14	361	123	8.1	0.03	0.08	**1.20**	Pass	Pass	BL
OID Lagoon	OID - Site	Copper	8	8	36.04	16.81	132	69.6	20.2	0.27	0.52	**1.78**	Pass	Pass	BL
OID Lagoon	OID - Site	Lead	8	8	17.51	11.70	80.5	30.4	14.4	0.22	0.58	**1.22**	Pass	Pass	BL
OID Lagoon	OID - Site	Manganese	8	8	461.88	226.81	3217	1684	399	0.14	0.27	**1.16**	Pass	Pass	BL
OID Lagoon	OID - Site	Mercury	7	8	0.06	0.03	0.145	0.105	0.05	0.39	0.53	**1.12**	Pass	Pass	BL
OID Lagoon	OID - Site	Nickel	8	8	27.26	15.39	262	102	21.2	0.10	0.27	**1.29**	Pass	Pass	BL
OID Lagoon	OID - Site	Selenium	8	8	1.13	0.42	0.565	0.357	0.8	**2.01**	**3.18**	**1.42**	Fail	Fail	Fail
OID Lagoon	OID - Site	Silver	4	8	0.85	0.58	7.73	4.24	NA	0.11	0.20	NA	Pass	Pass	NA
OID Lagoon	OID - Site	Vanadium	8	8	44.29	18.79	27.4	7.22	32.5	**1.62**	**6.13**	**1.36**	Fail	Fail	Fail
OID Lagoon	OID - Site	Zinc	8	8	96.28	31.11	441	305	69.7	0.22	0.32	**1.38**	Pass	Pass	BL

TABLE 6-13a

Mean Surface Sediment (0-6 inches) Concentrations (mg/kg) of Inorganics by Subarea Compared to NOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
Wetlands Beach	WMU Ditch	Aluminum	12	12	64763.33	34941.57	17259	2891	12100	**3.75**	**22.40**	**5.35**	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Arsenic	12	12	6.28	2.92	178	80.2	4	0.04	0.08	**1.57**	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Barium	12	12	1327.46	843.23	1318	384	149	**1.01**	**3.45**	**8.91**	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Cadmium	12	12	2.43	1.29	17.7	10.9	0.87	0.14	0.22	**2.79**	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Chromium	12	12	131.84	116.71	155	55.58	17	0.85	**2.37**	**7.76**	Pass	Fail	BL
Wetlands Beach	WMU Ditch	Cobalt	6	12	6.13	2.08	361	123	8.1	0.02	0.05	0.76	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Copper	12	12	1615.56	1128.03	132	69.6	20.2	**12.22**	**23.22**	**79.98**	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Lead	12	12	167.18	107.54	80.5	30.4	14.4	**2.08**	**5.50**	**11.61**	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Manganese	12	12	782.09	372.91	3217	1684	399	0.24	0.46	**1.96**	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Mercury	3	11	0.15	0.09	0.145	0.105	0.05	**1.03**	**1.42**	**2.99**	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Nickel	12	12	73.39	41.64	262	102	21.2	0.28	0.72	**3.46**	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Selenium	10	12	2.77	2.03	0.565	0.357	0.8	**4.91**	**7.77**	**3.47**	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Silver	11	12	1.93	1.04	7.73	4.24	NA	0.25	0.46	NA	Pass	Pass	NA
Wetlands Beach	WMU Ditch	Vanadium	12	12	39.40	16.74	27.4	7.22	32.5	**1.44**	**5.46**	**1.21**	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Zinc	12	12	1289.36	666.15	441	305	69.7	**2.92**	**4.23**	**18.50**	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Aluminum	9	9	57604.44	47043.00	17259	2891	12100	**3.34**	**19.92**	**4.76**	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 5' South	Arsenic	9	9	3.86	2.40	178	80.2	4	0.02	0.05	0.96	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Barium	9	9	894.71	899.49	1318	384	149	0.68	**2.33**	**6.00**	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Cadmium	9	9	1.36	1.23	17.7	10.9	0.87	0.08	0.12	**1.57**	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Chromium	9	9	91.24	82.37	155	55.58	17	0.59	**1.64**	**5.37**	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Cobalt	4	9	3.63	1.94	361	123	8.1	0.01	0.03	0.45	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Copper	9	9	1166.84	865.05	132	69.6	20.2	**8.83**	**16.77**	**57.76**	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Lead	9	9	149.44	189.44	80.5	30.4	14.4	**1.86**	**4.92**	**10.38**	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Manganese	9	9	461.74	337.35	3217	1684	399	0.14	0.27	**1.16**	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Mercury	0	9	0.18	0.08	0.145	0.105	0.05	**1.26**	**1.73**	**3.64**	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Nickel	9	9	60.66	41.57	262	102	21.2	0.23	0.59	**2.86**	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Selenium	9	9	2.36	2.44	0.565	0.357	0.8	**4.18**	**6.62**	**2.95**	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 5' South	Silver	8	9	0.97	0.54	7.73	4.24	NA	0.13	0.23	NA	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 5' South	Vanadium	9	9	28.19	18.33	27.4	7.22	32.5	**1.03**	**3.90**	0.87	Fail	Fail	Pass
Wetlands Beach	WMU Ditch - 5' South	Zinc	9	9	1066.16	1035.05	441	305	69.7	**2.42**	**3.50**	**15.30**	Fail	Fail	BL

Notes:

-- = benchmark is unavailable

BL = background concentration is lower than the bird RBCs

Fail = mean concentration exceeds the NOAEL-based RBC and background; therefore, this analyte was considered to pose a possible risk to individual special-status avian species

HQ = hazard quotient

mg/kg = milligrams per kilogram

N = sample size

NA = not available

NOAEL = no observed adverse effect level

Pass = mean concentration was less than the NOAEL-based RBC or less than background; therefore, there are no risks to individual special-status avian species

RBC = risk-based concentration

UTL = upper tolerance limit

Shading or bold indicates cases where the mean soil concentration exceeds the bird RBC or background value.

Background is only used in the risk results if it is greater than the bird RBCs; otherwise the background risk result is marked as BL.

TABLE 6-13b

Mean Surface Sediment (0-6 inches) Concentrations (mg/kg) of Inorganics by Subarea Compared to LOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
NCL - East	NCL - East (< 8' Elev)	Aluminum	50	50	31294.60	39810.37	--	--	12100	**--**	**--**	**2.59**	Use NOAEL	Use NOAEL	Fail
NCL - East	NCL - East (< 8' Elev)	Arsenic	50	50	4.74	4.66	781	347.0	4	0.01	0.01	**1.18**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Barium	50	50	672.19	1048.73	2651	771	149	0.25	0.87	**4.51**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Cadmium	50	50	1.46	1.55	30.2	17.6	0.87	0.05	0.08	**1.68**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Chromium	50	50	61.10	78.53	162	58.10	17	0.38	**1.05**	**3.59**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Cobalt	27	50	7.06	2.60	370	126	8.1	0.02	0.06	0.87	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Copper	50	50	591.73	1014.51	513	208.0	20.2	**1.15**	**2.84**	**29.29**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Lead	50	50	89.89	119.56	173.0	60.7	14.4	0.52	**1.48**	**6.24**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Manganese	50	50	473.50	460.36	6254	3275	399	0.08	0.14	**1.19**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Mercury	18	50	0.09	0.05	0.911	0.572	0.05	0.09	0.15	**1.73**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Nickel	49	50	41.96	41.56	457	175	21.2	0.09	0.24	**1.98**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Selenium	47	50	1.62	1.26	1.120	0.712	0.8	**1.45**	**2.28**	**2.03**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Silver	29	50	1.14	1.24	77.30	42.40	NA	0.01	0.03	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	Vanadium	50	50	41.81	18.51	54.8	14.40	32.5	0.76	**2.90**	**1.29**	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Zinc	50	50	567.28	943.95	444	306	69.7	**1.28**	**1.85**	**8.14**	Fail	Fail	BL
NCL - North	NCL - Ditch	Aluminum	4	4	12030.00	5589.36	--	--	12100	**--**	**--**	0.99	Use NOAEL	Use NOAEL	Pass
NCL - North	NCL - Ditch	Arsenic	4	4	2.82	1.36	781	347.0	4	0.00	0.01	0.71	Pass	Pass	BL
NCL - North	NCL - Ditch	Barium	4	4	283.50	124.76	2651	771	149	0.11	0.37	**1.90**	Pass	Pass	BL
NCL - North	NCL - Ditch	Cadmium	4	4	1.00	0.61	30.2	17.6	0.87	0.03	0.06	**1.15**	Pass	Pass	BL
NCL - North	NCL - Ditch	Chromium	4	4	24.13	8.12	162	58.10	17	0.15	0.42	**1.42**	Pass	Pass	BL
NCL - North	NCL - Ditch	Cobalt	1	4	7.00	3.04	370	126	8.1	0.02	0.06	0.86	Pass	Pass	BL
NCL - North	NCL - Ditch	Copper	4	4	91.90	70.19	513	208.0	20.2	0.18	0.44	**4.55**	Pass	Pass	BL
NCL - North	NCL - Ditch	Lead	4	4	160.13	105.43	173.0	60.7	14.4	0.93	**2.64**	**11.12**	Pass	Fail	BL
NCL - North	NCL - Ditch	Manganese	4	4	183.70	72.25	6254	3275	399	0.03	0.06	0.46	Pass	Pass	BL
NCL - North	NCL - Ditch	Mercury	0	4	0.09	0.06	0.911	0.572	0.05	0.10	0.16	**1.88**	Pass	Pass	BL
NCL - North	NCL - Ditch	Nickel	4	4	23.05	10.01	457	175	21.2	0.05	0.13	**1.09**	Pass	Pass	BL
NCL - North	NCL - Ditch	Selenium	4	4	2.40	1.35	1.120	0.712	0.8	**2.14**	**3.37**	**3.00**	Fail	Fail	Fail
NCL - North	NCL - Ditch	Silver	4	4	0.44	0.15	77.30	42.40	NA	0.01	0.01	NA	Pass	Pass	NA
NCL - North	NCL - Ditch	Vanadium	4	4	34.40	13.56	54.8	14.40	32.5	0.63	**2.39**	**1.06**	Pass	Fail	Fail
NCL - North	NCL - Ditch	Zinc	4	4	269.14	143.73	444	306	69.7	0.61	0.88	**3.86**	Pass	Pass	BL
NCL - North	NCL - Pond	Aluminum	18	18	14296.67	4335.95	--	--	12100	**--**	**--**	**1.18**	Use NOAEL	Use NOAEL	Fail
NCL - North	NCL - Pond	Arsenic	18	18	3.83	1.72	781	347.0	4	0.00	0.01	0.96	Pass	Pass	BL
NCL - North	NCL - Pond	Barium	18	18	454.89	1154.83	2651	771	149	0.17	0.59	**3.05**	Pass	Pass	BL
NCL - North	NCL - Pond	Cadmium	18	18	1.37	0.77	30.2	17.6	0.87	0.05	0.08	**1.57**	Pass	Pass	BL
NCL - North	NCL - Pond	Chromium	18	18	21.05	9.23	162	58.10	17	0.13	0.36	**1.24**	Pass	Pass	BL
NCL - North	NCL - Pond	Cobalt	16	18	7.91	1.61	370	126	8.1	0.02	0.06	0.98	Pass	Pass	BL
NCL - North	NCL - Pond	Copper	18	18	50.88	63.48	513	208.0	20.2	0.10	0.24	**2.52**	Pass	Pass	BL
NCL - North	NCL - Pond	Lead	18	18	37.15	39.33	173.0	60.7	14.4	0.21	0.61	**2.58**	Pass	Pass	BL
NCL - North	NCL - Pond	Manganese	18	18	347.06	198.12	6254	3275	399	0.06	0.11	0.87	Pass	Pass	BL
NCL - North	NCL - Pond	Mercury	3	18	0.14	0.05	0.911	0.572	0.05	0.159	0.25	**2.89**	Pass	Pass	BL
NCL - North	NCL - Pond	Nickel	18	18	23.77	6.70	457	175	21.2	0.05	0.14	**1.12**	Pass	Pass	BL
NCL - North	NCL - Pond	Selenium	9	18	2.82	3.31	1.120	0.712	0.8	**2.52**	**3.96**	**3.52**	Fail	Fail	Fail
NCL - North	NCL - Pond	Silver	4	18	0.55	0.19	77.30	42.40	NA	0.01	0.01	NA	Pass	Pass	NA
NCL - North	NCL - Pond	Vanadium	18	18	39.53	13.35	54.8	14.40	32.5	0.72	**2.75**	**1.22**	Pass	Fail	Fail
NCL - North	NCL - Pond	Zinc	18	18	180.77	189.50	444	306	69.7	0.41	0.59	**2.59**	Pass	Pass	BL

TABLE 6-13b

Mean Surface Sediment (0-6 inches) Concentrations (mg/kg) of Inorganics by Subarea Compared to LOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
OID Lagoon	Lagoon - Main	Aluminum	13	13	5366.92	2433.94	--	--	12100	**--**	**--**	0.44	Use NOAEL	Use NOAEL	Pass
OID Lagoon	Lagoon - Main	Arsenic	13	13	2.88	1.10	781	347.0	4	0.00	0.01	0.72	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Barium	13	13	119.05	54.24	2651	771	149	0.04	0.15	0.80	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Cadmium	13	13	0.85	0.42	30.2	17.6	0.87	0.03	0.05	0.98	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Chromium	13	13	13.89	5.79	162	58.10	17	0.09	0.24	0.82	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Cobalt	1	13	3.41	1.67	370	126	8.1	0.01	0.03	0.42	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Copper	12	13	51.43	33.50	513	208.0	20.2	0.10	0.25	**2.55**	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Lead	13	13	17.41	11.88	173.0	60.7	14.4	0.10	0.29	**1.21**	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Manganese	13	13	322.15	166.66	6254	3275	399	0.05	0.10	0.81	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Mercury	5	13	0.10	0.08	0.911	0.572	0.05	0.11	0.18	**2.02**	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Nickel	11	13	11.55	4.83	457	175	21.2	0.03	0.07	0.54	Pass	Pass	BL
OID Lagoon	Lagoon - Main	Selenium	11	13	1.40	0.61	1.120	0.712	0.8	**1.25**	**1.97**	**1.75**	Fail	Fail	Fail
OID Lagoon	Lagoon - Main	Silver	5	13	0.77	0.31	77.30	42.40	NA	0.01	0.02	NA	Pass	Pass	NA
OID Lagoon	Lagoon - Main	Vanadium	13	13	18.78	6.69	54.8	14.40	32.5	0.34	**1.30**	0.58	Pass	Fail	Pass
OID Lagoon	Lagoon - Main	Zinc	13	13	168.25	98.24	444	306	69.7	0.38	0.55	**2.41**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Aluminum	8	8	2292.50	1696.94	--	--	12100	**--**	**--**	0.19	Use NOAEL	Use NOAEL	Pass
OID Lagoon	Lagoon Finger - West	Arsenic	8	8	2.44	2.74	781	347.0	4	0.00	0.01	0.61	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Barium	7	8	39.24	39.03	2651	771	149	0.01	0.05	0.26	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Cadmium	5	8	0.49	0.56	30.2	17.6	0.87	0.02	0.03	0.57	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Chromium	8	8	8.18	6.57	162	58.10	17	0.05	0.14	0.48	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Cobalt	0	8	2.88	1.70	370	126	8.1	0.01	0.02	0.36	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Copper	6	8	12.73	20.52	513	208.0	20.2	0.02	0.06	0.63	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Lead	7	8	10.15	15.82	173.0	60.7	14.4	0.06	0.17	0.70	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Manganese	8	8	262.75	387.05	6254	3275	399	0.04	0.08	0.66	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Mercury	1	8	0.09	0.09	0.911	0.572	0.05	0.10	0.15	**1.77**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Nickel	8	8	5.83	5.28	457	175	21.2	0.01	0.03	0.27	Pass	Pass	BL
OID Lagoon	Lagoon Finger - West	Selenium	2	8	1.11	0.71	1.120	0.712	0.8	0.99	**1.56**	**1.39**	Pass	Fail	Fail
OID Lagoon	Lagoon Finger - West	Silver	0	8	0.71	0.36	77.30	42.40	NA	0.01	0.02	NA	Pass	Pass	NA
OID Lagoon	Lagoon Finger - West	Vanadium	8	8	28.18	20.30	54.8	14.40	32.5	0.51	**1.96**	0.87	Pass	Fail	Pass
OID Lagoon	Lagoon Finger - West	Zinc	8	8	91.49	152.22	444	306	69.7	0.21	0.30	**1.31**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Aluminum	6	6	1930.00	577.79	--	--	12100	**--**	**--**	0.16	Use NOAEL	Use NOAEL	Pass
OID Lagoon	Lagoon Finger - East	Arsenic	6	6	1.40	0.33	781	347.0	4	0.00	0.00	0.35	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Barium	5	6	23.25	5.14	2651	771	149	0.01	0.03	0.16	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Cadmium	3	6	0.27	0.18	30.2	17.6	0.87	0.01	0.02	0.31	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Chromium	6	6	5.28	1.04	162	58.10	17	0.03	0.09	0.31	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Cobalt	0	6	3.52	2.73	370	126	8.1	0.01	0.03	0.43	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Copper	4	6	3.98	2.45	513	208.0	20.2	0.01	0.02	0.20	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Lead	6	6	2.25	0.83	173.0	60.7	14.4	0.01	0.04	0.16	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Manganese	6	6	76.37	21.86	6254	3275	399	0.01	0.02	0.19	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Mercury	0	6	0.13	0.01	0.911	0.572	0.05	0.14	0.22	**2.53**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Nickel	3	6	4.10	0.94	457	175	21.2	0.01	0.02	0.19	Pass	Pass	BL
OID Lagoon	Lagoon Finger - East	Selenium	1	6	0.85	0.40	1.120	0.712	0.8	0.76	**1.19**	**1.06**	Pass	Fail	Fail
OID Lagoon	Lagoon Finger - East	Silver	0	6	0.61	0.09	77.30	42.40	NA	0.01	0.01	NA	Pass	Pass	NA
OID Lagoon	Lagoon Finger - East	Vanadium	6	6	23.47	24.74	54.8	14.40	32.5	0.43	**1.63**	0.72	Pass	Fail	Pass
OID Lagoon	Lagoon Finger - East	Zinc	6	6	19.57	9.03	444	306	69.7	0.04	0.06	0.28	Pass	Pass	BL

TABLE 6-13b

Mean Surface Sediment (0-6 inches) Concentrations (mg/kg) of Inorganics by Subarea Compared to LOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
OID Lagoon	Lagoon Finger - Footbridge	Aluminum	7	7	6784.29	4161.27	--	--	12100	**--**	**--**	0.56	Use NOAEL	Use NOAEL	Pass
OID Lagoon	Lagoon Finger - Footbridge	Arsenic	7	7	2.56	0.72	781	347.0	4	0.00	0.01	0.64	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Barium	6	7	103.67	47.34	2651	771	149	0.04	0.13	0.70	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Cadmium	7	7	0.78	0.50	30.2	17.6	0.87	0.03	0.04	0.90	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Chromium	7	7	13.40	4.78	162	58.10	17	0.08	0.23	0.79	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Cobalt	2	7	3.27	1.77	370	126	8.1	0.01	0.03	0.40	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Copper	7	7	56.23	30.98	513	208.0	20.2	0.11	0.27	**2.78**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Lead	7	7	19.99	10.14	173.0	60.7	14.4	0.12	0.33	**1.39**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Manganese	7	7	282.59	128.01	6254	3275	399	0.05	0.09	0.71	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Mercury	1	6	0.18	0.13	0.911	0.572	0.05	0.20	0.31	**3.60**	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Nickel	3	7	12.74	6.55	457	175	21.2	0.03	0.07	0.60	Pass	Pass	BL
OID Lagoon	Lagoon Finger - Footbridge	Selenium	7	7	3.16	2.37	1.120	0.712	0.8	**2.82**	**4.43**	**3.95**	Fail	Fail	Fail
OID Lagoon	Lagoon Finger - Footbridge	Silver	0	7	1.10	0.85	77.30	42.40	NA	0.01	0.03	NA	Pass	Pass	NA
OID Lagoon	Lagoon Finger - Footbridge	Vanadium	7	7	17.20	7.02	54.8	14.40	32.5	0.31	**1.19**	0.53	Pass	Fail	Pass
OID Lagoon	Lagoon Finger - Footbridge	Zinc	7	7	156.80	83.65	444	306	69.7	0.35	0.51	**2.25**	Pass	Pass	BL
OID Lagoon	OID - North	Aluminum	7	7	1948.57	310.77	--	--	12100	**--**	**--**	0.16	Use NOAEL	Use NOAEL	Pass
OID Lagoon	OID - North	Arsenic	7	7	0.89	0.21	781	347.0	4	0.001	0.00	0.22	Pass	Pass	BL
OID Lagoon	OID - North	Barium	3	7	25.13	5.93	2651	771	149	0.01	0.03	0.17	Pass	Pass	BL
OID Lagoon	OID - North	Cadmium	7	7	0.41	0.09	30.2	17.6	0.87	0.01	0.02	0.47	Pass	Pass	BL
OID Lagoon	OID - North	Chromium	7	7	3.83	0.96	162	58.10	17	0.02	0.07	0.23	Pass	Pass	BL
OID Lagoon	OID - North	Cobalt	0	7	1.66	0.30	370	126	8.1	0.004	0.01	0.20	Pass	Pass	BL
OID Lagoon	OID - North	Copper	7	7	11.14	10.08	513	208.0	20.2	0.02	0.05	0.55	Pass	Pass	BL
OID Lagoon	OID - North	Lead	7	7	4.07	1.37	173.0	60.7	14.4	0.02	0.07	0.28	Pass	Pass	BL
OID Lagoon	OID - North	Manganese	7	7	130.66	38.40	6254	3275	399	0.02	0.04	0.33	Pass	Pass	BL
OID Lagoon	OID - North	Mercury	0	7	0.13	0.01	0.911	0.572	0.05	0.14	0.22	**2.57**	Pass	Pass	BL
OID Lagoon	OID - North	Nickel	3	7	4.60	1.31	457	175	21.2	0.01	0.03	0.22	Pass	Pass	BL
OID Lagoon	OID - North	Selenium	6	7	0.47	0.11	1.120	0.712	0.8	0.42	0.65	0.58	Pass	Pass	Pass
OID Lagoon	OID - North	Silver	3	7	0.64	0.02	77.30	42.40	NA	0.01	0.02	NA	Pass	Pass	NA
OID Lagoon	OID - North	Vanadium	7	7	5.86	1.30	54.8	14.40	32.5	0.11	0.41	0.18	Pass	Pass	Pass
OID Lagoon	OID - North	Zinc	7	7	45.63	6.58	444	306	69.7	0.10	0.15	0.65	Pass	Pass	BL
OID Lagoon	OID - Site	Aluminum	8	8	14088.75	8405.57	--	--	12100	**--**	**--**	**1.16**	Use NOAEL	Use NOAEL	Fail
OID Lagoon	OID - Site	Arsenic	8	8	5.08	2.20	781	347.0	4	0.01	0.01	**1.27**	Pass	Pass	BL
OID Lagoon	OID - Site	Barium	8	8	245.13	104.37	2651	771	149	0.09	0.32	**1.65**	Pass	Pass	BL
OID Lagoon	OID - Site	Cadmium	7	8	1.04	1.07	30.2	17.6	0.87	0.03	0.06	**1.20**	Pass	Pass	BL
OID Lagoon	OID - Site	Chromium	8	8	28.56	9.64	162	58.10	17	0.18	0.49	**1.68**	Pass	Pass	BL
OID Lagoon	OID - Site	Cobalt	4	8	9.73	6.14	370	126	8.1	0.03	0.08	**1.20**	Pass	Pass	BL
OID Lagoon	OID - Site	Copper	8	8	36.04	16.81	513	208.0	20.2	0.07	0.17	**1.78**	Pass	Pass	BL
OID Lagoon	OID - Site	Lead	8	8	17.51	11.70	173.0	60.7	14.4	0.10	0.29	**1.22**	Pass	Pass	BL
OID Lagoon	OID - Site	Manganese	8	8	461.88	226.81	6254	3275	399	0.07	0.14	**1.16**	Pass	Pass	BL
OID Lagoon	OID - Site	Mercury	7	8	0.06	0.03	0.911	0.572	0.05	0.06	0.10	**1.12**	Pass	Pass	BL
OID Lagoon	OID - Site	Nickel	8	8	27.26	15.39	457	175	21.2	0.06	0.16	**1.29**	Pass	Pass	BL
OID Lagoon	OID - Site	Selenium	8	8	1.13	0.42	1.120	0.712	0.8	**1.01**	**1.59**	**1.42**	Fail	Fail	Fail
OID Lagoon	OID - Site	Silver	4	8	0.85	0.58	77.30	42.40	NA	0.01	0.02	NA	Pass	Pass	NA
OID Lagoon	OID - Site	Vanadium	8	8	44.29	18.79	54.8	14.40	32.5	0.81	**3.08**	**1.36**	Pass	Fail	Fail
OID Lagoon	OID - Site	Zinc	8	8	96.28	31.11	444	306	69.7	0.22	0.31	**1.38**	Pass	Pass	BL

TABLE 6-13b

Mean Surface Sediment (0-6 inches) Concentrations (mg/kg) of Inorganics by Subarea Compared to LOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
Wetlands Beach	WMU Ditch	Aluminum	12	12	64763.33	34941.57	--	--	12100	**--**	**--**	**5.35**	Use NOAEL	Use NOAEL	Fail
Wetlands Beach	WMU Ditch	Arsenic	12	12	6.28	2.92	781	347.0	4	0.01	0.02	**1.57**	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Barium	12	12	1327.46	843.23	2651	771	149	0.50	**1.72**	**8.91**	Pass	Fail	BL
Wetlands Beach	WMU Ditch	Cadmium	12	12	2.43	1.29	30.2	17.6	0.87	0.08	0.14	**2.79**	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Chromium	12	12	131.84	116.71	162	58.10	17	0.81	**2.27**	**7.76**	Pass	Fail	BL
Wetlands Beach	WMU Ditch	Cobalt	6	12	6.13	2.08	370	126	8.1	0.02	0.05	0.76	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Copper	12	12	1615.56	1128.03	513	208.0	20.2	**3.15**	**7.77**	**79.98**	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Lead	12	12	167.18	107.54	173.0	60.7	14.4	0.97	**2.75**	**11.61**	Pass	Fail	BL
Wetlands Beach	WMU Ditch	Manganese	12	12	782.09	372.91	6254	3275	399	0.13	0.24	**1.96**	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Mercury	3	11	0.15	0.09	0.911	0.572	0.05	0.16	0.26	**2.99**	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Nickel	12	12	73.39	41.64	457	175	21.2	0.16	0.42	**3.46**	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Selenium	10	12	2.77	2.03	1.120	0.712	0.8	**2.48**	**3.89**	**3.47**	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Silver	11	12	1.93	1.04	77.30	42.40	NA	0.02	0.05	NA	Pass	Pass	NA
Wetlands Beach	WMU Ditch	Vanadium	12	12	39.40	16.74	54.8	14.40	32.5	0.72	**2.74**	**1.21**	Pass	Fail	Fail
Wetlands Beach	WMU Ditch	Zinc	12	12	1289.36	666.15	444	306	69.7	**2.90**	**4.21**	**18.50**	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Aluminum	9	9	57604.44	47043.00	--	--	12100	**--**	**--**	**4.76**	Use NOAEL	Use NOAEL	Fail
Wetlands Beach	WMU Ditch - 5' South	Arsenic	9	9	3.86	2.40	781	347.0	4	0.00	0.01	0.96	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Barium	9	9	894.71	899.49	2651	771	149	0.34	**1.16**	**6.00**	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Cadmium	9	9	1.36	1.23	30.2	17.6	0.87	0.05	0.08	**1.57**	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Chromium	9	9	91.24	82.37	162	58.10	17	0.56	**1.57**	**5.37**	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Cobalt	4	9	3.63	1.94	370	126	8.1	0.01	0.03	0.45	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Copper	9	9	1166.84	865.05	513	208.0	20.2	**2.27**	**5.61**	**57.76**	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Lead	9	9	149.44	189.44	173.0	60.7	14.4	0.86	**2.46**	**10.38**	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Manganese	9	9	461.74	337.35	6254	3275	399	0.07	0.14	**1.16**	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Mercury	0	9	0.18	0.08	0.911	0.572	0.05	0.20	0.32	**3.64**	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Nickel	9	9	60.66	41.57	457	175	21.2	0.13	0.35	**2.86**	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Selenium	9	9	2.36	2.44	1.120	0.712	0.8	**2.11**	**3.32**	**2.95**	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 5' South	Silver	8	9	0.97	0.54	77.30	42.40	NA	0.01	0.02	NA	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 5' South	Vanadium	9	9	28.19	18.33	54.8	14.40	32.5	0.51	**1.96**	0.87	Pass	Fail	Pass
Wetlands Beach	WMU Ditch - 5' South	Zinc	9	9	1066.16	1035.05	444	306	69.7	**2.40**	**3.48**	**15.30**	Fail	Fail	BL

Notes:

-- = benchmark is unavailable

BL = background concentration is lower than the bird RBCs

Fail = mean concentration exceeds the LOAEL-based RBC and background; therefore, this analyte was considered to pose a probable risk to individual special-status avian species

HQ = hazard quotient

LOAEL = lowest observed adverse effect level

mg/kg = milligram per kilogram

N = sample size

NA = not available

Pass = mean concentration was less than the LOAEL-based RBC or less than background; therefore, there are no population-level risks to special-status avian species

RBC = risk-based concentration

Use NOAEL = a LOAEL was not available for this analyte; therefore, the risk results estimated using the NOAEL will be relied on

UTL = upper tolerance limit

Shading or bold indicates cases where the mean soil concentration exceeds the bird RBCs or background value.

Background is only used in the risk results if it is greater than the bird RBCs; otherwise the background risk result is marked as BL.

TABLE 6-14a

Mean Dioxin and Furan Avian TEQ Concentrations (ng/kg, dry weight) in Surface Sediment (0-6 inches) by Subarea Compared to NOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC		HQ_{mean}		$Risk_{mean}$	
Area	**Subarea**	**N**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Sparrow**	**Plover**	**Sparrow**	**Plover**
NCL - East	NCL - East (< 8' Elev)	3	0.0012	2.24	0.748	1.294	99.89	65.36	0.01	0.01	Pass	Pass
NCL - North	NCL - North	1	0.2154	0.215	0.215		99.89	65.36	0.002	0.003	Pass	Pass
OID Lagoon	Lagoon - Main	7	0.00229	7.43	4.098	3.132	99.89	65.36	0.04	0.06	Pass	Pass
OID Lagoon	Lagoon Finger - West	5	0.0035	10.62	2.186	4.715	99.89	65.36	0.02	0.03	Pass	Pass
OID Lagoon	Lagoon Finger - East	4	0.0012	0.102	0.0307	0.0482	99.89	65.36	0.0003	0.0005	Pass	Pass
OID Lagoon	Lagoon Finger - Footbridge	5	11.56	41.89	22.236	13.174	99.89	65.36	0.22	0.34	Pass	Pass
OID Lagoon	OID - North	3	0.666	0.944	0.782	0.145	99.89	65.36	0.01	0.01	Pass	Pass
OID Lagoon	OID - Site	4	0.00175	2.12	1.061	0.966	99.89	65.36	0.01	0.02	Pass	Pass
Wetlands Beach	WMU Ditch	3	25.52	121.52	73.180	48.005	99.89	65.36	0.73	**1.12**	Pass	**Fail**
Wetlands Beach	WMU Ditch - 5' South	4	0.002	0.0844	0.0584	0.0382	99.89	65.36	0.001	0.001	Pass	Pass

Notes:

Fail = mean concentration exceeds the NOAEL-based RBC; therefore, this analyte was considered to pose a possible risk to individual special-status avian species

HQ = hazard quotient

ng/kg = nanograms per kilogram

N = sample size

Pass = mean concentration was less than the NOAEL-based RBC; therefore, there are no risks to individual special-status avian species

RBC = risk-based concentration

TEQ = toxic equivalency quotient

Shading indicates cases where the mean soil concentration exceeds the bird RBCs.

TABLE 6-14b

Mean Dioxin and Furan Avian TEQ Concentrations (ng/kg, dry weight) in Surface Sediment (0-6 inches) by Subarea Compared to LOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC		HQ_{mean}		$Risk_{mean}$	
Area	**Subarea**	**N**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**	**Sparrow**	**Plover**	**Sparrow**	**Plover**	**Sparrow**	**Plover**
NCL - East	NCL - East (< 8' Elev)	3	0.0012	2.24	0.748	1.294	998.9	653.6	0.001	0.001	pass	pass
NCL - North	NCL - North	1	0.2154	0.215	0.215		998.9	653.6	0.0002	0.0003	pass	pass
OID Lagoon	Lagoon - Main	7	0.00229	7.43	4.098	3.132	998.9	653.6	0.004	0.01	pass	pass
OID Lagoon	Lagoon Finger - West	5	0.0035	10.62	2.186	4.715	998.9	653.6	0.002	0.003	pass	pass
OID Lagoon	Lagoon Finger - East	4	0.0012	0.102	0.0307	0.0482	998.9	653.6	0.00003	0.00005	pass	pass
OID Lagoon	Lagoon Finger - Footbridge	5	11.56	41.89	22.236	13.174	998.9	653.6	0.02	0.03	pass	pass
OID Lagoon	OID - North	3	0.666	0.944	0.782	0.145	998.9	653.6	0.001	0.001	pass	pass
OID Lagoon	OID - Site	4	0.00175	2.12	1.061	0.966	998.9	653.6	0.001	0.002	pass	pass
Wetlands Beach	WMU Ditch	3	25.52	121.52	73.180	48.005	998.9	653.6	0.07	0.11	pass	pass
Wetlands Beach	WMU Ditch - 5' South	4	0.002	0.0844	0.0584	0.0382	998.9	653.6	0.0001	0.0001	pass	pass

Notes:

HQ = hazard quotient

ng/kg = nanogram per kilogram

N = sample size

Pass = mean concentration was less than the NOAEL-based RBC; therefore, there are no population-level risks to special-status avian species

RBC = risk-based concentration

TEQ = toxic equivalency quotient

Shading indicates cases where the mean soil concentration exceeds the bird RBCs.

TABLE 6-15

Exposure Estimates for the California Least Tern Based on Mean Measured Fish Tissue Concentrations by Subarea and Compared to Literature-Based Avian Toxicity Data

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

								TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	**Area**	**Subarea**	**N**	**Mean Fish (mg/kg dw)**	**Food Intake (kg/kg-BW/day dw)**	**Proportion Fish in Diet**	**Total Dose**	**NOAEL**	**LOAEL**	**NOAEL-Based**	**LOAEL-Based**	**$Risk_{Mean}$**
Aluminum	OID - Lagoon	Lagoon - Main	4	134	0.22	1	29.4	109.7	--	0.27	--	Pass
Aluminum	OID - Lagoon	Lagoon Finger - East	4	128	0.22	1	28.2	109.7	--	0.26	--	Pass
Aluminum	OID - Lagoon	Lagoon Finger - Footbridge	5	.	0.22	1	.	109.7	--	.	--	Nondetected/Pass
Aluminum	OID - Lagoon	Lagoon Finger - West	7	91.4	0.22	1	20.1	109.7	--	0.18	--	Pass
Aluminum	NCL - East	NCL - East (<8' Elev)	4	320	0.22	1	70.3	109.7	--	0.64	--	Pass
Aluminum	Wetlands Beach	WMU Ditch	5	200	0.22	1	43.9	109.7	--	0.40	--	Pass
Barium	OID - Lagoon	Lagoon - Main	4	.	0.22	1	.	20.8	41.7	.	.	Nondetected/Pass
Barium	OID - Lagoon	Lagoon Finger - East	4	.	0.22	1	.	20.8	41.7	.	.	Nondetected/Pass
Barium	OID - Lagoon	Lagoon Finger - Footbridge	5	.	0.22	1	.	20.8	41.7	.	.	Nondetected/Pass
Barium	OID - Lagoon	Lagoon Finger - West	7	31.1	0.22	1	6.8	20.8	41.7	0.33	0.16	Pass
Barium	NCL - East	NCL - East (<8' Elev)	4	14.2	0.22	1	3.1	20.8	41.7	0.15	0.08	Pass
Barium	Wetlands Beach	WMU Ditch	5	.	0.22	1	.	20.8	41.7	.	.	Nondetected/Pass
Chromium	OID - Lagoon	Lagoon - Main	4	.	0.22	1	.	2.66	2.78	.	.	Nondetected/Pass
Chromium	OID - Lagoon	Lagoon Finger - East	4	7.81	0.22	1	1.7	2.66	2.78	0.65	0.62	Pass
Chromium	OID - Lagoon	Lagoon Finger - Footbridge	5	.	0.22	1	.	2.66	2.78	.	.	Nondetected/Pass
Chromium	OID - Lagoon	Lagoon Finger - West	7	6.44	0.22	1	1.4	2.66	2.78	0.53	0.51	Pass
Chromium	NCL - East	NCL - East (<8' Elev)	4	.	0.22	1	.	2.66	2.78	.	.	Nondetected/Pass
Chromium	Wetlands Beach	WMU Ditch	5	9.16	0.22	1	2.0	2.66	2.78	0.76	0.72	Pass
Copper	OID - Lagoon	Lagoon - Main	4	.	0.22	1	.	4.05	12.1	.	.	Nondetected/Pass
Copper	OID - Lagoon	Lagoon Finger - East	4	14.1	0.22	1	3.1	4.05	12.1	0.77	0.26	Pass
Copper	OID - Lagoon	Lagoon Finger - Footbridge	5	9.13	0.22	1	2.0	4.05	12.1	0.50	0.17	Pass
Copper	OID - Lagoon	Lagoon Finger - West	7	.	0.22	1	.	4.05	12.1	.	.	Nondetected/Pass
Copper	NCL - East	NCL - East (<8' Elev)	4	11.3	0.22	1	2.5	4.05	12.1	0.61	0.20	Pass
Copper	Wetlands Beach	WMU Ditch	5	10.6	0.22	1	2.3	4.05	12.1	0.58	0.19	Pass
Manganese	OID - Lagoon	Lagoon - Main	4	38.0	0.22	1	8.4	179	348	0.05	0.02	Pass
Manganese	OID - Lagoon	Lagoon Finger - East	4	51.0	0.22	1	11.2	179	348	0.06	0.03	Pass
Manganese	OID - Lagoon	Lagoon Finger - Footbridge	5	33.0	0.22	1	7.3	179	348	0.04	0.02	Pass
Manganese	OID - Lagoon	Lagoon Finger - West	7	32.7	0.22	1	7.2	179	348	0.04	0.02	Pass
Manganese	NCL - East	NCL - East (<8' Elev)	4	35.1	0.22	1	7.7	179	348	0.04	0.02	Pass
Manganese	Wetlands Beach	WMU Ditch	5	62.2	0.22	1	13.7	179	348	0.08	0.04	Pass
Mercury	OID - Lagoon	Lagoon - Main	4	0.018	0.22	1	0.004	0.068	0.37	0.06	0.01	Pass
Mercury	OID - Lagoon	Lagoon Finger - East	4	0.019	0.22	1	0.004	0.068	0.37	0.06	0.01	Pass
Mercury	OID - Lagoon	Lagoon Finger - Footbridge	5	0.014	0.22	1	0.003	0.068	0.37	0.04	0.01	Pass
Mercury	OID - Lagoon	Lagoon Finger - West	7	0.016	0.22	1	0.004	0.068	0.37	0.05	0.01	Pass
Mercury	NCL - East	NCL - East (<8' Elev)	4	0.015	0.22	1	0.003	0.068	0.37	0.05	0.01	Pass
Mercury	Wetlands Beach	WMU Ditch	5	0.020	0.22	1	0.004	0.068	0.37	0.06	0.01	Pass
Selenium	OID - Lagoon	Lagoon - Main	4	6.39	0.22	1	1.4	0.29	0.579	**4.85**	**2.43**	Fail
Selenium	OID - Lagoon	Lagoon Finger - East	4	7.41	0.22	1	1.6	0.29	0.579	**5.62**	**2.82**	Fail
Selenium	OID - Lagoon	Lagoon Finger - Footbridge	5	6.71	0.22	1	1.5	0.29	0.579	**5.09**	**2.55**	Fail
Selenium	OID - Lagoon	Lagoon Finger - West	7	6.5	0.22	1	1.4	0.29	0.579	**4.93**	**2.47**	Fail

TABLE 6-15

Exposure Estimates for the California Least Tern Based on Mean Measured Fish Tissue Concentrations by Subarea and Compared to Literature-Based Avian Toxicity Data

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

								TRVs (mg/kg-BW/day)		Hazard Quotients		
Analyte	**Area**	**Subarea**	**N**	**Mean Fish (mg/kg dw)**	**Food Intake (kg/kg-BW/day dw)**	**Proportion Fish in Diet**	**Total Dose**	**NOAEL**	**LOAEL**	**NOAEL-Based**	**LOAEL-Based**	**$Risk_{Mean}$**
Selenium	NCL - East	NCL - East (<8' Elev)	4	6.5	0.22	1	1.4	0.29	0.579	**4.93**	**2.47**	Fail
Selenium	Wetlands Beach	WMU Ditch	5	7.4	0.22	1	1.6	0.29	0.579	**5.61**	**2.81**	Fail
Zinc	OID - Lagoon	Lagoon - Main	4	116	0.22	1	25.6	66.1	66.5	0.39	0.39	Pass
Zinc	OID - Lagoon	Lagoon Finger - East	4	116	0.22	1	25.5	66.1	66.5	0.39	0.38	Pass
Zinc	OID - Lagoon	Lagoon Finger - Footbridge	5	133	0.22	1	29.3	66.1	66.5	0.44	0.44	Pass
Zinc	OID - Lagoon	Lagoon Finger - West	7	172	0.22	1	37.9	66.1	66.5	0.57	0.57	Pass
Zinc	NCL - East	NCL - East (<8' Elev)	4	123	0.22	1	27.0	66.1	66.5	0.41	0.41	Pass
Zinc	Wetlands Beach	WMU Ditch	5	181	0.22	1	39.7	66.1	66.5	0.60	0.60	Pass

Notes:

-- = no TRVs available

"." = analyte not detected in fish tissue

Fail = NOAEL is exceeded; therefore, this analyte was considered to pose a possible risk to individual special-status avian species

kg/kg-BW/day dw = kilograms per kilogram body weight per day, dry weight

LOAEL = lowest observed adverse effect level

mg/kg dw = milligrams per kilogram, dry weight

mg/kg-BW/day = milligrams per kilogram body weight per day

NOAEL = no observed adverse effect level

Nondetected = this analyte was not detected in fish tissue, therefore, an exposure estimate for terns was not calculated and no risks to individual terns was predicted

Pass = exposure estimate is less than the NOAEL; therefore, there are no risks to individual special-status avian species

TRV = toxicity reference value

Bold indicates cases where the NOAEL or LOAEL were exceeded.

Shading indicates cases where the NOAEL was exceeded.

TABLE 6-16a

Mean Surface Sediment (0-6 inches) Concentrations of Inorganics by WMU Stepout in NCL - East (<8 feet Elev) Compared to NOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Subarea 2**	**Depth**	**Analyte**	**Mean**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Aluminum	86545.5	17259	2891	12100	**5.01**	**29.93**	**7.15**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Arsenic	9.3	178	80.2	4	0.05	0.12	**2.31**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Barium	2057.1	1318	384	149	**1.56**	**5.35**	**13.81**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Cadmium	3.2	17.7	10.9	0.87	0.18	0.30	**3.72**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Chromium	172.0	155	55.58	17	**1.11**	**3.09**	**10.12**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Cobalt	9.1	361	123	8.1	0.03	0.07	**1.12**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Copper	1994.4	132	69.6	20.2	**15.09**	**28.66**	**98.73**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Lead	242.1	80.5	30.4	14.4	**3.01**	**7.97**	**16.81**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Manganese	1119.9	3217	1684	399	0.35	0.66	**2.81**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Mercury	0.1	0.145	0.105	0.05	0.39	0.54	**1.13**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Nickel	99.5	262	102	21.2	0.38	0.97	**4.69**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Selenium	2.4	0.565	0.357	0.8	**4.22**	**6.69**	**2.98**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Silver	2.9	7.73	4.24	NA	0.38	0.69	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Vanadium	62.6	27.4	7.22	32.5	**2.29**	**8.68**	**1.93**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Zinc	1845.7	441	305	69.7	**4.18**	**6.06**	**26.48**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Aluminum	25557.0	17259	2891	12100	**1.48**	**8.84**	**2.11**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Arsenic	3.9	178	80.2	4	0.02	0.05	0.97	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Barium	293.8	1318	384	149	0.22	0.76	**1.97**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Cadmium	1.1	17.7	10.9	0.87	0.06	0.10	**1.22**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Chromium	44.9	155	55.58	17	0.29	0.81	**2.64**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Cobalt	6.5	361	123	8.1	0.02	0.05	0.80	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Copper	400.1	132	69.6	20.2	**3.03**	**5.75**	**19.81**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Lead	69.7	80.5	30.4	14.4	0.87	**2.29**	**4.84**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Manganese	346.8	3217	1684	399	0.11	0.21	0.87	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Mercury	0.1	0.145	0.105	0.05	0.37	0.51	**1.07**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Nickel	35.7	262	102	21.2	0.14	0.35	**1.68**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Selenium	1.4	0.565	0.357	0.8	**2.40**	**3.80**	**1.70**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Silver	0.6	7.73	4.24	NA	0.07	0.14	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Vanadium	40.5	27.4	7.22	32.5	**1.48**	**5.61**	**1.25**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Zinc	348.5	441	305	69.7	0.79	**1.14**	**5.00**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Aluminum	12865.0	17259	2891	12100	0.75	**4.45**	**1.06**	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Arsenic	3.9	178	80.2	4	0.02	0.05	0.97	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Barium	201.8	1318	384	149	0.15	0.52	**1.35**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Cadmium	1.1	17.7	10.9	0.87	0.06	0.10	**1.24**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Chromium	24.1	155	55.58	17	0.16	0.43	**1.42**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Cobalt	6.1	361	123	8.1	0.02	0.05	0.75	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Copper	88.2	132	69.6	20.2	0.67	**1.27**	**4.37**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Lead	23.3	80.5	30.4	14.4	0.29	0.77	**1.62**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Manganese	325.3	3217	1684	399	0.10	0.19	0.82	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Mercury	0.0	0.145	0.105	0.05	0.28	0.38	0.81	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Nickel	22.0	262	102	21.2	0.08	0.21	**1.04**	Pass	Pass	BL

TABLE 6-16a

Mean Surface Sediment (0-6 inches) Concentrations of Inorganics by WMU Stepout in NCL - East (<8 feet Elev) Compared to NOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Subarea 2**	**Depth**	**Analyte**	**Mean**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Selenium	1.4	0.565	0.357	0.8	**2.52**	**4.00**	**1.78**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Silver	0.3	7.73	4.24	NA	0.04	0.07	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Vanadium	36.4	27.4	7.22	32.5	**1.33**	**5.04**	**1.12**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Zinc	115.2	441	305	69.7	0.26	0.38	**1.65**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Aluminum	10877.5	17259	2891	12100	0.63	**3.76**	0.90	Pass	Fail	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Arsenic	3.5	178	80.2	4	0.02	0.04	0.86	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Barium	170.0	1318	384	149	0.13	0.44	**1.14**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Cadmium	0.8	17.7	10.9	0.87	0.05	0.07	0.92	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Chromium	17.9	155	55.58	17	0.12	0.32	**1.05**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Cobalt	3.7	361	123	8.1	0.01	0.03	0.45	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Copper	60.2	132	69.6	20.2	0.46	0.86	**2.98**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Lead	40.9	80.5	30.4	14.4	0.51	**1.35**	**2.84**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Manganese	316.5	3217	1684	399	0.10	0.19	0.79	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Mercury	0.0	0.145	0.105	0.05	0.28	0.38	0.81	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Nickel	18.9	262	102	21.2	0.07	0.18	0.89	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Selenium	1.3	0.565	0.357	0.8	**2.28**	**3.61**	**1.61**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Silver	0.3	7.73	4.24	NA	0.04	0.08	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Vanadium	32.7	27.4	7.22	32.5	**1.19**	**4.53**	**1.01**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Zinc	85.3	441	305	69.7	0.19	0.28	**1.22**	Pass	Pass	BL

Notes:

-- = benchmark is unavailable

BL = background concentration is lower than the bird RBCs

Fail = mean concentration exceeds the NOAEL-based RBC and background; therefore, this analyte was considered to pose a possible risk to individual special-status avian species

HQ = hazard quotient

mg/kg = milligrams per kilogram

N = sample size

NA = not available

NOAEL = no observed adverse effect level

Pass = mean concentration was less than the NOAEL-based RBC or less than background; therefore, there are no risks to individual special-status avian species

RBC = risk-based concentration

UTL = upper tolerance limit

Shading or bold indicates cases where the mean soil concentration exceeds the bird RBC or background value.

Background is only used in the risk results if it is greater than the bird RBCs; otherwise the background risk result is marked as BL.

TABLE 6-16b

Mean Surface Sediment (0-6 inches) Concentrations of Inorganics by WMU Stepout in NCL - East (<8 feet Elev) Compared to LOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Subarea 2**	**Depth**	**Analyte**	**Mean**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Aluminum	86545.5	--	--	12100	**--**	**--**	**7.15**	Use NOAEL	Use NOAEL	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Arsenic	9.3	781	347.0	4	0.01	0.03	**2.31**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Barium	2057.1	2651	771	149	0.78	**2.67**	**13.81**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Cadmium	3.2	30.2	17.6	0.87	0.11	0.18	**3.72**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Chromium	172.0	162	58.10	17	**1.06**	**2.96**	**10.12**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Cobalt	9.1	370	126	8.1	0.02	0.07	**1.12**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Copper	1994.4	513	208.0	20.2	**3.89**	**9.59**	**98.73**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Lead	242.1	173.0	60.7	14.4	**1.40**	**3.99**	**16.81**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Manganese	1119.9	6254	3275	399	0.18	0.34	**2.81**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Mercury	0.1	0.911	0.572	0.05	0.06	0.10	**1.13**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Nickel	99.5	457	175	21.2	0.22	0.57	**4.69**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Selenium	2.4	1.120	0.712	0.8	**2.13**	**3.35**	**2.98**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Silver	2.9	77.30	42.40	NA	0.04	0.07	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Vanadium	62.6	54.8	14.40	32.5	**1.14**	**4.35**	**1.93**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	0-6 in	Zinc	1845.7	444	306	69.7	**4.16**	**6.03**	**26.48**	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Aluminum	25557.0	--	--	12100	**--**	**--**	**2.11**	Use NOAEL	Use NOAEL	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Arsenic	3.9	781	347.0	4	0.00	0.01	0.97	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Barium	293.8	2651	771	149	0.11	0.38	**1.97**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Cadmium	1.1	30.2	17.6	0.87	0.04	0.06	**1.22**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Chromium	44.9	162	58.10	17	0.28	0.77	**2.64**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Cobalt	6.5	370	126	8.1	0.02	0.05	0.80	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Copper	400.1	513	208.0	20.2	0.78	**1.92**	**19.81**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Lead	69.7	173.0	60.7	14.4	0.40	**1.15**	**4.84**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Manganese	346.8	6254	3275	399	0.06	0.11	0.87	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Mercury	0.1	0.911	0.572	0.05	0.06	0.09	**1.07**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Nickel	35.7	457	175	21.2	0.08	0.20	**1.68**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Selenium	1.4	1.120	0.712	0.8	**1.21**	**1.91**	**1.70**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Silver	0.6	77.30	42.40	NA	0.01	0.01	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Vanadium	40.5	54.8	14.40	32.5	0.74	**2.81**	**1.25**	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	0-6 in	Zinc	348.5	444	306	69.7	0.78	**1.14**	**5.00**	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Aluminum	12865.0	--	--	12100	**--**	**--**	**1.06**	Use NOAEL	Use NOAEL	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Arsenic	3.9	781	347.0	4	0.00	0.01	0.97	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Barium	201.8	2651	771	149	0.08	0.26	**1.35**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Cadmium	1.1	30.2	17.6	0.87	0.04	0.06	**1.24**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Chromium	24.1	162	58.10	17	0.15	0.42	**1.42**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Cobalt	6.1	370	126	8.1	0.02	0.05	0.75	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Copper	88.2	513	208.0	20.2	0.17	0.42	**4.37**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Lead	23.3	173.0	60.7	14.4	0.13	0.38	**1.62**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Manganese	325.3	6254	3275	399	0.05	0.10	0.82	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Mercury	0.0	0.911	0.572	0.05	0.04	0.07	0.81	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Nickel	22.0	457	175	21.2	0.05	0.13	**1.04**	Pass	Pass	BL

TABLE 6-16b

Mean Surface Sediment (0-6 inches) Concentrations of Inorganics by WMU Stepout in NCL - East (<8 feet Elev) Compared to LOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and Western Snowy Plover

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

						RBC			HQ_{mean}			$Risk_{mean}$		
Area	**Subarea**	**Subarea 2**	**Depth**	**Analyte**	**Mean**	**Sparrow**	**Plover**	**Background UTL**	**Sparrow**	**Plover**	**Background**	**Sparrow**	**Plover**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Selenium	1.4	1.120	0.712	0.8	**1.27**	**2.00**	**1.78**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Silver	0.3	77.30	42.40	NA	0.00	0.01	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Vanadium	36.4	54.8	14.40	32.5	0.66	**2.53**	**1.12**	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	0-6 in	Zinc	115.2	444	306	69.7	0.26	0.38	**1.65**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Aluminum	10877.5	--	--	12100	**--**	**--**	0.90	Use NOAEL	Use NOAEL	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Arsenic	3.5	781	347.0	4	0.00	0.01	0.86	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Barium	170.0	2651	771	149	0.06	0.22	**1.14**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Cadmium	0.8	30.2	17.6	0.87	0.03	0.05	0.92	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Chromium	17.9	162	58.10	17	0.11	0.31	**1.05**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Cobalt	3.7	370	126	8.1	0.01	0.03	0.45	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Copper	60.2	513	208.0	20.2	0.12	0.29	**2.98**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Lead	40.9	173.0	60.7	14.4	0.24	0.67	**2.84**	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Manganese	316.5	6254	3275	399	0.05	0.10	0.79	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Mercury	0.0	0.911	0.572	0.05	0.04	0.07	0.81	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Nickel	18.9	457	175	21.2	0.04	0.11	0.89	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Selenium	1.3	1.120	0.712	0.8	**1.15**	**1.81**	**1.61**	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Silver	0.3	77.30	42.40	NA	0.00	0.01	NA	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Vanadium	32.7	54.8	14.40	32.5	0.60	**2.27**	**1.01**	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	0-6 in	Zinc	85.3	444	306	69.7	0.19	0.28	**1.22**	Pass	Pass	BL

Notes:

-- = benchmark is unavailable

BL = background concentration is lower than the bird RBCs

Fail = mean concentration exceeds the LOAEL-based RBC and background; therefore, this analyte was considered to pose a probable risk to individual special-status avian species

HQ = hazard quotient

LOAEL = lowest observed adverse effect level

mg/kg = milligrams per kilogram

N = sample size

NA = not available

Pass = mean concentration was less than the LOAEL-based RBC or less than background; therefore, there are no population-level risks to special-status avian species

RBC = risk-based concentration

Use NOAEL = a LOAEL was not available for this analyte; therefore, the risk results estimated using the NOAEL will be relied on

UTL = upper tolerance limit

Shading or bold indicates cases where the mean soil concentration exceeds the bird RBCs or background value.

Background is only used in the risk results if it is greater than the bird RBCs; otherwise the background risk result is marked as BL.

TABLE 6-17a

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to NOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow and LOAEL-Based RBCs for California Vole and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - East	McWane - 5' South	Aluminum	4	4	12115.00	5127.93	3487	220	2596	12100	**3.47**	**55.01**	**4.67**	**1.00**	Fail	Fail	Fail	Fail
NCL - East	McWane - 5' South	Antimony	4	4	0.39	0.28	52.2	2.21	--	0.37	0.01	0.18	--	**1.05**	Pass	Pass	Uncertainty	BL
NCL - East	McWane - 5' South	Arsenic	4	4	3.38	0.39	131	70.0	582	4	0.03	0.05	0.01	0.84	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Barium	4	4	330.25	339.99	2023	246	122	149	0.16	**1.34**	**2.70**	**2.22**	Pass	Fail	Fail	Fail
NCL - East	McWane - 5' South	Beryllium	4	4	0.97	0.76	6.90	27.4	--	0.6	0.14	0.04	--	**1.61**	Pass	Pass	Uncertainty	BL
NCL - East	McWane - 5' South	Cadmium	4	4	0.87	0.34	661	8.73	2.85	0.87	0.00	0.10	0.31	1.00	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Chromium	4	4	20.23	9.26	718	78.9	41.0	17	0.03	0.26	0.49	**1.19**	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Cobalt	3	4	6.75	2.26	1680	277	361	8.1	0.00	0.02	0.02	0.83	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Copper	4	4	97.38	96.97	773	16.8	10.2	20.2	0.13	**5.79**	**9.54**	**4.82**	Pass	Fail	Fail	Fail
NCL - East	McWane - 5' South	Lead	4	4	26.33	15.65	1208	53.4	18.3	14.4	0.02	0.49	**1.44**	**1.83**	Pass	Pass	Fail	BL
NCL - East	McWane - 5' South	Manganese	4	4	439.25	111.72	3346	700	2959	399	0.13	0.63	0.15	**1.10**	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Mercury	0	4	0.08	0.03	3.23	0.271	0.176	0.05	0.02	0.28	0.43	**1.52**	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Nickel	4	4	20.13	7.87	337	10.8	42.4	21.2	0.06	**1.87**	0.47	0.95	Pass	Fail	Pass	Pass
NCL - East	McWane - 5' South	Selenium	4	4	0.75	0.17	1.85	0.824	1.68	0.8	0.41	0.91	0.45	0.94	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Silver	3	4	0.35	0.21	7690	112	7.73	NA	0.00	0.00	0.04	NA	Pass	Pass	Pass	NA
NCL - East	McWane - 5' South	Thallium	4	4	0.17	0.05	13.0	3.44	--	0.27	0.01	0.05	--	0.62	Pass	Pass	Uncertainty	BL
NCL - East	McWane - 5' South	Vanadium	4	4	27.40	2.32	1398	148	11.3	32.5	0.02	0.19	**2.43**	0.84	Pass	Pass	Fail	Pass
NCL - East	McWane - 5' South	Zinc	4	4	146.30	94.87	1932	239	293	69.7	0.08	0.61	0.50	**2.10**	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Aluminum	5	5	11220.00	2010.47	3487	220	2596	12100	**3.22**	**50.94**	**4.32**	0.93	Fail	Fail	Fail	Pass
NCL - East	McWane - Center	Antimony	5	5	0.33	0.24	52.2	2.21	--	0.37	0.01	0.15	--	0.90	Pass	Pass	Uncertainty	BL
NCL - East	McWane - Center	Arsenic	5	5	5.74	2.95	131	70.0	582	4	0.04	0.08	0.01	**1.44**	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Barium	5	5	263.20	133.72	2023	246	122	149	0.13	**1.07**	**2.15**	**1.77**	Pass	Fail	Fail	Fail
NCL - East	McWane - Center	Beryllium	5	5	0.97	0.44	6.90	27.4	--	0.6	0.14	0.04	--	**1.62**	Pass	Pass	Uncertainty	BL
NCL - East	McWane - Center	Cadmium	5	5	0.69	0.18	661	8.73	2.85	0.87	0.00	0.08	0.24	0.80	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Chromium	5	5	24.78	12.58	718	78.9	41.0	17	0.03	0.31	0.60	**1.46**	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Cobalt	5	5	7.66	1.29	1680	277	361	8.1	0.00	0.03	0.02	0.95	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Copper	5	5	80.68	43.91	773	16.8	10.2	20.2	0.10	**4.80**	**7.90**	**3.99**	Pass	Fail	Fail	Fail
NCL - East	McWane - Center	Lead	5	5	24.30	6.98	1208	53.4	18.3	14.4	0.02	0.46	**1.33**	**1.69**	Pass	Pass	Fail	BL
NCL - East	McWane - Center	Manganese	5	5	389.00	48.19	3346	700	2959	399	0.12	0.56	0.13	0.97	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Mercury	0	5	0.05	0.01	3.23	0.271	0.176	0.05	0.01	0.18	0.28	0.97	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Nickel	5	5	18.94	2.70	337	10.8	42.4	21.2	0.06	**1.76**	0.45	0.89	Pass	Fail	Pass	Pass
NCL - East	McWane - Center	Selenium	5	5	0.87	0.31	1.85	0.824	1.68	0.8	0.47	**1.06**	0.52	**1.09**	Pass	Fail	Pass	BL
NCL - East	McWane - Center	Silver	5	5	0.17	0.09	7690	112	7.73	NA	0.00	0.00	0.02	NA	Pass	Pass	Pass	NA
NCL - East	McWane - Center	Thallium	5	5	0.13	0.06	13.0	3.44	--	0.27	0.01	0.04	--	0.48	Pass	Pass	Uncertainty	BL
NCL - East	McWane - Center	Vanadium	5	5	25.64	2.14	1398	148	11.3	32.5	0.02	0.17	**2.27**	0.79	Pass	Pass	Fail	Pass
NCL - East	McWane - Center	Zinc	5	5	122.60	46.91	1932	239	293	69.7	0.06	0.51	0.42	**1.76**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Aluminum	50	50	31294.60	39810.37	3487	220	2596	12100	**8.98**	**142.09**	**12.06**	**2.59**	Fail	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Antimony	50	50	2.85	4.30	52.2	2.21	--	0.37	0.05	**1.29**	--	**7.71**	Pass	Fail	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	Arsenic	50	50	4.74	4.66	131	70.0	582	4	0.04	0.07	0.01	**1.18**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Barium	50	50	672.19	1048.73	2023	246	122	149	0.33	**2.74**	**5.49**	**4.51**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Beryllium	41	50	2.51	3.67	6.90	27.4	--	0.6	0.36	0.09	--	**4.19**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	Cadmium	50	50	1.46	1.55	661	8.73	2.85	0.87	0.00	0.17	0.51	**1.68**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Chromium	50	50	61.10	78.53	718	78.9	41.0	17	0.09	0.77	**1.49**	**3.59**	Pass	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Cobalt	27	50	7.06	2.60	1680	277	361	8.1	0.00	0.03	0.02	0.87	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Copper	50	50	591.73	1014.51	773	16.8	10.2	20.2	0.77	**35.20**	**57.98**	**29.29**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Lead	50	50	89.89	119.56	1208	53.4	18.3	14.4	0.07	**1.68**	**4.91**	**6.24**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Manganese	50	50	473.50	460.36	3346	700	2959	399	0.14	0.68	0.16	**1.19**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Mercury	18	50	0.09	0.05	3.23	0.271	0.176	0.05	0.03	0.32	0.49	**1.73**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Nickel	49	50	41.96	41.56	337	10.8	42.4	21.2	0.12	**3.90**	0.99	**1.98**	Pass	Fail	Pass	Fail

TABLE 6-17a

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to NOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow and LOAEL-Based RBCs for California Vole and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - East	NCL - East (< 8' Elev)	Selenium	47	50	1.62	1.26	1.85	0.824	1.68	0.8	0.88	**1.97**	0.96	**2.03**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Silver	29	50	1.14	1.24	7690	112	7.73	NA	0.00	0.01	0.15	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	Thallium	47	50	0.21	0.12	13.0	3.44	--	0.27	0.02	0.06	**--**	0.79	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	Vanadium	50	50	41.81	18.51	1398	148	11.3	32.5	0.03	0.28	**3.71**	**1.29**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Zinc	50	50	567.28	943.95	1932	239	293	69.7	0.29	**2.37**	**1.94**	**8.14**	Pass	Fail	Fail	BL
NCL - East	NCL - East (> 8' Elev)	Aluminum	34	34	10038.24	4833.61	3487	220	2596	12100	**2.88**	**45.58**	**3.87**	0.83	Fail	Fail	Fail	Pass
NCL - East	NCL - East (> 8' Elev)	Antimony	31	34	0.54	0.61	52.2	2.21	--	0.37	0.01	0.24	**--**	**1.45**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (> 8' Elev)	Arsenic	34	34	3.01	0.64	131	70.0	582	4	0.02	0.04	0.01	0.75	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Barium	34	34	231.96	231.00	2023	246	122	149	0.11	0.94	**1.90**	**1.56**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (> 8' Elev)	Beryllium	22	34	0.77	0.73	6.90	27.4	--	0.6	0.11	0.03	**--**	**1.28**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (> 8' Elev)	Cadmium	34	34	0.94	0.42	661	8.73	2.85	0.87	0.00	0.11	0.33	**1.08**	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Chromium	34	34	19.86	9.91	718	78.9	41.0	17	0.03	0.25	0.48	**1.17**	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Cobalt	14	34	5.24	1.19	1680	277	361	8.1	0.00	0.02	0.01	0.65	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Copper	34	34	80.82	96.92	773	16.8	10.2	20.2	0.10	**4.81**	**7.92**	**4.00**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (> 8' Elev)	Lead	34	34	34.81	44.44	1208	53.4	18.3	14.4	0.03	0.65	**1.90**	**2.42**	Pass	Pass	Fail	BL
NCL - East	NCL - East (> 8' Elev)	Manganese	34	34	311.91	176.21	3346	700	2959	399	0.09	0.45	0.11	0.78	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Mercury	5	34	0.06	0.04	3.23	0.271	0.176	0.05	0.02	0.21	0.32	**1.12**	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Nickel	34	34	20.18	7.54	337	10.8	42.4	21.2	0.06	**1.88**	0.48	0.95	Pass	Fail	Pass	Pass
NCL - East	NCL - East (> 8' Elev)	Selenium	29	34	0.89	0.46	1.85	0.824	1.68	0.8	0.48	**1.08**	0.53	**1.12**	Pass	Fail	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Silver	15	34	0.43	0.23	7690	112	7.73	NA	0.00	0.00	0.06	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (> 8' Elev)	Thallium	28	34	0.20	0.18	13.0	3.44	--	0.27	0.02	0.06	**--**	0.72	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (> 8' Elev)	Vanadium	34	34	26.38	7.14	1398	148	11.3	32.5	0.02	0.18	**2.34**	0.81	Pass	Pass	Fail	Pass
NCL - East	NCL - East (> 8' Elev)	Zinc	34	34	214.98	396.06	1932	239	293	69.7	0.11	0.90	0.73	**3.08**	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Aluminum	9	9	7012.22	748.28	3487	220	2596	12100	**2.01**	**31.84**	**2.70**	0.58	Fail	Fail	Fail	Pass
NCL - North	NCL - Background	Antimony	7	9	0.23	0.08	52.2	2.21	--	0.37	0.00	0.10	**--**	0.62	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Background	Arsenic	9	9	2.46	0.17	131	70.0	582	4	0.02	0.04	0.00	0.61	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Barium	9	9	113.34	14.46	2023	246	122	149	0.06	0.46	0.93	0.76	Pass	Pass	Pass	Pass
NCL - North	NCL - Background	Beryllium	2	9	0.41	0.10	6.90	27.4	--	0.6	0.06	0.01	**--**	0.68	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Background	Cadmium	9	9	0.67	0.04	661	8.73	2.85	0.87	0.00	0.08	0.24	0.78	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Chromium	9	9	11.79	0.61	718	78.9	41.0	17	0.02	0.15	0.29	0.69	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Cobalt	3	9	4.96	0.52	1680	277	361	8.1	0.00	0.02	0.01	0.61	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Copper	9	9	15.67	1.33	773	16.8	10.2	20.2	0.02	0.93	**1.54**	0.78	Pass	Pass	Fail	Pass
NCL - North	NCL - Background	Lead	9	9	8.88	0.83	1208	53.4	18.3	14.4	0.01	0.17	0.49	0.62	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Manganese	9	9	254.33	21.89	3346	700	2959	399	0.08	0.36	0.09	0.64	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Mercury	1	9	0.04	0.02	3.23	0.271	0.176	0.05	0.01	0.17	0.26	0.90	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Nickel	9	9	13.04	1.33	337	10.8	42.4	21.2	0.04	**1.21**	0.31	0.62	Pass	Fail	Pass	Pass
NCL - North	NCL - Background	Selenium	7	9	0.62	0.31	1.85	0.824	1.68	0.8	0.33	0.75	0.37	0.77	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Silver	0	9	0.47	0.06	7690	112	7.73	NA	0.00	0.00	0.06	NA	Pass	Pass	Pass	NA
NCL - North	NCL - Background	Thallium	7	9	0.16	0.12	13.0	3.44	--	0.27	0.01	0.05	**--**	0.60	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Background	Vanadium	9	9	24.33	9.10	1398	148	11.3	32.5	0.02	0.16	**2.16**	0.75	Pass	Pass	Fail	Pass
NCL - North	NCL - Background	Zinc	9	9	60.68	7.08	1932	239	293	69.7	0.03	0.25	0.21	0.87	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Aluminum	4	4	12030.00	5589.36	3487	220	2596	12100	**3.45**	**54.62**	**4.63**	0.99	Fail	Fail	Fail	Pass
NCL - North	NCL - Ditch	Antimony	4	4	0.42	0.21	52.2	2.21	--	0.37	0.01	0.19	**--**	**1.13**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Ditch	Arsenic	4	4	2.82	1.36	131	70.0	582	4	0.02	0.04	0.00	0.71	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Barium	4	4	283.50	124.76	2023	246	122	149	0.14	**1.15**	**2.32**	**1.90**	Pass	Fail	Fail	Fail
NCL - North	NCL - Ditch	Beryllium	4	4	0.70	0.38	6.90	27.4	--	0.6	0.10	0.03	**--**	**1.16**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Ditch	Cadmium	4	4	1.00	0.61	661	8.73	2.85	0.87	0.00	0.11	0.35	**1.15**	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Chromium	4	4	24.13	8.12	718	78.9	41.0	17	0.03	0.31	0.59	**1.42**	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Cobalt	1	4	7.00	3.04	1680	277	361	8.1	0.00	0.03	0.02	0.86	Pass	Pass	Pass	BL

TABLE 6-17a

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to NOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow and LOAEL-Based RBCs for California Vole and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - North	NCL - Ditch	Copper	4	4	91.90	70.19	773	16.8	10.2	20.2	0.12	**5.47**	**9.00**	**4.55**	Pass	Fail	Fail	Fail
NCL - North	NCL - Ditch	Lead	4	4	160.13	105.43	1208	53.4	18.3	14.4	0.13	**3.00**	**8.75**	**11.12**	Pass	Fail	Fail	BL
NCL - North	NCL - Ditch	Manganese	4	4	183.70	72.25	3346	700	2959	399	0.05	0.26	0.06	0.46	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Mercury	0	4	0.09	0.06	3.23	0.271	0.176	0.05	0.03	0.35	0.53	**1.88**	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Nickel	4	4	23.05	10.01	337	10.8	42.4	21.2	0.07	**2.14**	0.54	**1.09**	Pass	Fail	Pass	Fail
NCL - North	NCL - Ditch	Selenium	4	4	2.40	1.35	1.85	0.824	1.68	0.8	**1.30**	**2.91**	**1.42**	**3.00**	Fail	Fail	Fail	BL
NCL - North	NCL - Ditch	Silver	4	4	0.44	0.15	7690	112	7.73	NA	0.00	0.00	0.06	NA	Pass	Pass	Pass	NA
NCL - North	NCL - Ditch	Thallium	4	4	0.19	0.09	13.0	3.44	--	0.27	0.01	0.05	--	0.69	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Ditch	Vanadium	4	4	34.40	13.56	1398	148	11.3	32.5	0.02	0.23	**3.05**	**1.06**	Pass	Pass	Fail	Fail
NCL - North	NCL - Ditch	Zinc	4	4	269.14	143.73	1932	239	293	69.7	0.14	**1.13**	0.92	**3.86**	Pass	Fail	Pass	BL
NCL - North	NCL - North	Aluminum	14	14	7615.71	691.76	3487	220	2596	12100	**2.18**	**34.58**	**2.93**	0.63	Fail	Fail	Fail	Pass
NCL - North	NCL - North	Antimony	10	14	0.31	0.10	52.2	2.21	--	0.37	0.01	0.14	--	0.84	Pass	Pass	Uncertainty	BL
NCL - North	NCL - North	Arsenic	14	14	2.72	0.32	131	70.0	582	4	0.02	0.04	0.00	0.68	Pass	Pass	Pass	BL
NCL - North	NCL - North	Barium	14	14	109.51	10.63	2023	246	122	149	0.05	0.45	0.89	0.73	Pass	Pass	Pass	Pass
NCL - North	NCL - North	Beryllium	4	14	0.46	0.07	6.90	27.4	--	0.6	0.07	0.02	--	0.77	Pass	Pass	Uncertainty	BL
NCL - North	NCL - North	Cadmium	14	14	0.70	0.05	661	8.73	2.85	0.87	0.00	0.08	0.25	0.81	Pass	Pass	Pass	BL
NCL - North	NCL - North	Chromium	14	14	14.06	0.81	718	78.9	41.0	17	0.02	0.18	0.34	0.83	Pass	Pass	Pass	BL
NCL - North	NCL - North	Cobalt	10	14	5.61	0.31	1680	277	361	8.1	0.00	0.02	0.02	0.69	Pass	Pass	Pass	BL
NCL - North	NCL - North	Copper	14	14	15.18	1.66	773	16.8	10.2	20.2	0.02	0.90	**1.49**	0.75	Pass	Pass	Fail	Pass
NCL - North	NCL - North	Lead	14	14	11.54	3.10	1208	53.4	18.3	14.4	0.01	0.22	0.63	0.80	Pass	Pass	Pass	BL
NCL - North	NCL - North	Manganese	14	14	198.50	55.71	3346	700	2959	399	0.06	0.28	0.07	0.50	Pass	Pass	Pass	BL
NCL - North	NCL - North	Mercury	5	14	0.07	0.05	3.23	0.271	0.176	0.05	0.02	0.26	0.40	**1.41**	Pass	Pass	Pass	BL
NCL - North	NCL - North	Nickel	14	14	15.09	0.71	337	10.8	42.4	21.2	0.04	**1.40**	0.36	0.71	Pass	Fail	Pass	Pass
NCL - North	NCL - North	Selenium	13	14	0.62	0.31	1.85	0.824	1.68	0.8	0.34	0.75	0.37	0.78	Pass	Pass	Pass	BL
NCL - North	NCL - North	Silver	1	14	1.08	2.08	7690	112	7.73	NA	0.00	0.01	0.14	NA	Pass	Pass	Pass	NA
NCL - North	NCL - North	Thallium	10	14	0.25	0.13	13.0	3.44	--	0.27	0.02	0.07	--	0.92	Pass	Pass	Uncertainty	BL
NCL - North	NCL - North	Vanadium	14	14	29.98	11.18	1398	148	11.3	32.5	0.02	0.20	**2.66**	0.92	Pass	Pass	Fail	Pass
NCL - North	NCL - North	Zinc	14	14	80.83	57.79	1932	239	293	69.7	0.04	0.34	0.28	**1.16**	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Aluminum	18	18	14296.67	4335.95	3487	220	2596	12100	**4.10**	**64.91**	**5.51**	**1.18**	Fail	Fail	Fail	Fail
NCL - North	NCL - Pond	Antimony	9	18	0.80	0.52	52.2	2.21	--	0.37	0.02	0.36	--	**2.15**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Pond	Arsenic	18	18	3.83	1.72	131	70.0	582	4	0.03	0.05	0.01	0.96	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Barium	18	18	454.89	1154.83	2023	246	122	149	0.22	**1.85**	**3.72**	**3.05**	Pass	Fail	Fail	Fail
NCL - North	NCL - Pond	Beryllium	18	18	1.92	4.20	6.90	27.4	--	0.6	0.28	0.07	--	**3.20**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Pond	Cadmium	18	18	1.37	0.77	661	8.73	2.85	0.87	0.00	0.16	0.48	**1.57**	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Chromium	18	18	21.05	9.23	718	78.9	41.0	17	0.03	0.27	0.51	**1.24**	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Cobalt	16	18	7.91	1.61	1680	277	361	8.1	0.00	0.03	0.02	0.98	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Copper	18	18	50.88	63.48	773	16.8	10.2	20.2	0.07	**3.03**	**4.98**	**2.52**	Pass	Fail	Fail	Fail
NCL - North	NCL - Pond	Lead	18	18	37.15	39.33	1208	53.4	18.3	14.4	0.03	0.70	**2.03**	**2.58**	Pass	Pass	Fail	BL
NCL - North	NCL - Pond	Manganese	18	18	347.06	198.12	3346	700	2959	399	0.10	0.50	0.12	0.87	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Mercury	3	18	0.14	0.05	3.23	0.271	0.176	0.05	0.04	0.53	0.82	**2.89**	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Nickel	18	18	23.77	6.70	337	10.8	42.4	21.2	0.07	**2.21**	0.56	**1.12**	Pass	Fail	Pass	Fail
NCL - North	NCL - Pond	Selenium	9	18	2.82	3.31	1.85	0.824	1.68	0.8	**1.53**	**3.42**	**1.67**	**3.52**	Fail	Fail	Fail	BL
NCL - North	NCL - Pond	Silver	4	18	0.55	0.19	7690	112	7.73	NA	0.00	0.00	0.07	NA	Pass	Pass	Pass	NA
NCL - North	NCL - Pond	Thallium	2	18	0.47	0.14	13.0	3.44	--	0.27	0.04	0.14	--	**1.75**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Pond	Vanadium	18	18	39.53	13.35	1398	148	11.3	32.5	0.03	0.27	**3.50**	**1.22**	Pass	Pass	Fail	Fail
NCL - North	NCL - Pond	Zinc	18	18	180.77	189.50	1932	239	293	69.7	0.09	0.76	0.62	**2.59**	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Aluminum	7	7	2522.86	472.61	3487	220	2596	12100	0.72	**11.45**	0.97	0.21	Pass	Fail	Pass	Pass
Wetlands Beach	Beach - Background	Antimony	7	7	0.14	0.04	52.2	2.21	--	0.37	0.00	0.06	--	0.37	Pass	Pass	Uncertainty	BL
Wetlands Beach	Beach - Background	Arsenic	7	7	1.25	0.36	131	70.0	582	4	0.01	0.02	0.00	0.31	Pass	Pass	Pass	BL

TABLE 6-17a

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to NOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow and LOAEL-Based RBCs for California Vole and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
Wetlands Beach	Beach - Background	Barium	7	7	54.99	17.01	2023	246	122	149	0.03	0.22	0.45	0.37	Pass	Pass	Pass	Pass
Wetlands Beach	Beach - Background	Beryllium	0	7	0.14	0.02	6.90	27.4	--	0.6	0.02	0.01	--	0.23	Pass	Pass	Uncertainty	BL
Wetlands Beach	Beach - Background	Cadmium	7	7	0.22	0.07	661	8.73	2.85	0.87	0.00	0.03	0.08	0.25	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Chromium	7	7	6.63	1.27	718	78.9	41.0	17	0.01	0.08	0.16	0.39	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Cobalt	0	7	1.91	0.40	1680	277	361	8.1	0.00	0.01	0.01	0.24	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Copper	7	7	5.21	1.13	773	16.8	10.2	20.2	0.01	0.31	0.51	0.26	Pass	Pass	Pass	Pass
Wetlands Beach	Beach - Background	Lead	7	7	4.44	1.58	1208	53.4	18.3	14.4	0.00	0.08	0.24	0.31	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Manganese	7	7	91.51	25.58	3346	700	2959	399	0.03	0.13	0.03	0.23	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Mercury	0	7	0.05	0.04	3.23	0.271	0.176	0.05	0.01	0.17	0.26	0.93	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Nickel	7	7	5.64	0.99	337	10.8	42.4	21.2	0.02	0.52	0.13	0.27	Pass	Pass	Pass	Pass
Wetlands Beach	Beach - Background	Selenium	1	7	0.48	0.11	1.85	0.824	1.68	0.8	0.26	0.58	0.28	0.60	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Silver	0	7	0.50	0.00	7690	112	7.73	NA	0.00	0.00	0.06	NA	Pass	Pass	Pass	NA
Wetlands Beach	Beach - Background	Thallium	7	7	0.07	0.01	13.0	3.44	--	0.27	0.01	0.02	--	0.26	Pass	Pass	Uncertainty	BL
Wetlands Beach	Beach - Background	Vanadium	7	7	10.60	1.81	1398	148	11.3	32.5	0.01	0.07	0.94	0.33	Pass	Pass	Pass	Pass
Wetlands Beach	Beach - Background	Zinc	7	7	26.03	5.37	1932	239	293	69.7	0.01	0.11	0.09	0.37	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Aluminum	7	7	1638.57	120.34	3487	220	2596	12100	0.47	**7.44**	0.63	0.14	Pass	Fail	Pass	Pass
Wetlands Beach	Breach - Background	Antimony	7	7	0.11	0.03	52.2	2.21	--	0.37	0.00	0.05	--	0.29	Pass	Pass	Uncertainty	BL
Wetlands Beach	Breach - Background	Arsenic	7	7	1.87	0.24	131	70.0	582	4	0.01	0.03	0.00	0.47	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Barium	7	7	70.89	42.43	2023	246	122	149	0.04	0.29	0.58	0.48	Pass	Pass	Pass	Pass
Wetlands Beach	Breach - Background	Beryllium	0	7	0.09	0.01	6.90	27.4	--	0.6	0.01	0.00	--	0.16	Pass	Pass	Uncertainty	BL
Wetlands Beach	Breach - Background	Cadmium	7	7	0.10	0.01	661	8.73	2.85	0.87	0.00	0.01	0.04	0.11	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Chromium	7	7	8.51	3.12	718	78.9	41.0	17	0.01	0.11	0.21	0.50	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Cobalt	0	7	1.29	0.13	1680	277	361	8.1	0.00	0.00	0.00	0.16	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Copper	1	7	2.24	0.27	773	16.8	10.2	20.2	0.00	0.13	0.22	0.11	Pass	Pass	Pass	Pass
Wetlands Beach	Breach - Background	Lead	7	7	2.26	0.61	1208	53.4	18.3	14.4	0.00	0.04	0.12	0.16	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Manganese	7	7	78.56	7.54	3346	700	2959	399	0.02	0.11	0.03	0.20	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Mercury	0	7	0.03	0.01	3.23	0.271	0.176	0.05	0.01	0.11	0.16	0.58	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Nickel	3	7	3.99	0.23	337	10.8	42.4	21.2	0.01	0.37	0.09	0.19	Pass	Pass	Pass	Pass
Wetlands Beach	Breach - Background	Selenium	0	7	0.51	0.00	1.85	0.824	1.68	0.8	0.28	0.62	0.30	0.64	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Silver	0	7	0.49	0.00	7690	112	7.73	NA	0.00	0.00	0.06	NA	Pass	Pass	Pass	NA
Wetlands Beach	Breach - Background	Thallium	7	7	0.06	0.02	13.0	3.44	--	0.27	0.00	0.02	--	0.22	Pass	Pass	Uncertainty	BL
Wetlands Beach	Breach - Background	Vanadium	7	7	18.07	8.48	1398	148	11.3	32.5	0.01	0.12	**1.60**	0.56	Pass	Pass	Fail	Pass
Wetlands Beach	Breach - Background	Zinc	7	7	10.76	0.86	1932	239	293	69.7	0.01	0.05	0.04	0.15	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Aluminum	4	4	9885.00	777.54	3487	220	2596	12100	**2.84**	**44.88**	**3.81**	0.82	Fail	Fail	Fail	Pass
Wetlands Beach	Hueneme Parcel	Antimony	4	4	0.63	0.23	52.2	2.21	--	0.37	0.01	0.28	--	**1.70**	Pass	Pass	Uncertainty	BL
Wetlands Beach	Hueneme Parcel	Arsenic	4	4	4.10	1.02	131	70.0	582	4	0.03	0.06	0.01	**1.03**	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Barium	4	4	212.75	67.96	2023	246	122	149	0.11	0.87	**1.74**	**1.43**	Pass	Pass	Fail	Fail
Wetlands Beach	Hueneme Parcel	Beryllium	3	4	0.62	0.15	6.90	27.4	--	0.6	0.09	0.02	--	**1.04**	Pass	Pass	Uncertainty	BL
Wetlands Beach	Hueneme Parcel	Cadmium	4	4	1.11	0.85	661	8.73	2.85	0.87	0.00	0.13	0.39	**1.27**	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Chromium	4	4	25.10	8.74	718	78.9	41.0	17	0.03	0.32	0.61	**1.48**	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Cobalt	3	4	6.38	1.33	1680	277	361	8.1	0.00	0.02	0.02	0.79	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Copper	4	4	51.48	25.09	773	16.8	10.2	20.2	0.07	**3.06**	**5.04**	**2.55**	Pass	Fail	Fail	Fail
Wetlands Beach	Hueneme Parcel	Lead	4	4	46.73	28.36	1208	53.4	18.3	14.4	0.04	0.88	**2.55**	**3.24**	Pass	Pass	Fail	BL
Wetlands Beach	Hueneme Parcel	Manganese	4	4	357.25	66.91	3346	700	2959	399	0.11	0.51	0.12	0.90	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Mercury	4	4	0.38	0.61	3.23	0.271	0.176	0.05	0.12	**1.41**	**2.17**	**7.64**	Pass	Fail	Fail	BL
Wetlands Beach	Hueneme Parcel	Nickel	4	4	19.25	1.88	337	10.8	42.4	21.2	0.06	**1.79**	0.45	0.91	Pass	Fail	Pass	Pass
Wetlands Beach	Hueneme Parcel	Selenium	4	4	0.92	0.39	1.85	0.824	1.68	0.8	0.50	**1.12**	0.55	**1.15**	Pass	Fail	Pass	BL
Wetlands Beach	Hueneme Parcel	Silver	4	4	1.09	1.48	7690	112	7.73	NA	0.00	0.01	0.14	NA	Pass	Pass	Pass	NA
Wetlands Beach	Hueneme Parcel	Thallium	4	4	0.22	0.07	13.0	3.44	--	0.27	0.02	0.06	--	0.82	Pass	Pass	Uncertainty	BL

TABLE 6-17a

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to NOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow and LOAEL-Based RBCs for California Vole and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
Wetlands Beach	Hueneme Parcel	Vanadium	4	4	32.25	4.83	1398	148	11.3	32.5	0.02	0.22	**2.86**	0.99	Pass	Pass	Fail	Pass
Wetlands Beach	Hueneme Parcel	Zinc	4	4	190.70	103.08	1932	239	293	69.7	0.10	0.80	0.65	**2.74**	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Aluminum	10	10	4188.00	4151.70	3487	220	2596	12100	**1.20**	**19.02**	**1.61**	0.35	Fail	Fail	Fail	Pass
Wetlands Beach	Wetland - East	Antimony	8	10	0.60	0.64	52.2	2.21	--	0.37	0.01	0.27	**--**	**1.61**	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - East	Arsenic	10	10	1.31	0.21	131	70.0	582	4	0.01	0.02	0.00	0.33	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Barium	9	10	82.62	70.93	2023	246	122	149	0.04	0.34	0.68	0.55	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - East	Beryllium	5	10	0.41	0.45	6.90	27.4	--	0.6	0.06	0.01	**--**	0.68	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - East	Cadmium	9	10	0.25	0.19	661	8.73	2.85	0.87	0.00	0.03	0.09	0.29	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Chromium	10	10	10.50	9.09	718	78.9	41.0	17	0.01	0.13	0.26	0.62	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Cobalt	0	10	1.35	0.77	1680	277	361	8.1	0.00	0.00	0.00	0.17	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Copper	10	10	65.61	97.93	773	16.8	10.2	20.2	0.08	**3.90**	**6.43**	**3.25**	Pass	Fail	Fail	Fail
Wetlands Beach	Wetland - East	Lead	10	10	10.20	11.13	1208	53.4	18.3	14.4	0.01	0.19	0.56	0.71	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Manganese	10	10	97.26	61.71	3346	700	2959	399	0.03	0.14	0.03	0.24	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Mercury	0	10	0.05	0.04	3.23	0.271	0.176	0.05	0.02	0.20	0.31	**1.09**	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Nickel	10	10	5.87	3.48	337	10.8	42.4	21.2	0.02	0.55	0.14	0.28	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - East	Selenium	4	7	0.42	0.17	1.85	0.824	1.68	0.8	0.23	0.51	0.25	0.52	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Silver	2	10	0.44	0.11	7690	112	7.73	NA	0.00	0.00	0.06	NA	Pass	Pass	Pass	NA
Wetlands Beach	Wetland - East	Thallium	9	10	0.06	0.10	13.0	3.44	--	0.27	0.00	0.02	**--**	0.23	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - East	Vanadium	10	10	7.76	3.57	1398	148	11.3	32.5	0.01	0.05	0.69	0.24	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - East	Zinc	10	10	59.72	68.18	1932	239	293	69.7	0.03	0.25	0.20	0.86	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Aluminum	14	14	2154.93	1041.42	3487	220	2596	12100	0.62	**9.78**	0.83	0.18	Pass	Fail	Pass	Pass
Wetlands Beach	Wetland - West	Antimony	13	14	0.28	0.21	52.2	2.21	--	0.37	0.01	0.13	**--**	0.75	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - West	Arsenic	14	14	1.43	0.34	131	70.0	582	4	0.01	0.02	0.00	0.36	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Barium	11	14	46.11	34.96	2023	246	122	149	0.02	0.19	0.38	0.31	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - West	Beryllium	3	14	0.24	0.18	6.90	27.4	--	0.6	0.03	0.01	**--**	0.40	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - West	Cadmium	13	14	0.33	0.49	661	8.73	2.85	0.87	0.00	0.04	0.11	0.37	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Chromium	14	14	6.89	4.73	718	78.9	41.0	17	0.01	0.09	0.17	0.41	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Cobalt	0	14	1.40	0.68	1680	277	361	8.1	0.00	0.01	0.00	0.17	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Copper	13	14	12.40	15.23	773	16.8	10.2	20.2	0.02	0.74	**1.21**	0.61	Pass	Pass	Fail	Pass
Wetlands Beach	Wetland - West	Lead	14	14	5.94	3.62	1208	53.4	18.3	14.4	0.00	0.11	0.32	0.41	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Manganese	14	14	75.75	28.49	3346	700	2959	399	0.02	0.11	0.03	0.19	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Mercury	1	14	0.08	0.04	3.23	0.271	0.176	0.05	0.03	0.30	0.46	**1.63**	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Nickel	5	14	4.32	1.27	337	10.8	42.4	21.2	0.01	0.40	0.10	0.20	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - West	Selenium	13	14	0.61	0.35	1.85	0.824	1.68	0.8	0.33	0.74	0.36	0.76	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Silver	13	14	0.55	0.20	7690	112	7.73	NA	0.00	0.00	0.07	NA	Pass	Pass	Pass	NA
Wetlands Beach	Wetland - West	Thallium	13	14	0.05	0.09	13.0	3.44	--	0.27	0.00	0.02	**--**	0.20	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - West	Vanadium	14	14	11.80	7.65	1398	148	11.3	32.5	0.01	0.08	**1.05**	0.36	Pass	Pass	Fail	Pass
Wetlands Beach	Wetland - West	Zinc	14	14	32.51	24.31	1932	239	293	69.7	0.02	0.14	0.11	0.47	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Aluminum	12	12	64763.33	34941.57	3487	220	2596	12100	**18.57**	**294.06**	**24.95**	**5.35**	Fail	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Antimony	12	12	5.75	3.32	52.2	2.21	--	0.37	0.11	**2.60**	**--**	**15.55**	Pass	Fail	Uncertainty	BL
Wetlands Beach	WMU Ditch	Arsenic	12	12	6.28	2.92	131	70.0	582	4	0.05	0.09	0.01	**1.57**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Barium	12	12	1327.46	843.23	2023	246	122	149	0.66	**5.41**	**10.85**	**8.91**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Beryllium	12	12	6.38	5.60	6.90	27.4	--	0.6	0.92	0.23	**--**	**10.64**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch	Cadmium	12	12	2.43	1.29	661	8.73	2.85	0.87	0.00	0.28	0.85	**2.79**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Chromium	12	12	131.84	116.71	718	78.9	41.0	17	0.18	**1.67**	**3.21**	**7.76**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Cobalt	6	12	6.13	2.08	1680	277	361	8.1	0.00	0.02	0.02	0.76	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Copper	12	12	1615.56	1128.03	773	16.8	10.2	20.2	**2.09**	**96.10**	**158.29**	**79.98**	Fail	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Lead	12	12	167.18	107.54	1208	53.4	18.3	14.4	0.14	**3.13**	**9.14**	**11.61**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Manganese	12	12	782.09	372.91	3346	700	2959	399	0.23	**1.12**	0.26	**1.96**	Pass	Fail	Pass	BL

TABLE 6-17a

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to NOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow and LOAEL-Based RBCs for California Vole and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
Wetlands Beach	WMU Ditch	Mercury	3	11	0.15	0.09	3.23	0.271	0.176	0.05	0.05	0.55	0.85	**2.99**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Nickel	12	12	73.39	41.64	337	10.8	42.4	21.2	0.22	**6.82**	**1.73**	**3.46**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Selenium	10	12	2.77	2.03	1.85	0.824	1.68	0.8	**1.50**	**3.37**	**1.65**	**3.47**	Fail	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Silver	11	12	1.93	1.04	7690	112	7.73	NA	0.00	0.02	0.25	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch	Thallium	9	12	0.31	0.40	13.0	3.44	--	0.27	0.02	0.09	**--**	**1.15**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch	Vanadium	12	12	39.40	16.74	1398	148	11.3	32.5	0.03	0.27	**3.49**	**1.21**	Pass	Pass	Fail	Fail
Wetlands Beach	WMU Ditch	Zinc	12	12	1289.36	666.15	1932	239	293	69.7	0.67	**5.40**	**4.40**	**18.50**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Aluminum	9	9	57604.44	47043.00	3487	220	2596	12100	**16.52**	**261.55**	**22.19**	**4.76**	Fail	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 5' South	Antimony	9	9	4.18	3.19	52.2	2.21	--	0.37	0.08	**1.89**	**--**	**11.30**	Pass	Fail	Uncertainty	BL
Wetlands Beach	WMU Ditch - 5' South	Arsenic	9	9	3.86	2.40	131	70.0	582	4	0.03	0.06	0.01	0.96	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Barium	9	9	894.71	899.49	2023	246	122	149	0.44	**3.64**	**7.31**	**6.00**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 5' South	Beryllium	9	9	3.51	1.76	6.90	27.4	--	0.6	0.51	0.13	**--**	**5.84**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 5' South	Cadmium	9	9	1.36	1.23	661	8.73	2.85	0.87	0.00	0.16	0.48	**1.57**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Chromium	9	9	91.24	82.37	718	78.9	41.0	17	0.13	**1.16**	**2.22**	**5.37**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Cobalt	4	9	3.63	1.94	1680	277	361	8.1	0.00	0.01	0.01	0.45	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Copper	9	9	1166.84	865.05	773	16.8	10.2	20.2	**1.51**	**69.41**	**114.33**	**57.76**	Fail	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 5' South	Lead	9	9	149.44	189.44	1208	53.4	18.3	14.4	0.12	**2.80**	**8.17**	**10.38**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Manganese	9	9	461.74	337.35	3346	700	2959	399	0.14	0.66	0.16	**1.16**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Mercury	0	9	0.18	0.08	3.23	0.271	0.176	0.05	0.06	0.67	**1.04**	**3.64**	Pass	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Nickel	9	9	60.66	41.57	337	10.8	42.4	21.2	0.18	**5.64**	**1.43**	**2.86**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 5' South	Selenium	9	9	2.36	2.44	1.85	0.824	1.68	0.8	**1.28**	**2.87**	**1.40**	**2.95**	Fail	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Silver	8	9	0.97	0.54	7690	112	7.73	NA	0.00	0.01	0.13	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 5' South	Thallium	9	9	0.05	0.03	13.0	3.44	--	0.27	0.00	0.01	**--**	0.19	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 5' South	Vanadium	9	9	28.19	18.33	1398	148	11.3	32.5	0.02	0.19	**2.50**	0.87	Pass	Pass	Fail	Pass
Wetlands Beach	WMU Ditch - 5' South	Zinc	9	9	1066.16	1035.05	1932	239	293	69.7	0.55	**4.46**	**3.64**	**15.30**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	Aluminum	14	14	63601.43	67977.47	3487	220	2596	12100	**18.24**	**288.78**	**24.50**	**5.26**	Fail	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	Antimony	13	14	5.78	6.58	52.2	2.21	--	0.37	0.11	**2.62**	**--**	**15.63**	Pass	Fail	Uncertainty	BL
Wetlands Beach	WMU Ditch - 15' South	Arsenic	14	14	3.36	3.18	131	70.0	582	4	0.03	0.05	0.01	0.84	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Barium	14	14	878.65	1047.49	2023	246	122	149	0.43	**3.58**	**7.18**	**5.90**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	Beryllium	14	14	4.63	5.35	6.90	27.4	--	0.6	0.67	0.17	**--**	**7.71**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 15' South	Cadmium	14	14	2.74	3.37	661	8.73	2.85	0.87	0.00	0.31	0.96	**3.15**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Chromium	14	14	122.29	128.46	718	78.9	41.0	17	0.17	**1.55**	**2.98**	**7.19**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	Cobalt	5	14	5.05	2.97	1680	277	361	8.1	0.00	0.02	0.01	0.62	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Copper	14	14	1463.64	1651.89	773	16.8	10.2	20.2	**1.89**	**87.07**	**143.41**	**72.46**	Fail	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	Lead	14	14	159.05	169.23	1208	53.4	18.3	14.4	0.13	**2.98**	**8.69**	**11.05**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	Manganese	14	14	707.21	603.85	3346	700	2959	399	0.21	**1.01**	0.24	**1.77**	Pass	Fail	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Mercury	1	13	0.10	0.07	3.23	0.271	0.176	0.05	0.03	0.38	0.59	**2.07**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Nickel	14	14	72.99	66.26	337	10.8	42.4	21.2	0.22	**6.78**	**1.72**	**3.44**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	Selenium	9	14	1.83	1.44	1.85	0.824	1.68	0.8	0.99	**2.22**	**1.09**	**2.29**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	Silver	9	14	1.60	1.79	7690	112	7.73	NA	0.00	0.01	0.21	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 15' South	Thallium	8	14	0.21	0.19	13.0	3.44	--	0.27	0.02	0.06	**--**	0.76	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 15' South	Vanadium	14	14	47.35	19.84	1398	148	11.3	32.5	0.03	0.32	**4.20**	**1.46**	Pass	Pass	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	Zinc	14	14	1204.14	1189.80	1932	239	293	69.7	0.62	**5.04**	**4.11**	**17.28**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 30' South	Aluminum	9	9	8793.33	6364.61	3487	220	2596	12100	**2.52**	**39.93**	**3.39**	0.73	Fail	Fail	Fail	Pass
Wetlands Beach	WMU Ditch - 30' South	Antimony	6	9	1.37	0.82	52.2	2.21	--	0.37	0.03	0.62	**--**	**3.70**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 30' South	Arsenic	9	9	1.40	0.44	131	70.0	582	4	0.01	0.02	0.00	0.35	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Barium	9	9	78.22	65.99	2023	246	122	149	0.04	0.32	0.64	0.52	Pass	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 30' South	Beryllium	9	9	0.57	0.32	6.90	27.4	--	0.6	0.08	0.02	**--**	0.94	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 30' South	Cadmium	5	9	0.50	0.24	661	8.73	2.85	0.87	0.00	0.06	0.17	0.57	Pass	Pass	Pass	BL

TABLE 6-17a

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to NOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow and LOAEL-Based RBCs for California Vole and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

							RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
Wetlands Beach	WMU Ditch - 30' South	Chromium	9	9	22.01	14.99	718	78.9	41.0	17	0.03	0.28	0.54	**1.29**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Cobalt	9	9	1.29	0.35	1680	277	361	8.1	0.00	0.00	0.00	0.16	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Copper	9	9	156.90	123.19	773	16.8	10.2	20.2	0.20	**9.33**	**15.37**	**7.77**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 30' South	Lead	9	9	23.86	17.11	1208	53.4	18.3	14.4	0.02	0.45	**1.30**	**1.66**	Pass	Pass	Fail	BL
Wetlands Beach	WMU Ditch - 30' South	Manganese	9	9	125.90	58.47	3346	700	2959	399	0.04	0.18	0.04	0.32	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Mercury	0	9	0.12	0.02	3.23	0.271	0.176	0.05	0.04	0.43	0.66	**2.33**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Nickel	9	9	15.10	10.59	337	10.8	42.4	21.2	0.04	**1.40**	0.36	0.71	Pass	Fail	Pass	Pass
Wetlands Beach	WMU Ditch - 30' South	Selenium	8	9	0.23	0.24	1.85	0.824	1.68	0.8	0.12	0.28	0.14	0.29	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Silver	0	9	0.46	0.09	7690	112	7.73	NA	0.00	0.00	0.06	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 30' South	Thallium	0	9	0.53	0.29	13.0	3.44	--	0.27	0.04	0.16	**--**	**1.98**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 30' South	Vanadium	9	9	45.97	8.54	1398	148	11.3	32.5	0.03	0.31	**4.07**	**1.41**	Pass	Pass	Fail	Fail
Wetlands Beach	WMU Ditch - 30' South	Zinc	9	9	213.46	149.77	1932	239	293	69.7	0.11	0.89	0.73	**3.06**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Aluminum	9	9	7015.56	4453.60	3487	220	2596	12100	**2.01**	**31.85**	**2.70**	0.58	Fail	Fail	Fail	Pass
Wetlands Beach	WMU Ditch - 50' South	Antimony	6	9	0.59	0.26	52.2	2.21	--	0.37	0.01	0.27	**--**	**1.60**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 50' South	Arsenic	9	9	1.30	0.27	131	70.0	582	4	0.01	0.02	0.00	0.32	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Barium	9	9	59.57	27.93	2023	246	122	149	0.03	0.24	0.49	0.40	Pass	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 50' South	Beryllium	9	9	0.44	0.21	6.90	27.4	--	0.6	0.06	0.02	**--**	0.74	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 50' South	Cadmium	6	9	0.41	0.15	661	8.73	2.85	0.87	0.00	0.05	0.15	0.48	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Chromium	9	9	18.30	9.64	718	78.9	41.0	17	0.03	0.23	0.45	**1.08**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Cobalt	9	9	1.27	0.26	1680	277	361	8.1	0.00	0.00	0.00	0.16	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Copper	9	9	120.56	88.47	773	16.8	10.2	20.2	0.16	**7.17**	**11.81**	**5.97**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 50' South	Lead	9	9	16.31	12.83	1208	53.4	18.3	14.4	0.01	0.31	0.89	**1.13**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Manganese	9	9	123.01	48.28	3346	700	2959	399	0.04	0.18	0.04	0.31	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Mercury	1	9	0.16	0.19	3.23	0.271	0.176	0.05	0.05	0.59	0.91	**3.20**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Nickel	9	9	9.46	4.70	337	10.8	42.4	21.2	0.03	0.88	0.22	0.45	Pass	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 50' South	Selenium	2	9	0.61	0.31	1.85	0.824	1.68	0.8	0.33	0.74	0.36	0.77	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Silver	0	9	0.39	0.03	7690	112	7.73	NA	0.00	0.00	0.05	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 50' South	Thallium	0	9	0.39	0.03	13.0	3.44	--	0.27	0.03	0.11	**--**	**1.45**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 50' South	Vanadium	9	9	41.10	15.84	1398	148	11.3	32.5	0.03	0.28	**3.64**	**1.26**	Pass	Pass	Fail	Fail
Wetlands Beach	WMU Ditch - 50' South	Zinc	9	9	119.62	77.80	1932	239	293	69.7	0.06	0.50	0.41	**1.72**	Pass	Pass	Pass	BL

Notes:

-- = benchmark is unavailable

BL = background concentration is lower than the bird RBCs

Fail = mean concentration exceeds the NOAEL-based RBC for sparrow or LOAEL-based RBC for mammals and background; therefore, this analyte was considered to pose a possible risk to individual special-status avian species or a population-level risk to mammals

HQ = hazard quotient

mg/kg = milligrams per kilogram

N = sample size

NA = not available

NOAEL = no observed adverse effect level

Pass = mean concentration was less than the NOAEL-based RBC for sparrows, less than the LOAEL-based RBC for mammals, or less than background; therefore, there are no risks to terrestrial wildlife

RBC = risk-based concentration

Uncertainty = benchmark value not available; therefore, this analyte is considered an uncertainty

UTL = upper tolerance limit

Shading or bold indicates cases where the mean soil concentration exceeds the bird RBC or background value.

Background is only used in the risk results if it is greater than the bird RBCs; otherwise the background risk result is marked as BL.

TABLE 6-17b

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to LOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow, California Vole, and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - East	McWane - 5' South	Aluminum	4	4	12115.00	5127.93	9390	9635	19800	3487	220	--	12100	**3.47**	**55.01**	**--**	**1.00**	Fail	Fail	Use NOAEL	Fail
NCL - East	McWane - 5' South	Antimony	4	4	0.39	0.28	0.16	0.315	0.77	52.2	2.21	--	0.37	0.01	0.18	**--**	**1.05**	Pass	Pass	Uncertainty	BL
NCL - East	McWane - 5' South	Arsenic	4	4	3.38	0.39	3	3.3	3.9	131	70.0	2546	4	0.03	0.05	0.00	0.84	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Barium	4	4	330.25	339.99	143	169.5	839	2023	246	246	149	0.16	**1.34**	**1.34**	**2.22**	Pass	Fail	Fail	Fail
NCL - East	McWane - 5' South	Beryllium	4	4	0.97	0.76	0.44	0.665	2.1	6.90	27.4	--	0.6	0.14	0.04	**--**	**1.61**	Pass	Pass	Uncertainty	BL
NCL - East	McWane - 5' South	Cadmium	4	4	0.87	0.34	0.48	0.85	1.3	661	8.73	4.68	0.87	0.00	0.10	0.19	1.00	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Chromium	4	4	20.23	9.26	13.4	16.8	33.9	718	78.9	42.9	17	0.03	0.26	0.47	**1.19**	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Cobalt	3	4	6.75	2.26	3.4	7.65	8.3	1680	277	370	8.1	0.00	0.02	0.02	0.83	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Copper	4	4	97.38	96.97	35.3	56.1	242	773	16.8	33.0	20.2	0.13	**5.79**	**2.95**	**4.82**	Pass	Fail	Fail	Fail
NCL - East	McWane - 5' South	Lead	4	4	26.33	15.65	12.3	22.35	48.3	1208	53.4	37.6	14.4	0.02	0.49	0.70	**1.83**	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Manganese	4	4	439.25	111.72	335	431	560	3346	700	5752	399	0.13	0.63	0.08	**1.10**	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Mercury	0	4	0.08	0.03	0.051	0.0665	0.12	3.23	0.271	1.126	0.05	0.02	0.28	0.07	**1.52**	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Nickel	4	4	20.13	7.87	9.6	21.6	27.7	337	10.8	73.0	21.2	0.06	**1.87**	0.28	0.95	Pass	Fail	Pass	Pass
NCL - East	McWane - 5' South	Selenium	4	4	0.75	0.17	0.65	0.675	1	1.85	0.824	3.64	0.8	0.41	0.91	0.21	0.94	Pass	Pass	Pass	BL
NCL - East	McWane - 5' South	Silver	3	4	0.35	0.21	0.16	0.335	0.55	7690	112	77.30	NA	0.00	0.00	0.00	NA	Pass	Pass	Pass	NA
NCL - East	McWane - 5' South	Thallium	4	4	0.17	0.05	0.093	0.19	0.2	13.0	3.44	--	0.27	0.01	0.05	**--**	0.62	Pass	Pass	Uncertainty	BL
NCL - East	McWane - 5' South	Vanadium	4	4	27.40	2.32	25.3	26.85	30.6	1398	148	22.6	32.5	0.02	0.19	**1.21**	0.84	Pass	Pass	Fail	Pass
NCL - East	McWane - 5' South	Zinc	4	4	146.30	94.87	75.2	112.5	285	1932	239	295	69.7	0.08	0.61	0.50	**2.10**	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Aluminum	5	5	11220.00	2010.47	10100	10400	14800	3487	220	--	12100	**3.22**	**50.94**	**--**	0.93	Fail	Fail	Use NOAEL	Pass
NCL - East	McWane - Center	Antimony	5	5	0.33	0.24	0.16	0.24	0.76	52.2	2.21	--	0.37	0.01	0.15	**--**	0.90	Pass	Pass	Uncertainty	BL
NCL - East	McWane - Center	Arsenic	5	5	5.74	2.95	3.3	3.8	9.3	131	70.0	2546	4	0.04	0.08	0.00	**1.44**	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Barium	5	5	263.20	133.72	170	227	496	2023	246	246	149	0.13	**1.07**	**1.07**	**1.77**	Pass	Fail	Fail	Fail
NCL - East	McWane - Center	Beryllium	5	5	0.97	0.44	0.58	0.87	1.7	6.90	27.4	--	0.6	0.14	0.04	**--**	**1.62**	Pass	Pass	Uncertainty	BL
NCL - East	McWane - Center	Cadmium	5	5	0.69	0.18	0.5	0.75	0.93	661	8.73	4.68	0.87	0.00	0.08	0.15	0.80	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Chromium	5	5	24.78	12.58	14.6	18.8	44.5	718	78.9	42.9	17	0.03	0.31	0.58	**1.46**	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Cobalt	5	5	7.66	1.29	6.4	7	9.2	1680	277	370	8.1	0.00	0.03	0.02	0.95	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Copper	5	5	80.68	43.91	56.9	63.9	159	773	16.8	33.0	20.2	0.10	**4.80**	**2.44**	**3.99**	Pass	Fail	Fail	Fail
NCL - East	McWane - Center	Lead	5	5	24.30	6.98	15.9	24.8	33	1208	53.4	37.6	14.4	0.02	0.46	0.65	**1.69**	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Manganese	5	5	389.00	48.19	336	390	453	3346	700	5752	399	0.12	0.56	0.07	0.97	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Mercury	0	5	0.05	0.01	0.043	0.045	0.058	3.23	0.271	1.126	0.05	0.01	0.18	0.04	0.97	Pass	Pass	Pass	BL
NCL - East	McWane - Center	Nickel	5	5	18.94	2.70	16	19.1	22.2	337	10.8	73.0	21.2	0.06	**1.76**	0.26	0.89	Pass	Fail	Pass	Pass
NCL - East	McWane - Center	Selenium	5	5	0.87	0.31	0.56	0.73	1.3	1.85	0.824	3.64	0.8	0.47	**1.06**	0.24	**1.09**	Pass	Fail	Pass	BL
NCL - East	McWane - Center	Silver	5	5	0.17	0.09	0.1	0.16	0.32	7690	112	77.30	NA	0.00	0.00	0.00	NA	Pass	Pass	Pass	NA
NCL - East	McWane - Center	Thallium	5	5	0.13	0.06	0.068	0.15	0.2	13.0	3.44	--	0.27	0.01	0.04	**--**	0.48	Pass	Pass	Uncertainty	BL
NCL - East	McWane - Center	Vanadium	5	5	25.64	2.14	22.5	25.8	28.5	1398	148	22.6	32.5	0.02	0.17	**1.14**	0.79	Pass	Pass	Fail	Pass
NCL - East	McWane - Center	Zinc	5	5	122.60	46.91	89	108	205	1932	239	295	69.7	0.06	0.51	0.42	**1.76**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Aluminum	50	50	31294.60	39810.37	2150	12200	159000	3487	220	--	12100	**8.98**	**142.09**	**--**	**2.59**	Fail	Fail	Use NOAEL	Fail
NCL - East	NCL - East (< 8' Elev)	Antimony	50	50	2.85	4.30	0.24	0.735	20.1	52.2	2.21	--	0.37	0.05	**1.29**	**--**	**7.71**	Pass	Fail	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	Arsenic	50	50	4.74	4.66	0.83	3.65	33.7	131	70.0	2546	4	0.04	0.07	0.00	**1.18**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Barium	50	50	672.19	1048.73	49.9	200	5040	2023	246	246	149	0.33	**2.74**	**2.73**	**4.51**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Beryllium	41	50	2.51	3.67	0.14	0.815	16.8	6.90	27.4	--	0.6	0.36	0.09	**--**	**4.19**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	Cadmium	50	50	1.46	1.55	0.098	0.98	6.7	661	8.73	4.68	0.87	0.00	0.17	0.31	**1.68**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Chromium	50	50	61.10	78.53	6.2	24.85	342	718	78.9	42.9	17	0.09	0.77	**1.43**	**3.59**	Pass	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Cobalt	27	50	7.06	2.60	1.4	6.7	13.7	1680	277	370	8.1	0.00	0.03	0.02	0.87	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Copper	50	50	591.73	1014.51	15.9	86.15	3950	773	16.8	33.0	20.2	0.77	**35.20**	**17.93**	**29.29**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Lead	50	50	89.89	119.56	7.3	28.95	616	1208	53.4	37.6	14.4	0.07	**1.68**	**2.39**	**6.24**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	Manganese	50	50	473.50	460.36	62.5	282.5	2100	3346	700	5752	399	0.14	0.68	0.08	**1.19**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Mercury	18	50	0.09	0.05	0.014	0.0755	0.18	3.23	0.271	1.126	0.05	0.03	0.32	0.08	**1.73**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Nickel	49	50	41.96	41.56	5	20.85	179	337	10.8	73.0	21.2	0.12	**3.90**	0.57	**1.98**	Pass	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	Selenium	47	50	1.62	1.26	0.53	1.05	5.6	1.85	0.824	3.64	0.8	0.88	**1.97**	0.45	**2.03**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	Silver	29	50	1.14	1.24	0.13	0.65	4.9	7690	112	77.30	NA	0.00	0.01	0.01	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	Thallium	47	50	0.21	0.12	0.04	0.21	0.71	13.0	3.44	--	0.27	0.02	0.06	**--**	0.79	Pass	Pass	Uncertainty	BL

TABLE 6-17b

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to LOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow, California Vole, and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - East	NCL - East (< 8' Elev)	Vanadium	50	50	41.81	18.51	12.8	36.6	125	1398	148	22.6	32.5	0.03	0.28	**1.85**	**1.29**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	Zinc	50	50	567.28	943.95	30.8	131	4570	1932	239	295	69.7	0.29	**2.37**	**1.92**	**8.14**	Pass	Fail	Fail	BL
NCL - East	NCL - East (> 8' Elev)	Aluminum	34	34	10038.24	4833.61	3800	9370	30300	3487	220	--	12100	**2.88**	**45.58**	**--**	0.83	Fail	Fail	Use NOAEL	Pass
NCL - East	NCL - East (> 8' Elev)	Antimony	31	34	0.54	0.61	0.18	0.41	3.8	52.2	2.21	--	0.37	0.01	0.24	**--**	**1.45**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (> 8' Elev)	Arsenic	34	34	3.01	0.64	1.6	2.9	5.3	131	70.0	2546	4	0.02	0.04	0.00	0.75	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Barium	34	34	231.96	231.00	87.5	156.5	1220	2023	246	246	149	0.11	0.94	0.94	**1.56**	Pass	Pass	Pass	Fail
NCL - East	NCL - East (> 8' Elev)	Beryllium	22	34	0.77	0.73	0.17	0.535	4.5	6.90	27.4	--	0.6	0.11	0.03	**--**	**1.28**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (> 8' Elev)	Cadmium	34	34	0.94	0.42	0.31	0.865	2.3	661	8.73	4.68	0.87	0.00	0.11	0.20	**1.08**	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Chromium	34	34	19.86	9.91	11.1	15.5	64.2	718	78.9	42.9	17	0.03	0.25	0.46	**1.17**	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Cobalt	14	34	5.24	1.19	2.9	5.15	8.6	1680	277	370	8.1	0.00	0.02	0.01	0.65	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Copper	34	34	80.82	96.92	15.9	52.05	535	773	16.8	33.0	20.2	0.10	**4.81**	**2.45**	**4.00**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (> 8' Elev)	Lead	34	34	34.81	44.44	8.7	20.65	248	1208	53.4	37.6	14.4	0.03	0.65	0.93	**2.42**	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Manganese	34	34	311.91	176.21	113	287.5	1200	3346	700	5752	399	0.09	0.45	0.05	0.78	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Mercury	5	34	0.06	0.04	0.011	0.044	0.13	3.23	0.271	1.126	0.05	0.02	0.21	0.05	**1.12**	Pass	Pass	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Nickel	34	34	20.18	7.54	11.8	17.95	40.1	337	10.8	73.0	21.2	0.06	**1.88**	0.28	0.95	Pass	Fail	Pass	Pass
NCL - East	NCL - East (> 8' Elev)	Selenium	29	34	0.89	0.46	0.3	0.795	2	1.85	0.824	3.64	0.8	0.48	**1.08**	0.25	**1.12**	Pass	Fail	Pass	BL
NCL - East	NCL - East (> 8' Elev)	Silver	15	34	0.43	0.23	0.14	0.455	1.2	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (> 8' Elev)	Thallium	28	34	0.20	0.18	0.046	0.13	0.99	13.0	3.44	--	0.27	0.02	0.06	**--**	0.72	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (> 8' Elev)	Vanadium	34	34	26.38	7.14	13.9	24.65	46.7	1398	148	22.6	32.5	0.02	0.18	**1.17**	0.81	Pass	Pass	Fail	Pass
NCL - East	NCL - East (> 8' Elev)	Zinc	34	34	214.98	396.06	59.6	111.5	2380	1932	239	295	69.7	0.11	0.90	0.73	**3.08**	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Aluminum	9	9	7012.22	748.28	6080	7100	8320	3487	220	--	12100	**2.01**	**31.84**	**--**	0.58	Fail	Fail	Use NOAEL	Pass
NCL - North	NCL - Background	Antimony	7	9	0.23	0.08	0.15	0.19	0.37	52.2	2.21	--	0.37	0.00	0.10	**--**	0.62	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Background	Arsenic	9	9	2.46	0.17	2.2	2.5	2.7	131	70.0	2546	4	0.02	0.04	0.00	0.61	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Barium	9	9	113.34	14.46	89.1	111	137	2023	246	246	149	0.06	0.46	0.46	0.76	Pass	Pass	Pass	Pass
NCL - North	NCL - Background	Beryllium	2	9	0.41	0.10	0.33	0.37	0.61	6.90	27.4	--	0.6	0.06	0.01	**--**	0.68	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Background	Cadmium	9	9	0.67	0.04	0.62	0.66	0.76	661	8.73	4.68	0.87	0.00	0.08	0.14	0.78	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Chromium	9	9	11.79	0.61	10.9	11.7	12.8	718	78.9	42.9	17	0.02	0.15	0.28	0.69	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Cobalt	3	9	4.96	0.52	4.3	5	5.9	1680	277	370	8.1	0.00	0.02	0.01	0.61	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Copper	9	9	15.67	1.33	13.7	15.7	17.6	773	16.8	33.0	20.2	0.02	0.93	0.47	0.78	Pass	Pass	Pass	Pass
NCL - North	NCL - Background	Lead	9	9	8.88	0.83	7.5	8.9	10.2	1208	53.4	37.6	14.4	0.01	0.17	0.24	0.62	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Manganese	9	9	254.33	21.89	225	251	282	3346	700	5752	399	0.08	0.36	0.04	0.64	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Mercury	1	9	0.04	0.02	0.02	0.041	0.1	3.23	0.271	1.126	0.05	0.01	0.17	0.04	0.90	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Nickel	9	9	13.04	1.33	11.3	13.2	15.7	337	10.8	73.0	21.2	0.04	**1.21**	0.18	0.62	Pass	Fail	Pass	Pass
NCL - North	NCL - Background	Selenium	7	9	0.62	0.31	0.44	0.47	1.4	1.85	0.824	3.64	0.8	0.33	0.75	0.17	0.77	Pass	Pass	Pass	BL
NCL - North	NCL - Background	Silver	0	9	0.47	0.06	0.36	0.49	0.53	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA
NCL - North	NCL - Background	Thallium	7	9	0.16	0.12	0.087	0.11	0.37	13.0	3.44	--	0.27	0.01	0.05	**--**	0.60	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Background	Vanadium	9	9	24.33	9.10	18.9	21.5	48.3	1398	148	22.6	32.5	0.02	0.16	**1.08**	0.75	Pass	Pass	Fail	Pass
NCL - North	NCL - Background	Zinc	9	9	60.68	7.08	52	60.5	76.9	1932	239	295	69.7	0.03	0.25	0.21	0.87	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Aluminum	4	4	12030.00	5589.36	5920	11400	19400	3487	220	--	12100	**3.45**	**54.62**	**--**	0.99	Fail	Fail	Use NOAEL	Pass
NCL - North	NCL - Ditch	Antimony	4	4	0.42	0.21	0.21	0.38	0.7	52.2	2.21	--	0.37	0.01	0.19	**--**	**1.13**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Ditch	Arsenic	4	4	2.82	1.36	0.89	3.15	4.1	131	70.0	2546	4	0.02	0.04	0.00	0.71	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Barium	4	4	283.50	124.76	177	258	441	2023	246	246	149	0.14	**1.15**	**1.15**	**1.90**	Pass	Fail	Fail	Fail
NCL - North	NCL - Ditch	Beryllium	4	4	0.70	0.38	0.29	0.645	1.2	6.90	27.4	--	0.6	0.10	0.03	**--**	**1.16**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Ditch	Cadmium	4	4	1.00	0.61	0.2	1.105	1.6	661	8.73	4.68	0.87	0.00	0.11	0.21	**1.15**	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Chromium	4	4	24.13	8.12	14.5	24.3	33.4	718	78.9	42.9	17	0.03	0.31	0.56	**1.42**	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Cobalt	1	4	7.00	3.04	2.9	7.45	10.2	1680	277	370	8.1	0.00	0.03	0.02	0.86	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Copper	4	4	91.90	70.19	45.8	62.9	196	773	16.8	33.0	20.2	0.12	**5.47**	**2.78**	**4.55**	Pass	Fail	Fail	Fail
NCL - North	NCL - Ditch	Lead	4	4	160.13	105.43	80.1	127.2	306	1208	53.4	37.6	14.4	0.13	**3.00**	**4.26**	**11.12**	Pass	Fail	Fail	BL
NCL - North	NCL - Ditch	Manganese	4	4	183.70	72.25	90.8	189	266	3346	700	5752	399	0.05	0.26	0.03	0.46	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Mercury	0	4	0.09	0.06	0.057	0.069	0.18	3.23	0.271	1.126	0.05	0.03	0.35	0.08	**1.88**	Pass	Pass	Pass	BL
NCL - North	NCL - Ditch	Nickel	4	4	23.05	10.01	10.1	23.8	34.5	337	10.8	73.0	21.2	0.07	**2.14**	0.32	**1.09**	Pass	Fail	Pass	Fail
NCL - North	NCL - Ditch	Selenium	4	4	2.40	1.35	1	2.45	3.7	1.85	0.824	3.64	0.8	**1.30**	**2.91**	0.66	**3.00**	Fail	Fail	Pass	BL
NCL - North	NCL - Ditch	Silver	4	4	0.44	0.15	0.22	0.495	0.56	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA

TABLE 6-17b

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to LOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow, California Vole, and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - North	NCL - Ditch	Thallium	4	4	0.19	0.09	0.048	0.225	0.25	13.0	3.44	--	0.27	0.01	0.05	--	0.69	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Ditch	Vanadium	4	4	34.40	13.56	16.2	36.85	47.7	1398	148	22.6	32.5	0.02	0.23	**1.52**	**1.06**	Pass	Pass	Fail	Fail
NCL - North	NCL - Ditch	Zinc	4	4	269.14	143.73	99.5554	269.5	438	1932	239	295	69.7	0.14	**1.13**	0.91	**3.86**	Pass	Fail	Pass	BL
NCL - North	NCL - North	Aluminum	14	14	7615.71	691.76	6490	7555	8640	3487	220	--	12100	**2.18**	**34.58**	--	0.63	Fail	Fail	Use NOAEL	Pass
NCL - North	NCL - North	Antimony	10	14	0.31	0.10	0.15	0.295	0.47	52.2	2.21	--	0.37	0.01	0.14	--	0.84	Pass	Pass	Uncertainty	BL
NCL - North	NCL - North	Arsenic	14	14	2.72	0.32	2.2	2.7	3.3	131	70.0	2546	4	0.02	0.04	0.00	0.68	Pass	Pass	Pass	BL
NCL - North	NCL - North	Barium	14	14	109.51	10.63	92.2	111.5	123	2023	246	246	149	0.05	0.45	0.45	0.73	Pass	Pass	Pass	Pass
NCL - North	NCL - North	Beryllium	4	14	0.46	0.07	0.36	0.45	0.58	6.90	27.4	--	0.6	0.07	0.02	--	0.77	Pass	Pass	Uncertainty	BL
NCL - North	NCL - North	Cadmium	14	14	0.70	0.05	0.63	0.7	0.82	661	8.73	4.68	0.87	0.00	0.08	0.15	0.81	Pass	Pass	Pass	BL
NCL - North	NCL - North	Chromium	14	14	14.06	0.81	12.7	13.95	15.4	718	78.9	42.9	17	0.02	0.18	0.33	0.83	Pass	Pass	Pass	BL
NCL - North	NCL - North	Cobalt	10	14	5.61	0.31	5.1	5.65	6.2	1680	277	370	8.1	0.00	0.02	0.02	0.69	Pass	Pass	Pass	BL
NCL - North	NCL - North	Copper	14	14	15.18	1.66	12.9	14.55	18.6	773	16.8	33.0	20.2	0.02	0.90	0.46	0.75	Pass	Pass	Pass	Pass
NCL - North	NCL - North	Lead	14	14	11.54	3.10	7.4	11.4	19.1	1208	53.4	37.6	14.4	0.01	0.22	0.31	0.80	Pass	Pass	Pass	BL
NCL - North	NCL - North	Manganese	14	14	198.50	55.71	129	207	262	3346	700	5752	399	0.06	0.28	0.03	0.50	Pass	Pass	Pass	BL
NCL - North	NCL - North	Mercury	5	14	0.07	0.05	0.014	0.0855	0.12	3.23	0.271	1.126	0.05	0.02	0.26	0.06	**1.41**	Pass	Pass	Pass	BL
NCL - North	NCL - North	Nickel	14	14	15.09	0.71	14.2	15.2	16.4	337	10.8	73.0	21.2	0.04	**1.40**	0.21	0.71	Pass	Fail	Pass	Pass
NCL - North	NCL - North	Selenium	13	14	0.62	0.31	0.25	0.625	1.5	1.85	0.824	3.64	0.8	0.34	0.75	0.17	0.78	Pass	Pass	Pass	BL
NCL - North	NCL - North	Silver	1	14	1.08	2.08	0.39	0.52	8.3	7690	112	77.30	NA	0.00	0.01	0.01	NA	Pass	Pass	Pass	NA
NCL - North	NCL - North	Thallium	10	14	0.25	0.13	0.15	0.19	0.47	13.0	3.44	--	0.27	0.02	0.07	--	0.92	Pass	Pass	Uncertainty	BL
NCL - North	NCL - North	Vanadium	14	14	29.98	11.18	20.1	25.6	52.9	1398	148	22.6	32.5	0.02	0.20	**1.33**	0.92	Pass	Pass	Fail	Pass
NCL - North	NCL - North	Zinc	14	14	80.83	57.79	53.2	58.55	220	1932	239	295	69.7	0.04	0.34	0.27	**1.16**	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Aluminum	18	18	14296.67	4335.95	8180	13950	27800	3487	220	--	12100	**4.10**	**64.91**	--	**1.18**	Fail	Fail	Use NOAEL	Fail
NCL - North	NCL - Pond	Antimony	9	18	0.80	0.52	0.37	0.59	2.2	52.2	2.21	--	0.37	0.02	0.36	--	**2.15**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Pond	Arsenic	18	18	3.83	1.72	1.4	3.45	7.2	131	70.0	2546	4	0.03	0.05	0.00	0.96	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Barium	18	18	454.89	1154.83	103	145	5060	2023	246	246	149	0.22	**1.85**	**1.85**	**3.05**	Pass	Fail	Fail	Fail
NCL - North	NCL - Pond	Beryllium	18	18	1.92	4.20	0.61	0.88	18.7	6.90	27.4	--	0.6	0.28	0.07	--	**3.20**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Pond	Cadmium	18	18	1.37	0.77	0.75	1.15	3.7	661	8.73	4.68	0.87	0.00	0.16	0.29	**1.57**	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Chromium	18	18	21.05	9.23	13.6	18.05	51.3	718	78.9	42.9	17	0.03	0.27	0.49	**1.24**	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Cobalt	16	18	7.91	1.61	5.5	7.45	11.5	1680	277	370	8.1	0.00	0.03	0.02	0.98	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Copper	18	18	50.88	63.48	14.5	24.4	270	773	16.8	33.0	20.2	0.07	**3.03**	**1.54**	**2.52**	Pass	Fail	Fail	Fail
NCL - North	NCL - Pond	Lead	18	18	37.15	39.33	6.1	15.1	123	1208	53.4	37.6	14.4	0.03	0.70	0.99	**2.58**	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Manganese	18	18	347.06	198.12	136	287.5	986	3346	700	5752	399	0.10	0.50	0.06	0.87	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Mercury	3	18	0.14	0.05	0.03	0.14	0.23	3.23	0.271	1.126	0.05	0.04	0.53	0.13	**2.89**	Pass	Pass	Pass	BL
NCL - North	NCL - Pond	Nickel	18	18	23.77	6.70	17.2	21.6	42.9	337	10.8	73.0	21.2	0.07	**2.21**	0.33	**1.12**	Pass	Fail	Pass	Fail
NCL - North	NCL - Pond	Selenium	9	18	2.82	3.31	0.17	2.1	15.2	1.85	0.824	3.64	0.8	**1.53**	**3.42**	0.77	**3.52**	Fail	Fail	Pass	BL
NCL - North	NCL - Pond	Silver	4	18	0.55	0.19	0.34	0.52	1.2	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA
NCL - North	NCL - Pond	Thallium	2	18	0.47	0.14	0.21	0.505	0.67	13.0	3.44	--	0.27	0.04	0.14	--	**1.75**	Pass	Pass	Uncertainty	BL
NCL - North	NCL - Pond	Vanadium	18	18	39.53	13.35	24.4	34.25	62.7	1398	148	22.6	32.5	0.03	0.27	**1.75**	**1.22**	Pass	Pass	Fail	Fail
NCL - North	NCL - Pond	Zinc	18	18	180.77	189.50	57.2	98.05	790	1932	239	295	69.7	0.09	0.76	0.61	**2.59**	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Aluminum	7	7	2522.86	472.61	2110	2260	3360	3487	220	--	12100	0.72	**11.45**	--	0.21	Pass	Fail	Use NOAEL	Pass
Wetlands Beach	Beach - Background	Antimony	7	7	0.14	0.04	0.089	0.14	0.2	52.2	2.21	--	0.37	0.00	0.06	--	0.37	Pass	Pass	Uncertainty	BL
Wetlands Beach	Beach - Background	Arsenic	7	7	1.25	0.36	0.73	1.2	1.9	131	70.0	2546	4	0.01	0.02	0.00	0.31	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Barium	7	7	54.99	17.01	35.1	51.4	84.2	2023	246	246	149	0.03	0.22	0.22	0.37	Pass	Pass	Pass	Pass
Wetlands Beach	Beach - Background	Beryllium	0	7	0.14	0.02	0.12	0.13	0.17	6.90	27.4	--	0.6	0.02	0.01	--	0.23	Pass	Pass	Uncertainty	BL
Wetlands Beach	Beach - Background	Cadmium	7	7	0.22	0.07	0.14	0.2	0.33	661	8.73	4.68	0.87	0.00	0.03	0.05	0.25	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Chromium	7	7	6.63	1.27	4.6	6.5	8	718	78.9	42.9	17	0.01	0.08	0.15	0.39	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Cobalt	0	7	1.91	0.40	1.5	1.7	2.6	1680	277	370	8.1	0.00	0.01	0.01	0.24	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Copper	7	7	5.21	1.13	3.8	5.2	7	773	16.8	33.0	20.2	0.01	0.31	0.16	0.26	Pass	Pass	Pass	Pass
Wetlands Beach	Beach - Background	Lead	7	7	4.44	1.58	2.3	4.3	7.6	1208	53.4	37.6	14.4	0.00	0.08	0.12	0.31	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Manganese	7	7	91.51	25.58	64.4	82.1	141	3346	700	5752	399	0.03	0.13	0.02	0.23	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Mercury	0	7	0.05	0.04	0.022	0.025	0.1	3.23	0.271	1.126	0.05	0.01	0.17	0.04	0.93	Pass	Pass	Pass	BL
Wetlands Beach	Beach - Background	Nickel	7	7	5.64	0.99	4.8	5.2	7.5	337	10.8	73.0	21.2	0.02	0.52	0.08	0.27	Pass	Pass	Pass	Pass
Wetlands Beach	Beach - Background	Selenium	1	7	0.48	0.11	0.23	0.52	0.52	1.85	0.824	3.64	0.8	0.26	0.58	0.13	0.60	Pass	Pass	Pass	BL

TABLE 6-17b

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to LOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow, California Vole, and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
Wetlands Beach	Beach - Background	Silver	0	7	0.50	0.00	0.49	0.5	0.5	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA
Wetlands Beach	Beach - Background	Thallium	7	7	0.07	0.01	0.056	0.065	0.087	13.0	3.44	--	0.27	0.01	0.02	--	0.26	Pass	Pass	Uncertainty	BL
Wetlands Beach	Beach - Background	Vanadium	7	7	10.60	1.81	8.1	10.4	13.5	1398	148	22.6	32.5	0.01	0.07	0.47	0.33	Pass	Pass	Pass	Pass
Wetlands Beach	Beach - Background	Zinc	7	7	26.03	5.37	19.6	28.7	32.3	1932	239	295	69.7	0.01	0.11	0.09	0.37	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Aluminum	7	7	1638.57	120.34	1450	1630	1790	3487	220	--	12100	0.47	**7.44**	--	0.14	Pass	Fail	Use NOAEL	Pass
Wetlands Beach	Breach - Background	Antimony	7	7	0.11	0.03	0.079	0.11	0.16	52.2	2.21	--	0.37	0.00	0.05	--	0.29	Pass	Pass	Uncertainty	BL
Wetlands Beach	Breach - Background	Arsenic	7	7	1.87	0.24	1.6	1.9	2.2	131	70.0	2546	4	0.01	0.03	0.00	0.47	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Barium	7	7	70.89	42.43	35.8	53.4	148	2023	246	246	149	0.04	0.29	0.29	0.48	Pass	Pass	Pass	Pass
Wetlands Beach	Breach - Background	Beryllium	0	7	0.09	0.01	0.081	0.095	0.11	6.90	27.4	--	0.6	0.01	0.00	--	0.16	Pass	Pass	Uncertainty	BL
Wetlands Beach	Breach - Background	Cadmium	7	7	0.10	0.01	0.091	0.1	0.11	661	8.73	4.68	0.87	0.00	0.01	0.02	0.11	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Chromium	7	7	8.51	3.12	4.9	7.7	14.5	718	78.9	42.9	17	0.01	0.11	0.20	0.50	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Cobalt	0	7	1.29	0.13	1.1	1.3	1.5	1680	277	370	8.1	0.00	0.00	0.00	0.16	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Copper	1	7	2.24	0.27	1.9	2.3	2.7	773	16.8	33.0	20.2	0.00	0.13	0.07	0.11	Pass	Pass	Pass	Pass
Wetlands Beach	Breach - Background	Lead	7	7	2.26	0.61	1.7	2	3.4	1208	53.4	37.6	14.4	0.00	0.04	0.06	0.16	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Manganese	7	7	78.56	7.54	68.7	77	91.9	3346	700	5752	399	0.02	0.11	0.01	0.20	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Mercury	0	7	0.03	0.01	0.018	0.025	0.06	3.23	0.271	1.126	0.05	0.01	0.11	0.03	0.58	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Nickel	3	7	3.99	0.23	3.7	4	4.3	337	10.8	73.0	21.2	0.01	0.37	0.05	0.19	Pass	Pass	Pass	Pass
Wetlands Beach	Breach - Background	Selenium	0	7	0.51	0.00	0.51	0.51	0.52	1.85	0.824	3.64	0.8	0.28	0.62	0.14	0.64	Pass	Pass	Pass	BL
Wetlands Beach	Breach - Background	Silver	0	7	0.49	0.00	0.49	0.49	0.5	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA
Wetlands Beach	Breach - Background	Thallium	7	7	0.06	0.02	0.047	0.057	0.09	13.0	3.44	--	0.27	0.00	0.02	--	0.22	Pass	Pass	Uncertainty	BL
Wetlands Beach	Breach - Background	Vanadium	7	7	18.07	8.48	7	18.4	32.8	1398	148	22.6	32.5	0.01	0.12	0.80	0.56	Pass	Pass	Pass	Pass
Wetlands Beach	Breach - Background	Zinc	7	7	10.76	0.86	9.4	10.9	12.1	1932	239	295	69.7	0.01	0.05	0.04	0.15	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Aluminum	4	4	9885.00	777.54	9210	9665	11000	3487	220	--	12100	**2.84**	**44.88**	--	0.82	Fail	Fail	Use NOAEL	Pass
Wetlands Beach	Hueneme Parcel	Antimony	4	4	0.63	0.23	0.43	0.575	0.93	52.2	2.21	--	0.37	0.01	0.28	--	**1.70**	Pass	Pass	Uncertainty	BL
Wetlands Beach	Hueneme Parcel	Arsenic	4	4	4.10	1.02	3.2	3.85	5.5	131	70.0	2546	4	0.03	0.06	0.00	**1.03**	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Barium	4	4	212.75	67.96	139	216	280	2023	246	246	149	0.11	0.87	0.86	**1.43**	Pass	Pass	Pass	Fail
Wetlands Beach	Hueneme Parcel	Beryllium	3	4	0.62	0.15	0.52	0.565	0.84	6.90	27.4	--	0.6	0.09	0.02	--	**1.04**	Pass	Pass	Uncertainty	BL
Wetlands Beach	Hueneme Parcel	Cadmium	4	4	1.11	0.85	0.28	0.92	2.3	661	8.73	4.68	0.87	0.00	0.13	0.24	**1.27**	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Chromium	4	4	25.10	8.74	18.7	21.85	38	718	78.9	42.9	17	0.03	0.32	0.59	**1.48**	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Cobalt	3	4	6.38	1.33	4.6	6.55	7.8	1680	277	370	8.1	0.00	0.02	0.02	0.79	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Copper	4	4	51.48	25.09	28.6	48.85	79.6	773	16.8	33.0	20.2	0.07	**3.06**	**1.56**	**2.55**	Pass	Fail	Fail	Fail
Wetlands Beach	Hueneme Parcel	Lead	4	4	46.73	28.36	21.9	38.75	87.5	1208	53.4	37.6	14.4	0.04	0.88	**1.24**	**3.24**	Pass	Pass	Fail	BL
Wetlands Beach	Hueneme Parcel	Manganese	4	4	357.25	66.91	306	335	453	3346	700	5752	399	0.11	0.51	0.06	0.90	Pass	Pass	Pass	BL
Wetlands Beach	Hueneme Parcel	Mercury	4	4	0.38	0.61	0.047	0.09	1.3	3.23	0.271	1.126	0.05	0.12	**1.41**	0.34	**7.64**	Pass	Fail	Pass	BL
Wetlands Beach	Hueneme Parcel	Nickel	4	4	19.25	1.88	17.6	18.8	21.8	337	10.8	73.0	21.2	0.06	**1.79**	0.26	0.91	Pass	Fail	Pass	Pass
Wetlands Beach	Hueneme Parcel	Selenium	4	4	0.92	0.39	0.66	0.765	1.5	1.85	0.824	3.64	0.8	0.50	**1.12**	0.25	**1.15**	Pass	Fail	Pass	BL
Wetlands Beach	Hueneme Parcel	Silver	4	4	1.09	1.48	0.17	0.44	3.3	7690	112	77.30	NA	0.00	0.01	0.01	NA	Pass	Pass	Pass	NA
Wetlands Beach	Hueneme Parcel	Thallium	4	4	0.22	0.07	0.14	0.225	0.3	13.0	3.44	--	0.27	0.02	0.06	--	0.82	Pass	Pass	Uncertainty	BL
Wetlands Beach	Hueneme Parcel	Vanadium	4	4	32.25	4.83	25.8	33.05	37.1	1398	148	22.6	32.5	0.02	0.22	**1.43**	0.99	Pass	Pass	Fail	Pass
Wetlands Beach	Hueneme Parcel	Zinc	4	4	190.70	103.08	98.8	170	324	1932	239	295	69.7	0.10	0.80	0.65	**2.74**	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Aluminum	10	10	4188.00	4151.70	1200	3115	15300	3487	220	--	12100	**1.20**	**19.02**	--	0.35	Fail	Fail	Use NOAEL	Pass
Wetlands Beach	Wetland - East	Antimony	8	10	0.60	0.64	0.065	0.37	2.1	52.2	2.21	--	0.37	0.01	0.27	--	**1.61**	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - East	Arsenic	10	10	1.31	0.21	0.97	1.35	1.6	131	70.0	2546	4	0.01	0.02	0.00	0.33	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Barium	9	10	82.62	70.93	16.7	71.8	253	2023	246	246	149	0.04	0.34	0.34	0.55	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - East	Beryllium	5	10	0.41	0.45	0.07	0.285	1.6	6.90	27.4	--	0.6	0.06	0.01	--	0.68	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - East	Cadmium	9	10	0.25	0.19	0.055	0.2	0.68	661	8.73	4.68	0.87	0.00	0.03	0.05	0.29	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Chromium	10	10	10.50	9.09	3.1	7.5	32.1	718	78.9	42.9	17	0.01	0.13	0.24	0.62	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Cobalt	0	10	1.35	0.77	0.73	1.05	3.4	1680	277	370	8.1	0.00	0.00	0.00	0.17	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Copper	10	10	65.61	97.93	2.3	39.45	327	773	16.8	33.0	20.2	0.08	**3.90**	**1.99**	**3.25**	Pass	Fail	Fail	Fail
Wetlands Beach	Wetland - East	Lead	10	10	10.20	11.13	1.6	7.7	39.2	1208	53.4	37.6	14.4	0.01	0.19	0.27	0.71	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Manganese	10	10	97.26	61.71	42.5	79.9	262	3346	700	5752	399	0.03	0.14	0.02	0.24	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Mercury	0	10	0.05	0.04	0.011	0.03	0.11	3.23	0.271	1.126	0.05	0.02	0.20	0.05	**1.09**	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Nickel	10	10	5.87	3.48	2.4	5.2	15	337	10.8	73.0	21.2	0.02	0.55	0.08	0.28	Pass	Pass	Pass	Pass

TABLE 6-17b

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to LOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow, California Vole, and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
Wetlands Beach	Wetland - East	Selenium	4	7	0.42	0.17	0.22	0.39	0.69	1.85	0.824	3.64	0.8	0.23	0.51	0.11	0.52	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - East	Silver	2	10	0.44	0.11	0.2	0.495	0.52	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA
Wetlands Beach	Wetland - East	Thallium	9	10	0.06	0.10	0.025	0.0285	0.34	13.0	3.44	--	0.27	0.00	0.02	--	0.23	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - East	Vanadium	10	10	7.76	3.57	4.2	7.2	16.5	1398	148	22.6	32.5	0.01	0.05	0.34	0.24	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - East	Zinc	10	10	59.72	68.18	9.5	42.75	237	1932	239	295	69.7	0.03	0.25	0.20	0.86	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Aluminum	14	14	2154.93	1041.42	679	1885	4290	3487	220	--	12100	0.62	**9.78**	--	0.18	Pass	Fail	Use NOAEL	Pass
Wetlands Beach	Wetland - West	Antimony	13	14	0.28	0.21	0.093	0.205	0.78	52.2	2.21	--	0.37	0.01	0.13	--	0.75	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - West	Arsenic	14	14	1.43	0.34	0.94	1.45	2	131	70.0	2546	4	0.01	0.02	0.00	0.36	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Barium	11	14	46.11	34.96	14.1	38.6	138	2023	246	246	149	0.02	0.19	0.19	0.31	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - West	Beryllium	3	14	0.24	0.18	0.07	0.16	0.56	6.90	27.4	--	0.6	0.03	0.01	--	0.40	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - West	Cadmium	13	14	0.33	0.49	0.069	0.16	1.9	661	8.73	4.68	0.87	0.00	0.04	0.07	0.37	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Chromium	14	14	6.89	4.73	2.6	5.1	19	718	78.9	42.9	17	0.01	0.09	0.16	0.41	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Cobalt	0	14	1.40	0.68	0.62	1.25	3.5	1680	277	370	8.1	0.00	0.01	0.00	0.17	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Copper	13	14	12.40	15.23	2.3	5.8	57	773	16.8	33.0	20.2	0.02	0.74	0.38	0.61	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - West	Lead	14	14	5.94	3.62	2.4	4.5	12.1	1208	53.4	37.6	14.4	0.00	0.11	0.16	0.41	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Manganese	14	14	75.75	28.49	50.1	66.2	132	3346	700	5752	399	0.02	0.11	0.01	0.19	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Mercury	1	14	0.08	0.04	0.013	0.1	0.13	3.23	0.271	1.126	0.05	0.03	0.30	0.07	**1.63**	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Nickel	5	14	4.32	1.27	3	4.05	7	337	10.8	73.0	21.2	0.01	0.40	0.06	0.20	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - West	Selenium	13	14	0.61	0.35	0.25	0.52	1.7	1.85	0.824	3.64	0.8	0.33	0.74	0.17	0.76	Pass	Pass	Pass	BL
Wetlands Beach	Wetland - West	Silver	13	14	0.55	0.20	0.12	0.505	1	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA
Wetlands Beach	Wetland - West	Thallium	13	14	0.05	0.09	0.018	0.028	0.35	13.0	3.44	--	0.27	0.00	0.02	--	0.20	Pass	Pass	Uncertainty	BL
Wetlands Beach	Wetland - West	Vanadium	14	14	11.80	7.65	4.5	8.6	32	1398	148	22.6	32.5	0.01	0.08	0.52	0.36	Pass	Pass	Pass	Pass
Wetlands Beach	Wetland - West	Zinc	14	14	32.51	24.31	10.3	24.8	80.2	1932	239	295	69.7	0.02	0.14	0.11	0.47	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Aluminum	12	12	64763.33	34941.57	3760	69200	112000	3487	220	--	12100	**18.57**	**294.06**	--	**5.35**	Fail	Fail	Use NOAEL	Fail
Wetlands Beach	WMU Ditch	Antimony	12	12	5.75	3.32	0.34	6.95	10.4	52.2	2.21	--	0.37	0.11	**2.60**	--	**15.55**	Pass	Fail	Uncertainty	BL
Wetlands Beach	WMU Ditch	Arsenic	12	12	6.28	2.92	1.2	5.9	10.7	131	70.0	2546	4	0.05	0.09	0.00	**1.57**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Barium	12	12	1327.46	843.23	69.5	1200	2880	2023	246	246	149	0.66	**5.41**	**5.39**	**8.91**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Beryllium	12	12	6.38	5.60	0.28	4.8	19.9	6.90	27.4	--	0.6	0.92	0.23	--	**10.64**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch	Cadmium	12	12	2.43	1.29	0.049	2.7	4	661	8.73	4.68	0.87	0.00	0.28	0.52	**2.79**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Chromium	12	12	131.84	116.71	5.4	118.5	472	718	78.9	42.9	17	0.18	**1.67**	**3.08**	**7.76**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Cobalt	6	12	6.13	2.08	1.2	6.45	9.2	1680	277	370	8.1	0.00	0.02	0.02	0.76	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Copper	12	12	1615.56	1128.03	63.7	1505	3970	773	16.8	33.0	20.2	**2.09**	**96.10**	**48.94**	**79.98**	Fail	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Lead	12	12	167.18	107.54	13.7	135	311	1208	53.4	37.6	14.4	0.14	**3.13**	**4.44**	**11.61**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch	Manganese	12	12	782.09	372.91	57.1	822.5	1470	3346	700	5752	399	0.23	**1.12**	0.14	**1.96**	Pass	Fail	Pass	BL
Wetlands Beach	WMU Ditch	Mercury	3	11	0.15	0.09	0.019	0.16	0.3	3.23	0.271	1.126	0.05	0.05	0.55	0.13	**2.99**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch	Nickel	12	12	73.39	41.64	6	68.9	148	337	10.8	73.0	21.2	0.22	**6.82**	**1.01**	**3.46**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch	Selenium	10	12	2.77	2.03	0.3	2.6	7.7	1.85	0.824	3.64	0.8	**1.50**	**3.37**	0.76	**3.47**	Fail	Fail	Pass	BL
Wetlands Beach	WMU Ditch	Silver	11	12	1.93	1.04	0.64	1.85	3.6	7690	112	77.30	NA	0.00	0.02	0.02	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch	Thallium	9	12	0.31	0.40	0.023	0.125	1.4	13.0	3.44	--	0.27	0.02	0.09	--	**1.15**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch	Vanadium	12	12	39.40	16.74	6.6	40.45	74.7	1398	148	22.6	32.5	0.03	0.27	**1.75**	**1.21**	Pass	Pass	Fail	Fail
Wetlands Beach	WMU Ditch	Zinc	12	12	1289.36	666.15	81.3	1370	2100	1932	239	295	69.7	0.67	**5.40**	**4.37**	**18.50**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Aluminum	9	9	57604.44	47043.00	4240	53600	166000	3487	220	--	12100	**16.52**	**261.55**	--	**4.76**	Fail	Fail	Use NOAEL	Fail
Wetlands Beach	WMU Ditch - 5' South	Antimony	9	9	4.18	3.19	0.42	2.9	9.4	52.2	2.21	--	0.37	0.08	**1.89**	--	**11.30**	Pass	Fail	Uncertainty	BL
Wetlands Beach	WMU Ditch - 5' South	Arsenic	9	9	3.86	2.40	1.1	3.4	8.5	131	70.0	2546	4	0.03	0.06	0.00	0.96	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Barium	9	9	894.71	899.49	67.4	691	3110	2023	246	246	149	0.44	**3.64**	**3.64**	**6.00**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 5' South	Beryllium	9	9	3.51	1.76	0.26	4.2	5.9	6.90	27.4	--	0.6	0.51	0.13	--	**5.84**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 5' South	Cadmium	9	9	1.36	1.23	0.086	1	4.1	661	8.73	4.68	0.87	0.00	0.16	0.29	**1.57**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Chromium	9	9	91.24	82.37	9.3	68.4	274	718	78.9	42.9	17	0.13	**1.16**	**2.13**	**5.37**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Cobalt	4	9	3.63	1.94	1.1	3.4	6.6	1680	277	370	8.1	0.00	0.01	0.01	0.45	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Copper	9	9	1166.84	865.05	55.6	1240	3070	773	16.8	33.0	20.2	**1.51**	**69.41**	**35.35**	**57.76**	Fail	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 5' South	Lead	9	9	149.44	189.44	13.7	113	641	1208	53.4	37.6	14.4	0.12	**2.80**	**3.97**	**10.38**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 5' South	Manganese	9	9	461.74	337.35	66.7	384	1030	3346	700	5752	399	0.14	0.66	0.08	**1.16**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Mercury	0	9	0.18	0.08	0.03	0.17	0.29	3.23	0.271	1.126	0.05	0.06	0.67	0.16	**3.64**	Pass	Pass	Pass	BL

TABLE 6-17b

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to LOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow, California Vole, and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
Wetlands Beach	WMU Ditch - 5' South	Nickel	9	9	60.66	41.57	8.8	60.6	154	337	10.8	73.0	21.2	0.18	**5.64**	0.83	**2.86**	Pass	Fail	Pass	Fail
Wetlands Beach	WMU Ditch - 5' South	Selenium	9	9	2.36	2.44	0.34	1.5	8.1	1.85	0.824	3.64	0.8	**1.28**	**2.87**	0.65	**2.95**	Fail	Fail	Pass	BL
Wetlands Beach	WMU Ditch - 5' South	Silver	8	9	0.97	0.54	0.26	1.1	2	7690	112	77.30	NA	0.00	0.01	0.01	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 5' South	Thallium	9	9	0.05	0.03	0.025	0.045	0.12	13.0	3.44	--	0.27	0.00	0.01	--	0.19	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 5' South	Vanadium	9	9	28.19	18.33	8.4	22.3	66.3	1398	148	22.6	32.5	0.02	0.19	**1.25**	0.87	Pass	Pass	Fail	Pass
Wetlands Beach	WMU Ditch - 5' South	Zinc	9	9	1066.16	1035.05	93.4	869	3670	1932	239	295	69.7	0.55	**4.46**	**3.62**	**15.30**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	Aluminum	14	14	63601.43	67977.47	2630	32500	225000	3487	220	--	12100	**18.24**	**288.78**	--	**5.26**	Fail	Fail	Use NOAEL	Fail
Wetlands Beach	WMU Ditch - 15' South	Antimony	13	14	5.78	6.58	0.46	2.95	23.2	52.2	2.21	--	0.37	0.11	**2.62**	--	**15.63**	Pass	Fail	Uncertainty	BL
Wetlands Beach	WMU Ditch - 15' South	Arsenic	14	14	3.36	3.18	1.2	2.4	13.6	131	70.0	2546	4	0.03	0.05	0.00	0.84	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Barium	14	14	878.65	1047.49	42.3	466.5	3810	2023	246	246	149	0.43	**3.58**	**3.57**	**5.90**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	Beryllium	14	14	4.63	5.35	0.25	2.1	18.1	6.90	27.4	--	0.6	0.67	0.17	--	**7.71**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 15' South	Cadmium	14	14	2.74	3.37	0.38	1	11.3	661	8.73	4.68	0.87	0.00	0.31	0.59	**3.15**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Chromium	14	14	122.29	128.46	7	70.85	423	718	78.9	42.9	17	0.17	**1.55**	**2.85**	**7.19**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	Cobalt	5	14	5.05	2.97	2.5	3.8	13.8	1680	277	370	8.1	0.00	0.02	0.01	0.62	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Copper	14	14	1463.64	1651.89	54.9	741	5480	773	16.8	33.0	20.2	**1.89**	**87.07**	**44.34**	**72.46**	Fail	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	Lead	14	14	159.05	169.23	16.2	85.15	505	1208	53.4	37.6	14.4	0.13	**2.98**	**4.23**	**11.05**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 15' South	Manganese	14	14	707.21	603.85	161	521	1870	3346	700	5752	399	0.21	**1.01**	0.12	**1.77**	Pass	Fail	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Mercury	1	13	0.10	0.07	0.015	0.09	0.21	3.23	0.271	1.126	0.05	0.03	0.38	0.09	**2.07**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Nickel	14	14	72.99	66.26	11.2	48.95	204	337	10.8	73.0	21.2	0.22	**6.78**	**1.00**	**3.44**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	Selenium	9	14	1.83	1.44	0.55	1.15	5.2	1.85	0.824	3.64	0.8	0.99	**2.22**	0.50	**2.29**	Pass	Fail	Pass	BL
Wetlands Beach	WMU Ditch - 15' South	Silver	9	14	1.60	1.79	0.35	0.68	6.5	7690	112	77.30	NA	0.00	0.01	0.02	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 15' South	Thallium	8	14	0.21	0.19	0.026	0.082	0.55	13.0	3.44	--	0.27	0.02	0.06	--	0.76	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 15' South	Vanadium	14	14	47.35	19.84	16.4	48.5	71.9	1398	148	22.6	32.5	0.03	0.32	**2.10**	**1.46**	Pass	Pass	Fail	Fail
Wetlands Beach	WMU Ditch - 15' South	Zinc	14	14	1204.14	1189.80	147	687	3800	1932	239	295	69.7	0.62	**5.04**	**4.09**	**17.28**	Pass	Fail	Fail	BL
Wetlands Beach	WMU Ditch - 30' South	Aluminum	9	9	8793.33	6364.61	2360	6060	17500	3487	220	--	12100	**2.52**	**39.93**	--	0.73	Fail	Fail	Use NOAEL	Pass
Wetlands Beach	WMU Ditch - 30' South	Antimony	6	9	1.37	0.82	0.38	1.5	2.5	52.2	2.21	--	0.37	0.03	0.62	--	**3.70**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 30' South	Arsenic	9	9	1.40	0.44	0.86	1.3	2	131	70.0	2546	4	0.01	0.02	0.00	0.35	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Barium	9	9	78.22	65.99	22	50.3	229	2023	246	246	149	0.04	0.32	0.32	0.52	Pass	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 30' South	Beryllium	9	9	0.57	0.32	0.19	0.47	1.1	6.90	27.4	--	0.6	0.08	0.02	--	0.94	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 30' South	Cadmium	5	9	0.50	0.24	0.27	0.42	0.94	661	8.73	4.68	0.87	0.00	0.06	0.11	0.57	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Chromium	9	9	22.01	14.99	5.7	18.1	50.4	718	78.9	42.9	17	0.03	0.28	0.51	**1.29**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Cobalt	9	9	1.29	0.35	0.97	1.1	1.9	1680	277	370	8.1	0.00	0.00	0.00	0.16	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Copper	9	9	156.90	123.19	16.1	102	322	773	16.8	33.0	20.2	0.20	**9.33**	**4.75**	**7.77**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 30' South	Lead	9	9	23.86	17.11	3	23.2	53.1	1208	53.4	37.6	14.4	0.02	0.45	0.63	**1.66**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Manganese	9	9	125.90	58.47	72.8	105	250	3346	700	5752	399	0.04	0.18	0.02	0.32	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Mercury	0	9	0.12	0.02	0.09	0.12	0.14	3.23	0.271	1.126	0.05	0.04	0.43	0.10	**2.33**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Nickel	9	9	15.10	10.59	3.7	14.6	38.7	337	10.8	73.0	21.2	0.04	**1.40**	0.21	0.71	Pass	Fail	Pass	Pass
Wetlands Beach	WMU Ditch - 30' South	Selenium	8	9	0.23	0.24	0.033	0.15	0.76	1.85	0.824	3.64	0.8	0.12	0.28	0.06	0.29	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 30' South	Silver	0	9	0.46	0.09	0.36	0.45	0.66	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 30' South	Thallium	0	9	0.53	0.29	0.36	0.45	1.3	13.0	3.44	--	0.27	0.04	0.16	--	**1.98**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 30' South	Vanadium	9	9	45.97	8.54	35.1	44.1	61.8	1398	148	22.6	32.5	0.03	0.31	**2.04**	**1.41**	Pass	Pass	Fail	Fail
Wetlands Beach	WMU Ditch - 30' South	Zinc	9	9	213.46	149.77	28.4	253	471	1932	239	295	69.7	0.11	0.89	0.72	**3.06**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Aluminum	9	9	7015.56	4453.60	1650	5330	13700	3487	220	--	12100	**2.01**	**31.85**	--	0.58	Fail	Fail	Use NOAEL	Pass
Wetlands Beach	WMU Ditch - 50' South	Antimony	6	9	0.59	0.26	0.37	0.44	0.95	52.2	2.21	--	0.37	0.01	0.27	--	**1.60**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 50' South	Arsenic	9	9	1.30	0.27	0.87	1.2	1.6	131	70.0	2546	4	0.01	0.02	0.00	0.32	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Barium	9	9	59.57	27.93	23.1	58.8	97.6	2023	246	246	149	0.03	0.24	0.24	0.40	Pass	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 50' South	Beryllium	9	9	0.44	0.21	0.18	0.49	0.73	6.90	27.4	--	0.6	0.06	0.02	--	0.74	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 50' South	Cadmium	6	9	0.41	0.15	0.27	0.36	0.66	661	8.73	4.68	0.87	0.00	0.05	0.09	0.48	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Chromium	9	9	18.30	9.64	6.2	17.9	31.4	718	78.9	42.9	17	0.03	0.23	0.43	**1.08**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Cobalt	9	9	1.27	0.26	0.95	1.2	1.7	1680	277	370	8.1	0.00	0.00	0.00	0.16	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Copper	9	9	120.56	88.47	11.8	120	226	773	16.8	33.0	20.2	0.16	**7.17**	**3.65**	**5.97**	Pass	Fail	Fail	Fail
Wetlands Beach	WMU Ditch - 50' South	Lead	9	9	16.31	12.83	3.7	12.6	37.2	1208	53.4	37.6	14.4	0.01	0.31	0.43	**1.13**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Manganese	9	9	123.01	48.28	62.7	119	193	3346	700	5752	399	0.04	0.18	0.02	0.31	Pass	Pass	Pass	BL

TABLE 6-17b

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by Subarea Compared to LOAEL-Based RBCs for Terrestrial-Feeding Belding's Savannah Sparrow, California Vole, and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

										RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Analyte**	**Detects**	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
Wetlands Beach	WMU Ditch - 50' South	Mercury	1	9	0.16	0.19	0.09	0.1	0.66	3.23	0.271	1.126	0.05	0.05	0.59	0.14	**3.20**	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Nickel	9	9	9.46	4.70	3.9	8.5	15.7	337	10.8	73.0	21.2	0.03	0.88	0.13	0.45	Pass	Pass	Pass	Pass
Wetlands Beach	WMU Ditch - 50' South	Selenium	2	9	0.61	0.31	0.049	0.76	0.81	1.85	0.824	3.64	0.8	0.33	0.74	0.17	0.77	Pass	Pass	Pass	BL
Wetlands Beach	WMU Ditch - 50' South	Silver	0	9	0.39	0.03	0.35	0.38	0.47	7690	112	77.30	NA	0.00	0.00	0.01	NA	Pass	Pass	Pass	NA
Wetlands Beach	WMU Ditch - 50' South	Thallium	0	9	0.39	0.03	0.35	0.38	0.47	13.0	3.44	--	0.27	0.03	0.11	**--**	**1.45**	Pass	Pass	Uncertainty	BL
Wetlands Beach	WMU Ditch - 50' South	Vanadium	9	9	41.10	15.84	4.7	43.9	60.8	1398	148	22.6	32.5	0.03	0.28	**1.82**	**1.26**	Pass	Pass	Fail	Fail
Wetlands Beach	WMU Ditch - 50' South	Zinc	9	9	119.62	77.80	27.8	92.7	228	1932	239	295	69.7	0.06	0.50	0.41	**1.72**	Pass	Pass	Pass	BL

Notes:

-- = benchmark is unavailable

BL = background concentration is lower than the bird RBCs

Fail = mean concentration exceeds the LOAEL-based RBC and background; therefore, this analyte was considered to pose a probable risk to individual special-status avian species or a possible population-level risk to mammals

HQ = hazard quotient

mg/kg = milligrams per kilogram

N = sample size

NA = not available

NOAEL = no observed adverse effect level

Pass = mean concentration was less than the LOAEL-based RBC or less than background; therefore, there are no population-level risks to terrestrial wildlife

RBC = risk-based concentration

Uncertainty = benchmark value not available; therefore, this analyte is considered an uncertainty

Use NOAEL = a LOAEL was not available for this analyte; therefore, the risk results estimated using the NOAEL will be relied on

UTL = upper tolerance limit

Shading or bold indicates cases where the mean soil concentration exceeds the bird RBC or background value.

Background is only used in the risk results if it is greater than the bird RBCs; otherwise the background risk result is marked as BL.

TABLE 6-18a

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by WMU Stepout in NCL - East (<8 feet Elev) Compared to NOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and LOAEL-Based RBCs for California Vole and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Subarea 2**	**Analyte**	**Mean**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Aluminum	86545.5	3487	220	2596	12100	**24.82**	**392.96**	**33.34**	**7.15**	Fail	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Antimony	8.8	52.2	2.21	--	0.37	0.17	**3.98**	**--**	**23.78**	Pass	Fail	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Arsenic	9.3	131	70.0	582	4	0.07	0.13	0.02	**2.31**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Barium	2057.1	2023	246	122	149	**1.02**	**8.38**	**16.81**	**13.81**	Fail	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Beryllium	7.7	6.90	27.4	--	0.6	**1.11**	0.28	**--**	**12.81**	Fail	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Cadmium	3.2	661	8.73	2.85	0.87	0.005	0.37	**1.14**	**3.72**	Pass	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Chromium	172.0	718	78.9	41.0	17	0.24	**2.18**	**4.19**	**10.12**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Cobalt	9.1	1680	277	361	8.1	0.01	0.03	0.03	**1.12**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Copper	1994.4	773	16.8	10.2	20.2	**2.58**	**118.64**	**195.41**	**98.73**	Fail	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Lead	242.1	1208	53.4	18.3	14.4	0.20	**4.53**	**13.23**	**16.81**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Manganese	1119.9	3346	700	2959	399	0.33	**1.60**	0.38	**2.81**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Mercury	0.1	3.23	0.271	0.176	0.05	0.02	0.21	0.32	**1.13**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Nickel	99.5	337	10.8	42.4	21.2	0.30	**9.25**	**2.35**	**4.69**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Selenium	2.4	1.85	0.824	1.68	0.8	**1.29**	**2.90**	**1.42**	**2.98**	Fail	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Silver	2.9	7690	112	7.73	NA	0.0004	0.03	0.38	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Thallium	0.2	13.0	3.44	--	0.27	0.01	0.05	**--**	0.65	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Vanadium	62.6	1398	148	11.3	32.5	0.04	0.42	**5.55**	**1.93**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Zinc	1845.7	1932	239	293	69.7	0.96	**7.72**	**6.30**	**26.48**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Aluminum	25557.0	3487	220	2596	12100	**7.33**	**116.04**	**9.85**	**2.11**	Fail	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Antimony	1.7	52.2	2.21	--	0.37	0.03	0.76	**--**	**4.57**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Arsenic	3.9	131	70.0	582	4	0.03	0.06	0.01	0.97	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Barium	293.8	2023	246	122	149	0.15	**1.20**	**2.40**	**1.97**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Beryllium	1.2	6.90	27.4	--	0.6	0.18	0.04	**--**	**2.03**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Cadmium	1.1	661	8.73	2.85	0.87	0.002	0.12	0.37	**1.22**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Chromium	44.9	718	78.9	41.0	17	0.06	0.57	**1.09**	**2.64**	Pass	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Cobalt	6.5	1680	277	361	8.1	0.00	0.02	0.02	0.80	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Copper	400.1	773	16.8	10.2	20.2	0.52	**23.80**	**39.21**	**19.81**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Lead	69.7	1208	53.4	18.3	14.4	0.06	**1.30**	**3.81**	**4.84**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Manganese	346.8	3346	700	2959	399	0.10	0.50	0.12	0.87	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Mercury	0.1	3.23	0.271	0.176	0.05	0.02	0.20	0.31	**1.07**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Nickel	35.7	337	10.8	42.4	21.2	0.11	**3.31**	0.84	**1.68**	Pass	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Selenium	1.4	1.85	0.824	1.68	0.8	0.73	**1.65**	0.81	**1.70**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Silver	0.6	7690	112	7.73	NA	0.0001	0.01	0.07	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Thallium	0.2	13.0	3.44	--	0.27	0.02	0.06	**--**	0.81	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Vanadium	40.5	1398	148	11.3	32.5	0.03	0.27	**3.59**	**1.25**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Zinc	348.5	1932	239	293	69.7	0.18	**1.46**	**1.19**	**5.00**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Aluminum	12865.0	3487	220	2596	12100	**3.69**	**58.41**	**4.96**	**1.06**	Fail	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Antimony	0.9	52.2	2.21	--	0.37	0.02	0.42	**--**	**2.48**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Arsenic	3.9	131	70.0	582	4	0.03	0.06	0.01	0.97	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Barium	201.8	2023	246	122	149	0.10	0.82	**1.65**	**1.35**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Beryllium	0.8	6.90	27.4	--	0.6	0.12	0.03	**--**	**1.34**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Cadmium	1.1	661	8.73	2.85	0.87	0.002	0.12	0.38	**1.24**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Chromium	24.1	718	78.9	41.0	17	0.03	0.31	0.59	**1.42**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Cobalt	6.1	1680	277	361	8.1	0.00	0.02	0.02	0.75	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Copper	88.2	773	16.8	10.2	20.2	0.11	**5.25**	**8.64**	**4.37**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Lead	23.3	1208	53.4	18.3	14.4	0.02	0.44	**1.27**	**1.62**	Pass	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Manganese	325.3	3346	700	2959	399	0.10	0.46	0.11	0.82	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Mercury	0.0	3.23	0.271	0.176	0.05	0.01	0.15	0.23	0.81	Pass	Pass	Pass	BL

TABLE 6-18a

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by WMU Stepout in NCL - East (<8 feet Elev) Compared to NOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow and LOAEL-Based RBCs for California Vole and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Subarea 2**	**Analyte**	**Mean**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Nickel	22.0	337	10.8	42.4	21.2	0.07	**2.04**	0.52	**1.04**	Pass	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Selenium	1.4	1.85	0.824	1.68	0.8	0.77	**1.73**	0.85	**1.78**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Silver	0.3	7690	112	7.73	NA	0.0000	0.00	0.04	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Thallium	0.2	13.0	3.44	--	0.27	0.02	0.06	**--**	0.79	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Vanadium	36.4	1398	148	11.3	32.5	0.03	0.25	**3.23**	**1.12**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Zinc	115.2	1932	239	293	69.7	0.06	0.48	0.39	**1.65**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Aluminum	10877.5	3487	220	2596	12100	**3.12**	**49.39**	**4.19**	0.90	Fail	Fail	Fail	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Antimony	0.7	52.2	2.21	--	0.37	0.01	0.31	**--**	**1.87**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Arsenic	3.5	131	70.0	582	4	0.03	0.05	0.01	0.86	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Barium	170.0	2023	246	122	149	0.08	0.69	**1.39**	**1.14**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Beryllium	0.4	6.90	27.4	--	0.6	0.06	0.01	**--**	0.64	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Cadmium	0.8	661	8.73	2.85	0.87	0.001	0.09	0.28	0.92	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Chromium	17.9	718	78.9	41.0	17	0.02	0.23	0.44	**1.05**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Cobalt	3.7	1680	277	361	8.1	0.00	0.01	0.01	0.45	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Copper	60.2	773	16.8	10.2	20.2	0.08	**3.58**	**5.89**	**2.98**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Lead	40.9	1208	53.4	18.3	14.4	0.03	0.77	**2.23**	**2.84**	Pass	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Manganese	316.5	3346	700	2959	399	0.09	0.45	0.11	0.79	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Mercury	0.0	3.23	0.271	0.176	0.05	0.01	0.15	0.23	0.81	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Nickel	18.9	337	10.8	42.4	21.2	0.06	**1.76**	0.45	0.89	Pass	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Selenium	1.3	1.85	0.824	1.68	0.8	0.70	**1.56**	0.76	**1.61**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Silver	0.3	7690	112	7.73	NA	0.0000	0.00	0.04	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Thallium	0.2	13.0	3.44	--	0.27	0.02	0.06	**--**	0.81	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Vanadium	32.7	1398	148	11.3	32.5	0.02	0.22	**2.90**	**1.01**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Zinc	85.3	1932	239	293	69.7	0.04	0.36	0.29	**1.22**	Pass	Pass	Pass	BL

Notes:

-- = benchmark is unavailable

BL = background concentration is lower than the bird RBCs

Fail = mean concentration exceeds the NOAEL-based RBC for sparrow or LOAEL-based RBC for mammals and background; therefore, this analyte was considered to pose a possible risk to individual special-status avian species or a population-level risk to mammals

HQ = hazard quotient

mg/kg = milligrams per kilogram

N = sample size

NA = not available

NOAEL = no observed adverse effect level

Pass = mean concentration was less than the NOAEL-based RBC for sparrows, less than the LOAEL-based RBC for mammals, or less than background; therefore, there are no risks to terrestrial wildlife

RBC = risk-based concentration

Uncertainty = benchmark value not available; therefore, this analyte is considered an uncertainty

UTL = upper tolerance limit

Shading or bold indicates cases where the mean soil concentration exceeds the bird RBC or background value.

Background is only used in the risk results if it is greater than the bird RBCs; otherwise the background risk result is marked as BL.

TABLE 6-18b

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by WMU Stepout in NCL - East (<8' Elev) Compared to LOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow, California Vole, and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Subarea 2**	**Analyte**	**Mean**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Aluminum	86545.5	3487	220	--	12100	**24.82**	**392.96**	**--**	**7.15**	Fail	Fail	Use NOAEL	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Antimony	8.8	52.2	2.21	--	0.37	0.17	**3.98**	**--**	**23.78**	Pass	Fail	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Arsenic	9.3	131	70.0	2546	4	0.07	0.13	0.00	**2.31**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Barium	2057.1	2023	246	246	149	**1.02**	**8.38**	**8.36**	**13.81**	Fail	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Beryllium	7.7	6.90	27.4	--	0.6	**1.11**	0.28	**--**	**12.81**	Fail	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Cadmium	3.2	661	8.73	4.68	0.87	0.005	0.37	0.69	**3.72**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Chromium	172.0	718	78.9	42.9	17	0.24	**2.18**	**4.01**	**10.12**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Cobalt	9.1	1680	277	370	8.1	0.01	0.03	0.02	**1.12**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Copper	1994.4	773	16.8	33.0	20.2	**2.58**	**118.64**	**60.42**	**98.73**	Fail	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Lead	242.1	1208	53.4	37.6	14.4	0.20	**4.53**	**6.43**	**16.81**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Manganese	1119.9	3346	700	5752	399	0.33	**1.60**	0.19	**2.81**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Mercury	0.1	3.23	0.271	1.126	0.05	0.02	0.21	0.05	**1.13**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Nickel	99.5	337	10.8	73.0	21.2	0.30	**9.25**	**1.36**	**4.69**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Selenium	2.4	1.85	0.824	3.64	0.8	**1.29**	**2.90**	0.66	**2.98**	Fail	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Silver	2.9	7690	112	77.30	NA	0.0004	0.03	0.04	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Thallium	0.2	13.0	3.44	--	0.27	0.01	0.05	**--**	0.65	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Vanadium	62.6	1398	148	22.6	32.5	0.04	0.42	**2.78**	**1.93**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout	Zinc	1845.7	1932	239	295	69.7	0.96	**7.72**	**6.26**	**26.48**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Aluminum	25557.0	3230	220	--	12100	**7.91**	**116.17**	**--**	**2.11**	Fail	Fail	Use NOAEL	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Antimony	1.7	52.2	2.21	--	0.37	0.03	0.76	**--**	**4.57**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Arsenic	3.9	7.2	41	2546	4	0.54	0.09	0.00	0.97	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Barium	293.8	727	246	246	149	0.40	**1.19**	**1.19**	**1.97**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Beryllium	1.2	6.9	1.7	--	0.6	0.18	0.72	**--**	**2.03**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Cadmium	1.1	661	8.7	4.68	0.87	0.002	0.12	0.23	**1.22**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Chromium	44.9	433	79	42.9	17	0.10	0.57	**1.05**	**2.64**	Pass	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Cobalt	6.5	1084	131	370	8.1	0.01	0.05	0.02	0.80	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Copper	400.1	773	16.8	33.0	20.2	0.52	**23.82**	**12.12**	**19.81**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Lead	69.7	1208	53.4	37.6	14.4	0.06	**1.30**	**1.85**	**4.84**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Manganese	346.8	1336	700	5752	399	0.26	0.50	0.06	0.87	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Mercury	0.1	3.2	0.27	1.126	0.05	0.02	0.20	0.05	**1.07**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Nickel	35.7	337	10.8	73.0	21.2	0.11	**3.30**	0.49	**1.68**	Pass	Fail	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Selenium	1.4	1.8	0.82	3.64	0.8	0.75	**1.65**	0.37	**1.70**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Silver	0.6	4815	15.1	77.30	NA	0.0001	0.04	0.01	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Thallium	0.2	13	1.01	--	0.27	0.02	0.22	**--**	0.81	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Vanadium	40.5	1197	148	22.6	32.5	0.03	0.27	**1.79**	**1.25**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout	Zinc	348.5	1932	239	295	69.7	0.18	**1.46**	**1.18**	**5.00**	Pass	Fail	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Aluminum	12865.0	3230	220	--	12100	**3.98**	**58.48**	**--**	**1.06**	Fail	Fail	Use NOAEL	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Antimony	0.9	52.2	2.21	--	0.37	0.02	0.42	**--**	**2.48**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Arsenic	3.9	7.2	41	2546	4	0.54	0.09	0.00	0.97	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Barium	201.8	727	246	246	149	0.28	0.82	0.82	**1.35**	Pass	Pass	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Beryllium	0.8	6.9	1.7	--	0.6	0.12	0.47	**--**	**1.34**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Cadmium	1.1	661	8.7	4.68	0.87	0.002	0.12	0.23	**1.24**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Chromium	24.1	433	79	42.9	17	0.06	0.31	0.56	**1.42**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Cobalt	6.1	1084	131	370	8.1	0.01	0.05	0.02	0.75	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Copper	88.2	773	16.8	33.0	20.2	0.11	**5.25**	**2.67**	**4.37**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Lead	23.3	1208	53.4	37.6	14.4	0.02	0.44	0.62	**1.62**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Manganese	325.3	1336	700	5752	399	0.24	0.46	0.06	0.82	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Mercury	0.0	3.2	0.27	1.126	0.05	0.01	0.15	0.04	0.81	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Nickel	22.0	337	10.8	73.0	21.2	0.07	**2.04**	0.30	**1.04**	Pass	Fail	Pass	Fail

TABLE 6-18b

Mean Surface Soil (0-6 inches) Concentrations of Inorganics by WMU Stepout in NCL - East (<8' Elev) Compared to LOAEL-Based RBCs for Aquatic-Feeding Belding's Savannah Sparrow, California Vole, and Ornate Shrew

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

					RBC				HQ_{mean}				$Risk_{mean}$			
Area	**Subarea**	**Subarea 2**	**Analyte**	**Mean**	**Vole**	**Shrew**	**Sparrow**	**Background UTL**	**Vole**	**Shrew**	**Sparrow**	**Background**	**Vole**	**Shrew**	**Sparrow**	**Background**
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Selenium	1.4	1.8	0.82	3.64	0.8	0.79	**1.74**	0.39	**1.78**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Silver	0.3	4815	15.1	77.30	NA	0.0001	0.02	0.00	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Thallium	0.2	13	1.01	--	0.27	0.02	0.21	**--**	0.79	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Vanadium	36.4	1197	148	22.6	32.5	0.03	0.25	**1.61**	**1.12**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout	Zinc	115.2	1932	239	295	69.7	0.06	0.48	0.39	**1.65**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Aluminum	10877.5	3230	220	--	12100	**3.37**	**49.44**	**--**	0.90	Fail	Fail	Use NOAEL	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Antimony	0.7	52.2	2.21	--	0.37	0.01	0.31	**--**	**1.87**	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Arsenic	3.5	7.2	41	2546	4	0.48	0.08	0.00	0.86	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Barium	170.0	727	246	246	149	0.23	0.69	0.69	**1.14**	Pass	Pass	Pass	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Beryllium	0.4	6.9	1.7	--	0.6	0.06	0.23	**--**	0.64	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Cadmium	0.8	661	8.7	4.68	0.87	0.001	0.09	0.17	0.92	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Chromium	17.9	433	79	42.9	17	0.04	0.23	0.42	**1.05**	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Cobalt	3.7	1084	131	370	8.1	0.00	0.03	0.01	0.45	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Copper	60.2	773	16.8	33.0	20.2	0.08	**3.58**	**1.82**	**2.98**	Pass	Fail	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Lead	40.9	1208	53.4	37.6	14.4	0.03	0.77	**1.09**	**2.84**	Pass	Pass	Fail	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Manganese	316.5	1336	700	5752	399	0.24	0.45	0.06	0.79	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Mercury	0.0	3.2	0.27	1.126	0.05	0.01	0.15	0.04	0.81	Pass	Pass	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Nickel	18.9	337	10.8	73.0	21.2	0.06	**1.75**	0.26	0.89	Pass	Fail	Pass	Pass
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Selenium	1.3	1.8	0.82	3.64	0.8	0.72	**1.57**	0.35	**1.61**	Pass	Fail	Pass	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Silver	0.3	4815	15.1	77.30	NA	0.0001	0.02	0.00	NA	Pass	Pass	Pass	NA
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Thallium	0.2	13	1.01	--	0.27	0.02	0.22	**--**	0.81	Pass	Pass	Uncertainty	BL
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Vanadium	32.7	1197	148	22.6	32.5	0.03	0.22	**1.45**	**1.01**	Pass	Pass	Fail	Fail
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout	Zinc	85.3	1932	239	295	69.7	0.04	0.36	0.29	**1.22**	Pass	Pass	Pass	BL

Notes:

-- = benchmark is unavailable

BL = background concentration is lower than the bird RBCs

Fail = mean concentration exceeds the LOAEL-based RBC and background; therefore, this analyte was considered to pose a probable risk to individual special-status avian species or a possible population-level risk to mammals

HQ = hazard quotient

mg/kg = milligrams per kilogram

N = sample size

NA = not available

NOAEL = no observed adverse effect level

Pass = mean concentration was less than the LOAEL-based RBC or less than background; therefore, there are no population-level risks to terrestrial wildlife

RBC = risk-based concentration

Uncertainty = benchmark value not available; therefore, this analyte is considered an uncertainty

Use NOAEL = a LOAEL was not available for this analyte; therefore, the risk results estimated using the NOAEL will be relied on

UTL = upper tolerance limit

Shading or bold indicates cases where the mean soil concentration exceeds the bird RBC or background value.

Background is only used in the risk results if it is greater than the bird RBCs; otherwise the background risk result is marked as BL.

TABLE 6-19

Weight-of-Evidence Summary for Risks to Birds and Mammals

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

		Risk Result and COPEC Risk Driver by Line of Evidence[a]				
Area	**Subarea**	**Single-chemical Toxicity Data**	**Tissue-based Toxicity Data**	**Field Survey Data**	**Explanation**	**Weight-of-Evidence**
Belding's Savannah Sparrow - Aquatic (Individual-level)						
NCL-East	NCL - East (< 8' Elev)	(Al), Cu, Pb, Se, V, Zn			Multiple analytes across this area exceeded sparrow RBCs derived using literature-based benchmarks for birds. There was a decreasing number of risk drivers with stepout distance from the WMU. Although vanadium and selenium concentrations across this area and all four stepouts exceeded the sparrow RBCs, vanadium and selenium risks are uncertain because their background UTLs also exceeded the sparrow RBC. Vanadium at the first stepout was less than two times background and decreased to background levels by the 4th stepout (32.7 mg/kg compared to 32.5 mg/kg for background). Selenium is three times background in the first stepout, but also decreases to near the background level by the 4th stepout. Due to very low bioavailability at higher pH ranges, EPA (2003b) indicates that aluminum is only considered to be a contaminant of concern at sites with pH values less than 5.5. The pH in this area ranged between 7.6 and 8.0.	Multiple analytes exceeded the aquatic-feeding Belding's savannah sparrow RBCs across most areas of the Site. However, some analytes are not likely a risk or are likely to be of very low risk. Moreover, breeding data for sparrows suggest that risks, if present, are not affecting breeding sparrows. Although aluminum concentrations in many areas of the site exceeded both the sparrow RBC and background UTL, the pH of the sediments at the site (range of 7.6 to 8.2) are greater than 5.5; therefore, aluminum is not considered a contaminant of concern due to very low bioavailability (EPA, 2003b). Risks to individual aquatic Belding's savannah sparrow from exposure to aluminum are not predicted. Mercury concentrations at some locations in OID Lagoon and WMU Ditch exceeded the NOAEL-based RBC for aquatic-feeding sparrows. These elevated concentrations are not considered to be site-related and therefore, risks to sparrows are not site-related. Mean vanadium concentrations across the site were either less than the background UTL or were less than 1.5 times background. This suggests that risks to sparrows from vanadium are likely low. Although selenium concentrations at some subareas are near background levels, others range up to 3.5 times background and risks from selenium cannot be excluded. The number of risk drivers was observed to decrease with stepout distance to the east of the WMU and also decreases from the WMU Ditch to the WMU Ditch - 5' South. Despite these potential risks identified using literature-based oral toxicity data, results of breeding season field surveys indicate that the number of Belding's savannah sparrow breeding territories at Ormond Beach is correlated with the total number of territories at other Southern California locations. Ormond Beach aquatic-feeding sparrows are likely to forage in areas affected by Halaco Site contamination. Thus, it does not appear that exposure to site contaminants is adversely affecting breeding sparrows. Therefore, the weight-of-evidence is that there are no risks to individual aquatic Belding's savannah sparrow at NCL - North. In all other subareas, multiple analytes are a potential risk to individual aquatic sparrows. Risks were observed to decrease with distance to the east of the WMU and to the south of the WMU Ditch. Risks from selenium and vanadium, though widespread, are somewhat uncertain because the background UTL for each of these analytes also exceeds the sparrow RBC. Vanadium in particular may be of very low risk to aquatic sparrows because mean concentrations at all subareas are either less than background or are less than 1.5 times background. Mercury risks, if present, are likely not site-related. Risks from copper, lead, and zinc were common, whereas risks from barium were limited to WMU - 1st Stepout and WMU Ditch. These risk results are tempered with the available field survey data, which indicate that breeding season abundance of Belding's savannah sparrows at Ormond Beach is unaffected by Halaco Site contamination. Site-specific information is given more weight than results obtained from comparisons to literature-based information; therefore, risks to sparrows are predicted to be absent or very low.
	• WMU - 1st Stepout	(Al), Ba, Cr, Cu, Pb, Se, V, Zn				
	• WMU - 2nd Stepout	(Al), Cu, Se, V				
	• WMU - 3rd Stepout	Se, V				
	• WMU - 4th Stepout	Se, V				
NCL - North	NCL - Ditch	Pb, Se, V			Exceedances within NCL - Ditch and NCL - Pond were limited to lead, selenium, and vanadium. The mean vanadium concentrations at the two NCL - North subareas are very close to background (1.06 times background UTL at NCL - Ditch and 1.22 times at NCL - Pond).	
NCL - North	NCL - Pond	Se, V				
OID Lagoon	Lagoon - Main	Se		When the year with the greatest number of breeding territories at Ormond Beach was excluded, the number of breeding territories at Ormond Beach was significantly correlated with the total number of territories in Southern California. These results suggest that exposure to contaminants from the Halaco Site are not adversely affecting abundance.	Exceedances within the OID Lagoon area were limited to mercury, selenium, and vanadium. Selenium concentrations at all sites, except Lagoon Finger - Footbridge and vanadium at OID - Site are very close (less than 1.5 times) to their respective background UTLs, which also exceeded the sparrow RBC. Mercury exceeded NOAEL-based RBCs for aquatic-feeding sparrows at Lagoon Finger - Footbridge; however, mercury concentrations at the site do not appear to be related to Halaco process waste because the waste itself does not differ from background. This suggests that elevated mercury at onsite locations is not site-related (i.e., not from the Halaco process waste).	
OID Lagoon	Lagoon Finger - West	Se				
OID Lagoon	Lagoon Finger - East	Se				
OID Lagoon	Lagoon Finger - Footbridge	(Hg), Se				
OID Lagoon	OID - North	No Risk				
OID Lagoon	OID - Site	Se, V				
Wetlands Beach	WMU Ditch	(Al), Ba, Cu, Pb, (Hg), Se, V, Zn			Multiple analytes at WMU Ditch and the first stepout (5' South) exceeded sparrow RBCs. The pH in this area ranged between 7.6 and 7.9. Mercury exceeded NOAEL-based RBCs for aquatic-feeding sparrows at WMU Ditch and subareas; however, as previously indicated elevated mercury at onsite locations is not site-related (i.e., not from the Halaco process waste).	
Wetlands Beach	WMU Ditch - 5' South	(Al), Cu, Pb, (Hg), Se, Zn				

TABLE 6-19

Weight-of-Evidence Summary for Risks to Birds and Mammals

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Risk Result and COPEC Risk Driver by Line of Evidence[a]: Single-chemical Toxicity Data	Tissue-based Toxicity Data	Field Survey Data	Explanation	Weight-of-Evidence
Snowy Plover (Individual-level)						
NCL-East	NCL - East (< 8' Elev)	(Al), Ba, Cr, Cu, Pb, Se, V, Zn		When the 3 years with the greatest numbers of individuals during the breeding season at Ormond Beach were excluded, abundance at Ormond Beach was significantly correlated with abundance in the larger three-county area. These results suggest that exposure to contaminants from the Halaco Site are not adversely affecting abundance.	Multiple analytes across this area exceeded plover RBCs derived using literature-based benchmarks for birds. There was a decreasing number of risk drivers with stepout distance from the WMU. Although vanadium and selenium concentrations across this area and all four stepouts exceeded the plover RBCs, vanadium and selenium risks are uncertain because their background UTLs also exceeded the plover RBCs. Vanadium at the first stepout was less than two times background and decreased to background levels by the 4th stepout (32.7 mg/kg compared to 32.5 mg/kg for background). Selenium is three times background in the first stepout, but also decreases to near the background level by the 4th stepout. Due to very low bioavailability at higher pH ranges, EPA (2003b) indicates that aluminum is only considered to be a contaminant of concern at sites with pH values less than 5.5. The pH in this area ranged between 7.6 and 8.0.	All subareas of the Site had at least one analyte that exceeded the plover RBC. The number of risk drivers was observed to decrease with stepout distance to the east of the Waste Management Unit and also decreases from the WMU Ditch to the WMU Ditch - 5' South. However, some analytes are not likely a risk or are likely to be of very low risk. Moreover, breeding data for plovers suggest that risks, if present, are not affecting breeding plovers. As described above for the Belding's savannah sparrow, risks from aluminum, vanadium, and selenium are considered low and those from mercury are not likely to be site-related. Despite these potential risks identified using literature-based oral toxicity data, results of breeding season field surveys indicate that the number of adult western snowy plover at Ormond Beach is correlated with the total number of breeding plovers for the larger three county area. This result suggests that exposure to Halaco Site contaminants is not adversely affecting breeding plovers. Therefore, the weight-of-evidence is that multiple analytes across the Site are a potential risk to individual snowy plovers. Risks were observed to decrease with distance to the east of the Waste Management Unit and to the south of the WMU Ditch. Risks from selenium and vanadium, though widespread, are somewhat uncertain because the background UTL for each of these analytes also exceeds the plover RBC. Vanadium in particular may be of very low risk to plovers because mean concentrations at all subareas are either less than background or are less than 1.5 times background. Mercury risks, if present, are likely not site-related. Risks from barium, copper, lead, mercury, and zinc were widespread, whereas risks from chromium and TEQ-Birds were limited to certain subareas. These risk results are tempered with the available field survey data, which indicates that breeding season abundance of western snowy plovers at Ormond Beach is unaffected by Halaco Site contamination. Site-specific information is given more weight than results obtained from comparisons to literature-based information; therefore, risks to plovers are predicted to be absent or very low.
	• WMU - 1st Stepout	(Al), Ba, Cr, Cu, Pb, Se, V, Zn				
	• WMU - 2nd Stepout	(Al), Cu, Pb, Se, V, Zn				
	• WMU - 3rd Stepout	(Al), Cu, Se, V				
	• WMU - 4th Stepout	Pb, Se, V				
NCL - North	NCL - Ditch	Cu, Pb, Se, V			Multiple analytes at NCL - Ditch and NCL - Pond exceeded plover RBCs. The mean vanadium concentrations at the two NCL - North subareas are very close background (1.06 times background UTL at NCL - Ditch and 1.22 times at NCL - Pond). The pH in this area ranged between 8.0 and 8.2. Mercury exceeded NOAEL-based RBCs for plover at NCL - Pond; however, as previously indicated elevated mercury at onsite locations is not site-related (i.e., not from the Halaco process waste).	
NCL - North	NCL - Pond	(Al), Ba, Pb, (Hg), Se, V				
OID Lagoon	Lagoon - Main	Se			Exceedances within the OID Lagoon area were limited to aluminum, mercury, selenium, and vanadium. Selenium concentrations at all sites, except Lagoon Finger - Footbridge and vanadium at OID - Site are very close (less than 1.5 times) to their respective background UTLs, which also exceeded the plover RBC. Although pH values at this area are not available, pH across the Site ranged from 7.6 to 8.2 and are likely to be close to or within this range at OID Lagoon. mercury exceeded NOAEL-based RBCs for plover at several lagoon subareas; however, as previously indicated elevated mercury at onsite locations is not site-related (i.e., not from the Halaco process waste).	
OID Lagoon	Lagoon Finger - West	Se				
OID Lagoon	Lagoon Finger - East	(Hg), Se				
OID Lagoon	Lagoon Finger - Footbridge	(Hg), Se				
OID Lagoon	OID - North	(Hg), Se				
OID Lagoon	OID - Site	(Al), Se, V				
Wetlands Beach	WMU Ditch	(Al), Ba, Cr, Cu, Pb, (Hg), Se, V, Zn, TEQ-Birds			Multiple analytes at WMU Ditch and the first stepout (5' South) exceeded plover RBCs. The pH in this area ranged between 7.6 and 7.9. Mercury exceeded NOAEL-based RBCs for plover at WMU Ditch and subareas; however, as previously indicated elevated mercury at onsite locations is not site-related (i.e., not from the Halaco process waste).	
Wetlands Beach	WMU Ditch - 5' South	(Al), Ba, Cr, Cu, Pb, (Hg), Se, Zn				

TABLE 6-19

Weight-of-Evidence Summary for Risks to Birds and Mammals

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Risk Result and COPEC Risk Driver by Line of Evidence[a]: Single-chemical Toxicity Data	Tissue-based Toxicity Data	Field Survey Data	Explanation	Weight-of-Evidence
California Least Tern (Individual-level)						
NCL-East	NCL - East (< 8' Elev)	(Se)		Mean breeding success (fledglings per pair) at Ormond Beach did not differ from the statewide population. These results suggest that exposure to contaminants from the Halaco Site are not adversely affecting reproduction.	Selenium is three times background in the first stepout, but decreases to less than 2 times background in the 2nd stepout and is near the background level by the 4th stepout.	Selenium was the only analyte that was detected in fish at concentrations sufficient to pose a risk to terns. Although selenium concentrations at some subareas are near background levels, others range up to 3.5 times background. However, selenium concentrations in fish tissue are very similar across all locations (OID-Lagoon, NCL – East, and WMU Ditch, suggesting that concentrations in fish may not be site-related. Additionally, results of breeding season field surveys indicate that mean breeding success (number of fledglings per pair) for California least terns nesting at Ormond Beach did not differ from the State-wide population. Because the breeding success of Ormond Beach terns is comparable to other locations across the State of California, exposure to Halaco Site contaminants does not appear to be adversely affecting breeding terns. Therefore, the weight-of-evidence is that selenium is the only analyte identified as a risk to individual California least terns, though fish tissue data suggest that these risks are not site-related. Moreover, the available field survey data indicates that breeding success of California least terns at Ormond Beach is unaffected by Halaco Site contamination. Site-specific information is given more weight than results obtained from comparisons to literature-based information; therefore, risks to terns are predicted to be absent or very low.
	• WMU - 1st Stepout	(Se)				
	• WMU - 2nd Stepout	(Se)				
	• WMU - 3rd Stepout					
	• WMU - 4th Stepout					
OID Lagoon	Lagoon - Main	(Se)			Selenium concentrations at all subareas, except Lagoon Finger - Footbridge, are very close (less than 1.5 times) to the background UTL.	
OID Lagoon	Lagoon Finger - West	(Se)				
OID Lagoon	Lagoon Finger - East	(Se)				
OID Lagoon	Lagoon Finger - Footbridge	(Se)				
Wetlands Beach	WMU Ditch	(Se)			The mean selenium concentration at this subarea is about 3.5 times background.	

TABLE 6-19

Weight-of-Evidence Summary for Risks to Birds and Mammals

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

		Risk Result and COPEC Risk Driver by Line of Evidence[a]				
Area	**Subarea**	**Single-chemical Toxicity Data**	**Tissue-based Toxicity Data**	**Field Survey Data**	**Explanation**	**Weight-of-Evidence**
Belding's Savannah Sparrow - Terrestrial (Individual-level)						
NCL - East	McWane - 5' South	(Al), Ba, Cu, Pb		When the year with the greatest number of breeding territories at Ormond Beach was excluded, the number of breeding territories at Ormond Beach was significantly correlated with the total number of territories in Southern California. These results suggest that exposure to contaminants from the Halaco Site are not adversely affecting abundance.	Multiple analytes across multiple subareas exceeded sparrow RBCs derived using literature-based benchmarks for birds. There was a decreasing number of risk drivers with stepout distance from the WMU. As previously indicated, aluminum is not considered a risk driver at pH values greater than 5.5 (range 6.7 to 8.0 in this area). Although vanadium concentrations across this area and all four stepouts exceeded the sparrow RBCs, vanadium risks are uncertain because the background UTL also exceeded the sparrow RBC. Vanadium at the first stepout was less than two times background and decreased to background levels by the 4th stepout (32.7 mg/kg compared to 32.5 mg/kg for background).	Multiple analytes exceeded the terrestrial-feeding Belding's savannah sparrow RBCs across most areas of the Site. The number of risk drivers was observed to decrease with stepout distance to the east of the Waste Management Unit and distance to the south of WMU Ditch. However, some analytes are not likely a risk or are likely to be of very low risk. Moreover, breeding data for sparrows suggest that risks, if present, are not affecting breeding sparrows. As described above for the aquatic- feeding sparrow, risks from aluminum, vanadium, and selenium are considered low and those from mercury are not likely to be site-related. Despite these potential risks identified using literature-based oral toxicity data, results of breeding season field surveys indicate that abundance of sparrows is comparable to other locations and Halaco Site contaminants are not adversely affecting breeding sparrows. Therefore, the weight-of-evidence is that there are no risks to the individual terrestrial Belding's savannah sparrows at the NCL - Background, NCL - North, Beach - Background, Breach Background, and Wetland - West subareas. In all other subareas, at least one analyte was found to present risk to individual terrestrial sparrows. Risks were observed to decrease with distance to the east of the WMU and to the south of the WMU Ditch. Risks from selenium and vanadium, though widespread, are somewhat uncertain because the background UTL for each of these analytes also exceeds the plover RBC. Vanadium in particular may be of very low risk to terrestrial sparrows because mean concentrations at all subareas are either less than background or are less than 1.5 times background. Mercury risks, if present, are likely not site-related. Risks from barium, copper, and lead were widespread, whereas risks from cadmium, chromium, nickel, and zinc were limited to certain subareas. These risk results are tempered with the available field survey data, which indicates that breeding season abundance of Belding's savannah sparrows at Ormond Beach is unaffected by Halaco Site contamination. Site-specific information is given more weight than results obtained from comparisons to literature-based information; therefore, risks to sparrows are predicted to be absent or very low.
NCL - East	McWane - Center	Ba, Cu, Pb				
NCL - East	NCL - East (< 8' Elev)	(Al), Ba, Cr, Cu, Pb, V, Zn				
	• WMU - 1st Stepout	(Al), Ba, Cd, Cr, Cu, Pb, Ni, Se, V, Zn				
	• WMU - 2nd Stepout	(Al), Ba, Cr, Cu, Pb, V, Zn				
	• WMU - 3rd Stepout	(Al), Ba, Cu, Pb, V				
	• WMU - 4th Stepout	Ba, Cu, Pb, V				
NCL - East	NCL - East (> 8' Elev)	Ba, Cu, Pb				
NCL - North	NCL - Background	No Risk			No risks to sparrows from soil exposures at NCL - Background and NCL - North. Multiple analytes at NCL - Ditch and NCL - Pond exceeded sparrow RBCs. The mean vanadium concentrations at these two NCL - North subareas are very close background (1.06 times background UTL at NCL - Ditch and 1.22 times at NCL - Pond). The pH in this area ranged between 8.0 and 8.2.	
NCL - North	NCL - Ditch	Ba, Cu, Pb, Se, V				
NCL - North	NCL - North	No Risk				
NCL - North	NCL - Pond	(Al), Ba, Cu, Pb, Se, V				
Wetlands Beach	Beach - Background	No Risk			No risks to terrestrial sparrows were observed at background areas or the Wetland - West subarea. Multiple analytes across the other subareas exceeded sparrow RBCs. There was a decreasing number of risk drivers with stepout distance to the south of the WMU Ditch, though concentrations of these risk drivers generally decreased with distance to the south from WMU Ditch (except vanadium which was greater at WMU Ditch - 15' South). Vanadium risks are considered uncertain because background also exceeds the sparrow RBC and mean vanadium concentrations were less than two times background at WMU Ditch and all stepouts to the south, except 5' South where the mean vanadium concentration was less than background. The pH in this area ranged between 7.6 and 7.9. Mercury exceeded NOAEL-based RBCs for terrestrial-feeding sparrows at Hueneme Parcel and WMU Ditch – 5' South; however, as previously indicated elevated mercury at onsite locations is not site-related.	
Wetlands Beach	Breach - Background	No Risk				
Wetlands Beach	Hueneme Parcel	Ba, Cu, Pb, (Hg)				
Wetlands Beach	Wetland - East	Cu				
Wetlands Beach	Wetland - West	No Risk				
Wetlands Beach	WMU Ditch	(Al), Ba, Cr, Cu, Pb, Ni, Se, V, Zn				
Wetlands Beach	WMU Ditch - 05' South	(Al), Ba, Cr, Cu, Pb, (Hg), Ni, Se, Zn				
Wetlands Beach	WMU Ditch - 15' South	(Al), Ba, Cr, Cu, Pb, Ni, Se, V, Zn				
Wetlands Beach	WMU Ditch - 30' South	Cu, Pb, V				
Wetlands Beach	WMU Ditch - 50' South	Cu, V				

TABLE 6-19

Weight-of-Evidence Summary for Risks to Birds and Mammals

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

		Risk Result and COPEC Risk Driver by Line of Evidence[a]				
Area	**Subarea**	**Single-chemical Toxicity Data**	**Tissue-based Toxicity Data**	**Field Survey Data**	**Explanation**	**Weight-of-Evidence**
California Vole (Population-level)						
NCL - East	McWane - 5' South	(Al)			No risks to voles were observed at McWane - Center, the 4th WMU stepout, and NCL - East (> 8' Elev). As previously discussed, risks from exposure to aluminum are not predicted because pH in this area ranges from 6.7 to 8.0.	California vole populations were not found to be a risk at many areas of the Site, though a few analyses exceeded LOAEL-based RBCs for voles at about half the subareas. The number of risk drivers decreased with stepout distance to the east of the Waste Management Unit, with no risks to voles in the 2nd, 3rd, and 4th stepouts. Similarly, the number of risk drivers decreased with distance to the south of the WMU Ditch, with no risks to voles in the 30- and 50-foot stepouts. However, some analytes are not likely a risk or are likely to be of very low risk. As described above for the aquatic -feeding sparrow, risks from aluminum and selenium are considered low. Therefore, the weight-of-evidence is that risks to the California vole population are predicted only for the WMU - 1st Stepout, NCL - Ditch, NCL - Pond, WMU Ditch, WMU Ditch - 5' South, and WMU Ditch - 15' South subareas. These risks tend to decrease with distance to the south of the WMU Ditch. Risks from selenium, though widespread, are somewhat uncertain because the background UTL also exceeds the vole RBC. Risks from barium, beryllium, copper, and selenium were predicted at WMU - 1st Stepout, only selenium was a risk at NCL - Ditch and NCL - Pond, and copper and selenium at WMU Ditch and WMU Ditch - 5' South and copper at WMU Ditch - 15' South were a risk to the vole population.
NCL - East	McWane - Center	No Risk				
NCL - East	NCL - East (< 8' Elev)	(Al)				
	• WMU - 1st Stepout	(Al), Ba, Be, Cu, Se				
	• WMU - 2nd Stepout	(Al)				
	• WMU - 3rd Stepout	(Al)				
	• WMU - 4th Stepout	No Risk				
NCL - East	NCL - East (> 8' Elev)	No Risk				
NCL - North	NCL - Background	No Risk			No risks to voles at NCL - Background and NCL - North. The pH in this area ranged between 8.0 and 8.2.	
NCL - North	NCL - Ditch	Se				
NCL - North	NCL - North	No Risk				
NCL - North	NCL - Pond	(Al), Se				
Wetlands Beach	Beach - Background	No Risk			No risks to voles were observed at background areas, Hueneme Parcel, Wetland - East, and Wetland - West, and the 30' and 50' stepouts south of WMU Ditch. Multiple analytes within WMU Ditch and the 5' and 15' stepouts exceeded vole RBCs. The pH in this area ranged between 7.6 and 7.9.	
Wetlands Beach	Breach - Background	No Risk				
Wetlands Beach	Hueneme Parcel	No Risk				
Wetlands Beach	Wetland - East	No Risk				
Wetlands Beach	Wetland - West	No Risk				
Wetlands Beach	WMU Ditch	(Al), Cu, Se				
Wetlands Beach	WMU Ditch - 05' South	(Al), Cu, Se				
Wetlands Beach	WMU Ditch - 15' South	(Al), Cu				
Wetlands Beach	WMU Ditch - 30' South	No Risk				
Wetlands Beach	WMU Ditch - 50' South	No Risk				

TABLE 6-19

Weight-of-Evidence Summary for Risks to Birds and Mammals

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

		Risk Result and COPEC Risk Driver by Line of Evidence[a]				
Area	**Subarea**	**Single-chemical Toxicity Data**	**Tissue-based Toxicity Data**	**Field Survey Data**	**Explanation**	**Weight-of-Evidence**
Ornate Shrew (Population-level)						
NCL - East	McWane - 5' South	(Al), Ba, Cu			Multiple analytes across multiple subareas exceeded shrew RBCs derived using literature-based benchmarks for mammals. There was a decreasing number of risk drivers with stepout distance from the WMU. As previously indicated, aluminum is not considered a risk driver at pH values greater than 5.5 (range 6.7 to 8.0 in this area).	Multiple analytes exceeded the ornate shrew RBCs across most areas of the site. The number of risk drivers was observed to decrease with stepout distance to the east of the WMU and distance to the south of WMU Ditch. As described above for the aquatic- feeding sparrow, risks from aluminum and selenium are considered low, and those from mercury are not likely to be site-related. Therefore, the weight-of-evidence is that there are no risks to the ornate shrew population at the NCL - Background, NCL - North, Beach - Background, Breach Background, and Wetland - West subareas. In all other subareas, at least one analyte was found to present risk to shrews. Risks were observed to decrease with distance to the east of the WMU and to the south of the WMU Ditch. Risks from selenium, though widespread, are somewhat uncertain because the background UTL also exceeds the shrew RBC. Risks from copper were observed in all subareas, except those with no risks. Risks from barium, lead, nickel, and zinc were also widespread, whereas risks from antimony, chromium, and manganese were limited to certain subareas.
NCL - East	McWane - Center	Ba, Cu, Se				
NCL - East	NCL - East (< 8' Elev)	(Al), Sb, Ba, Cu, Pb, Ni, Se, Zn				
	• WMU - 1st Stepout	(Al), Sb, Ba, Cr, Cu, Pb, Mn, Ni, Se, Zn				
	• WMU - 2nd Stepout	(Al), Ba, Cu, Pb, Ni, Se, Zn				
	• WMU - 3rd Stepout	(Al), Cu, Ni, Se				
	• WMU - 4th Stepout	Cu, Se				
NCL - East	NCL - East (> 8' Elev)	Cu, Se				
NCL - North	NCL - Background	No Risk			No risks to shrews from soil exposures at NCL - Background and NCL North. Multiple analytes at NCL - Ditch and NCL - Pond exceeded shrew RBCs. The pH in this area ranged between 8.0 and 8.2.	
NCL - North	NCL - Ditch	Ba, Cu, Pb, Ni, Se, Zn				
NCL - North	NCL - North	No Risk				
NCL - North	NCL - Pond	(Al), Ba, Cu, Ni, Se				
Wetlands Beach	Beach - Background	No Risk			No risks to terrestrial shrews were observed at background areas or the Wetland - West subarea. Multiple analytes across the other subareas exceeded shrew RBCs. A decreasing number of risk drivers with stepout distance to the south of the WMU Ditch was generally observed. The one exception was the 15' South stepout, which had the same number of risk drivers as WMU Ditch. However, concentrations of all of these risk drivers were lower at WMU Ditch - 15' South than at WMU Ditch. The pH in this area ranged between 7.6 and 7.9. Mercury exceeded LOAEL-based RBCs for shrews at Hueneme Parcel; however, as previously indicated elevated mercury at onsite locations is not site-related.	
Wetlands Beach	Breach - Background	No Risk				
Wetlands Beach	Hueneme Parcel	Cu, (Hg), Se				
Wetlands Beach	Wetland - East	Cu				
Wetlands Beach	Wetland - West	No Risk				
Wetlands Beach	WMU Ditch	(Al), Sb, Ba, Cr, Cu, Pb, Mn, Ni, Se, Zn				
Wetlands Beach	WMU Ditch - 05' South	(Al), Sb, Ba, Cr, Cu, Pb, Ni, Se, Zn				
Wetlands Beach	WMU Ditch - 15' South	(Al), Sb, Ba, Cr, Cu, Pb, Mn, Ni, Se, Zn				
Wetlands Beach	WMU Ditch - 30' South	Cu				
Wetlands Beach	WMU Ditch - 50' South	Cu				

Notes:

EPA = U.S. Environmental Protection Agency

No Risk = mean concentrations of all analytes do not exceed plant community benchmarks or are less than the background UTL

UTL = upper tolerance limit

[a] Results are listed for each line of evidence, and risk drivers are listed on the basis of the weight-of-evidence analysis/summary.

Analytes in parenthesis are not considered risk drivers as discussed in the "Explanation" and "Weight-of-Evidence" columns.

Shading indicates a lack of line-of-evidence data within an area.

TABLE 8-1

Weight-of-Evidence Summary for Sediment-Associated Receptors at Each Subarea of the Site (Avian Risks Based on No Observed Adverse Effect Level)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

																						Totals by Subarea		
Area	**Subarea**	**Al[a]**	**Sb**	**As**	**Ba**	**Be**	**Cd**	**Cr**	**Co**	**Cu**	**Pb**	**Mg**	**Mn**	**Hg**	**Ni**	**Se**	**Ag**	**Tl**	**V**	**Zn**	**TEQ**	**Number of Analytes that Fail**	**Maximum Number of Receptors that Fail**	**Total Number of Receptor-Analyte Combinations that Fail**
NATURE CONSERVANCY LAND																								
NCL - East	NCL - East (< 8' Elev)				(pv)			(pv)		(sp, pv)	(sp, pv)					(sp, pv, t)			(sp, pv)	(sp, pv)		7	3	13
NCL - North	NCL - Ditch									(pv)	(sp, pv)					(sp, pv)			(sp, pv)			4	2	7
NCL - North	NCL - Pond				(pv)						(pv)					(sp, pv)			(sp, pv)			4	2	6
OID LAGOON																								
OID Lagoon	OID - North																					0	0	0
OID Lagoon	OID - Site															(sp, pv)			(sp, pv)			2	2	4
OID Lagoon	Lagoon Finger - Footbridge				bi	bi						bi				(sp, pv, t)						4	4	6
OID Lagoon	Lagoon - Main															(sp, pv, t)						1	3	3
OID Lagoon	Lagoon Finger - West															(sp, pv, t)						1	3	3
OID Lagoon	Lagoon Finger - East															(sp, pv, t)						1	3	3
WMU DITCH																								
Wetlands Beach	WMU Ditch				(sp, pv)			(pv)		(sp, pv), bit	(sp, pv)					(sp, pv, t)			(sp, pv)	(sp, pv)	(pv)	8	4	16
Wetlands Beach	WMU Ditch - 5' South				(pv)			(pv)		(sp, pv)	(sp, pv)					(sp, pv)				(sp, pv)		6	2	10
Totals by Receptor (Number of Subareas with Risks)																								
Belding's savannah sparrow		0	na	0	1	na	0	0	0	3	4	na	0	0	0	10	0	na	5	3	0	6		
Snowy plover		0	na	0	4	na	0	3	0	4	5	na	0	0	0	10	0	na	5	3	1	8		
California least tern		0	na	--	0	na	--	0	--	0	--	na	0	0	0	6	--	na	--	0	--	1		
Benthic invertebrates		0	0	nc	1	1	0	0	0	0	0	1	0	nc	0	nc	0	nc	0	0	0	3		
Benthic invertebrate tissue		na	na	0	na	na	0	0	na	3	0	na	na	0	na	0	na	na	na	0	0	1		
Fish tissue		0	--	--	na	--	--	na	--	0	--	na	na	0	na	0	--	--	--	0	--	0		

Notes:

-- = analyte was non-detected in all fish tissue samples

( ) = risks identified for this receptor are likely acceptable because they are: 1) unlikely, 2) not site-related, or 3) very low (see Section 8 discussion).

Al = aluminum, Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = chromium, Co = cobalt, Cu = copper, Pb = lead,

Mg = magnesium, Mn = manganese, Hg = mercury, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc

bi = benthic invertebrate

bit = benthic invertebrate tissue

na = no benchmark/TRV was available for this analyte/receptor combination

nc = analyte was not correlated with effects observed in the bioassays, so a LOEC was not developed

pv = snowy plover

sp = Belding's savannah sparrow

t = California least tern

TEQ = toxic equivalency quotient

[a] Although aluminum exceeded risk-based concentrations for sparrows and plovers at some locations, risks to aquatic-feeding birds were not predicted due to the measured pH range at the Site (7.6 to 8.2) which is well above the EPA limit of 5.5 below which risks may occur.

Risks based on the mean concentration in the subarea and the weight-of-evidence conclusions.

Essential nutrients were excluded from this evaluation, except magnesium which was significantly correlated with observed effects in the invertebrate bioassays.

Risks are for analytes with hazard quotients greater than one that also exceed the background upper tolerance limit, and are based on the following benchmark types:

Benthic invertebrates - site-specific lowest observed effect concentration (LOEC)

Benthic invertebrate tissue - literature-derived LOEC

Birds - literature-derived no observed adverse effect level (NOAEL)

Hazard Quotient Range

1-2

2-5

5-10

10-25

>25

TABLE 8-2

Weight-of-Evidence Summary for Sediment-Associated Receptors at Each Subarea of the Site (Avian Risks Based on Lowest Observed Adverse Effect Level)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Al[a]	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mg	Mn	Hg	Ni	Se	Ag	Tl	V	Zn	TEQ	Number of Analytes that Fail	Maximum Number of Receptors that Fail	Total Number of Receptor-Analyte Combinations that Fail
NATURE CONSERVANCY LAND																								
NCL - East	NCL - East (< 8' Elev)							(pv)		(sp, pv)	(pv)					(sp, pv, t)			(pv)	(sp, pv)		6	3	10
NCL - North	NCL - Ditch										(pv)					(sp, pv)			(pv)			3	2	4
NCL - North	NCL - Pond															(sp, pv)			(pv)			2	2	3
OID LAGOON																								
OID Lagoon	OID - North																					0	0	0
OID Lagoon	OID - Site															(sp, pv)			(pv)			2	2	3
OID Lagoon	Lagoon Finger - Footbridge				bi	bi						bi				(sp, pv, t)						4	4	6
OID Lagoon	Lagoon - Main															(sp, pv, t)						1	3	3
OID Lagoon	Lagoon Finger - West															(pv, t)						1	2	2
OID Lagoon	Lagoon Finger - East															(pv, t)						1	2	2
WMU DITCH																								
Wetlands Beach	WMU Ditch				(pv)			(pv)		(sp, pv), bit	(pv)					(sp, pv, t)			(pv)	(sp, pv)		7	4	12
Wetlands Beach	WMU Ditch - 5' South				(pv)			(pv)		(sp, pv)	(pv)					(sp, pv)				(sp, pv)		6	2	9
Totals by Receptor (Number of Subareas with Risks)																								
Belding's Savannah sparrow		0	na	0	0	na	0	0	0	3	0	na	0	0	0	8	0	na	0	3	0	3		
Snowy plover		0	na	0	2	na	0	3	0	3	4	na	0	0	0	10	0	na	5	3	1	8		
California least tern		0	na	--	0	na	--	0	--	0	--	na	0	0	0	6	--	na	--	0	--	1		
Benthic invertebrates		0	0	nc	1	1	0	0	0	0	0	1	0	nc	0	nc	0	nc	0	0	0	3		
Benthic invertebrate tissue		na	na	0	na	na	0	0	na	3	0	na	na	0	na	0	na	na	na	0	0	1		
Fish tissue		0	--	--	na	--	--	na	--	0	--	na	na	0	na	0	--	--	--	0	--	0		

Notes:

-- = analyte was non-detected in all fish tissue samples

( ) = risks identified for this receptor are likely acceptable because they are: 1) unlikely, 2) not site-related, or 3) very low (see Section 8 discussion).

Al = aluminum, Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = chromium, Co = cobalt, Cu = copper, Pb = lead,
Mg = magnesium, Mn = manganese, Hg = mercury, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc

bi = benthic invertebrate

bit = benthic invertebrate tissue

na = no benchmark/TRV was available for this analyte/receptor combination

nc = analyte was not correlated with effects observed in the bioassays, so a LOEC was not developed

pv = snowy plover

sp = Belding's savannah sparrow

t = California least tern

TEQ = toxic equivalency quotient

[a] Although aluminum exceeded risk-based concentrations for sparrows and plovers at some locations, risks to aquatic-feeding birds were not predicted due to the measured pH range at the Site (7.6 to 8.2) which is well above the EPA limit of 5.5 below which risks may occur.

Risks based on the mean concentration in the subarea and the weight-of-evidence conclusions.

Essential nutrients were excluded from this evaluation, except magnesium which was significantly correlated with observed effects in the invertebrate bioassays.

Risks are for analytes with hazard quotients greater than one that also exceed the background upper tolerance limit, and are based on the following benchmark types:

- Benthic invertebrates - site-specific lowest observed effect concentration (LOEC)
- Benthic invertebrate tissue - literature-derived LOEC
- Birds - literature-derived lowest observed adverse effect level (LOAEL)

Hazard Quotient Range

- 1-2
- 2-5
- 5-10
- 10-25
- >25

TABLE 8-3

Weight-of-Evidence Summary for Sediment-Associated Receptors at Four Stepouts to the East of the Waste Management Unit in the NCL- East (<8' Elev) Subarea of the Site (Avian Risks Based on No Observed Adverse Effect Level)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

																							Totals by Subarea		
Area	**Subarea**	**Subarea2[a]**	**Al[b]**	**Sb**	**As**	**Ba**	**Be**	**Cd**	**Cr**	**Co**	**Cu**	**Pb**	**Mg**	**Mn**	**Hg**	**Ni**	**Se**	**Ag**	**Tl**	**V**	**Zn**	**TEQ**	**Number of Analytes that Fail**	**Maximum Number of Receptors that Fail**	**Total Number of Receptor-Analyte Combinations that Fail**
NCL - East	*NCL - East (< 8' Elev)*					*(pv)*			*(pv)*		*(sp, pv)*	*(sp, pv)*					*(sp, pv, t)*			*(sp, pv)*	*(sp, pv)*		*7*	*3*	*13*
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout				(sp, pv)			(sp, pv)		(sp, pv)	(sp, pv)					(sp, pv, t)			(sp, pv)	(sp, pv)		7	3	15
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout									(sp, pv)	(pv)					(sp, pv, t)			(sp, pv)	(pv)		5	3	9
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout									(pv)						(sp, pv)			(sp, pv)			3	2	5
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout										(pv)					(sp, pv)			(sp, pv)			3	2	5
Totals by Receptor (Number of Subarea2s with Risks)																									
Belding's Savannah sparrow			0	na	0	1	na	0	1	0	2	1	na	0	0	0	4	0	na	4	1	0	7		
Snowy plover			0	na	0	1	na	0	1	0	3	3	na	0	0	0	4	0	na	4	2	0	7		
California least tern			0	na	--	0	na	--	0	--	0	--	na	0	0	0	2	--	na	--	0	--	1		
Benthic invertebrates			0	0	nc	0	0	0	0	0	0	0	0	0	nc	0	nc	0	nc	0	0	0	0		
Benthic invertebrate tissue			na	na	0	na	na	0	0	na	0	0	na	na	0	na	0	na	na	na	0	0	0		
Fish tissue			0	--	--	na	--	--	na	--	0	--	na	na	0	na	0	--	--	--	0	--	0		

Notes:

-- = analyte was non-detected in all fish tissue samples

( ) = risks identified for this receptor are likely acceptable because they are: 1) unlikely, 2) not site-related, or 3) very low (see Section 8 discussion).

Al = aluminum, Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = chromium, Co = cobalt, Cu = copper, Pb = lead,

Mg = magnesium, Mn = manganese, Hg = mercury, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc

bi = benthic invertebrate

na = no benchmark/TRV was available for this analyte/receptor combination

nc = analyte was not correlated with effects observed in the bioassays, so a LOEC was not developed

pv = snowy plover

sp = Belding's savannah sparrow

t = California least tern

TEQ = toxic equivalency quotient

italics indicate the risks for the entire NCL - East (<8'Elev) Subarea

[a] The four stepouts to the east of the Waste Management Unit include the following samples:

WMU - 1st Stepout = sample locations NEL-4 through NEL-11

WMU - 2nd Stepout = sample locations NEL-15 through NEL-22

WMU - 3rd Stepout = sample locations NEL-27 and NEL-29 through NEL-34

WMU - 4th Stepout = sample locations NEL-44 through NEL-47

[b] Although aluminum exceeded risk-based concentrations for sparrows and plovers at some locations, risks to aquatic birds were not predicted due to the measured pH range at the Site (7.6 to 8.2) which is well above the EPA limit of 5.5 below which risks may occur.

Risks based on the mean concentration in the subarea and the weight-of-evidence conclusions.

Essential nutrients were excluded from this evaluation, except magnesium which was significantly correlated with observed effects in the invertebrate bioassays.

Risks are for analytes with hazard quotients greater than one that also exceed the background upper tolerance limit, and are based on the following benchmark types:

Benthic invertebrates - site-specific lowest observed effect concentration (LOEC)

Benthic invertebrate tissue - literature-derived LOEC

Birds - literature-derived no observed adverse effect level (NOAEL)

Hazard Quotient Range

1-2

2-5

5-10

10-25

>25

TABLE 8-4

Weight-of-Evidence Summary for Sediment-Associated Receptors at Four Stepouts to the East of the Waste Management Unit in the NCL- East (<8' Elev) Subarea of the Site (Avian Risks Based on Lowest Observed Adverse Effect Level)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

																							Totals by Subarea		
Area	**Subarea**	**Subarea2[a]**	**Al[b]**	**Sb**	**As**	**Ba**	**Be**	**Cd**	**Cr**	**Co**	**Cu**	**Pb**	**Mg**	**Mn**	**Hg**	**Ni**	**Se**	**Ag**	**Tl**	**V**	**Zn**	**TEQ**	**Number of Analytes that Fail**	**Maximum Number of Receptors that Fail**	**Total Number of Receptor-Analyte Combinations that Fail**
NCL - East	*NCL - East (< 8' Elev)*								*(pv)*		*(sp, pv)*	*(pv)*					*(sp, pv, t)*			*(pv)*	*(sp, pv)*		*6*	*3*	*10*
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout				(pv)			(sp, pv)		(sp, pv)	(sp, pv)					(sp, pv, t)			(sp, pv)	(sp, pv)		7	3	14
NCL - East	NCL - East (< 8' Elev)	WMU - 2nd Stepout									(pv)	(pv)					(sp, pv, t)			(pv)	(pv)		5	3	7
NCL - East	NCL - East (< 8' Elev)	WMU - 3rd Stepout															(sp, pv)			(pv)			2	2	3
NCL - East	NCL - East (< 8' Elev)	WMU - 4th Stepout															(sp, pv)			(pv)			2	2	3
Totals by Receptor (Number of Subarea2s with Risks)																									
Belding's savannah sparrow			0	na	0	0	na	0	1	0	1	1	na	0	0	0	4	0	na	1	1	0	6		
Snowy plover			0	na	0	1	na	0	1	0	2	2	na	0	0	0	4	0	na	4	2	0	7		
California least turn			0	na	--	0	na	--	0	--	0	--	na	0	0	0	2	--	na	--	0	--	1		
Benthic invertebrates			0	0	nc	0	0	0	0	0	0	0	0	0	nc	0	nc	0	nc	0	0	0	0		
Benthic invertebrate tissue			na	na	0	na	na	0	0	na	0	0	na	na	0	na	0	na	na	na	0	0	0		
Fish tissue			0	--	--	na	--	--	na	--	0	--	na	na	0	na	0	--	--	--	0	--	0		

Notes:

-- = analyte was non-detected in all fish tissue samples

( ) = risks identified for this receptor are likely acceptable because they are: 1) unlikely, 2) not site-related, or 3) very low (see Section 8 discussion).

Al = aluminum, Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = chromium, Co = cobalt, Cu = copper, Pb = lead,

Mg = magnesium, Mn = manganese, Hg = mercury, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc

bi = benthic invertebrate

na = no benchmark/TRV was available for this analyte/receptor combination

nc = analyte was not correlated with effects observed in the bioassays, so a LOEC was not developed

pv = snowy plover

sp = Belding's savannah sparrow

t = California least tern

TEQ = toxic equivalency quotient

italics indicate the risks for the entire NCL - East (<8'Elev) Subarea

[a] The four stepouts to the east of the Waste Management Unit include the following samples:

WMU - 1st Stepout = sample locations NEL-4 through NEL-11

WMU - 2nd Stepout = sample locations NEL-15 through NEL-22

WMU - 3rd Stepout = sample locations NEL-27 and NEL-29 through NEL-34

WMU - 4th Stepout = sample locations NEL-44 through NEL-47

[b] Although aluminum exceeded risk-based concentrations for sparrows and plovers at some locations, risks to aquatic birds were not predicted due to the measured pH range at the Site (7.6 to 8.2) which is well above the EPA limit of 5.5 below which risks may occur.

Risks based on the mean concentration in the subarea and the weight-of-evidence conclusions.

Essential nutrients were excluded from this evaluation, except magnesium which was significantly correlated with observed effects in the invertebrate bioassays.

Risks are for analytes with hazard quotients greater than one that also exceed the background upper tolerance limit, and are based on the following benchmark types:

Benthic invertebrates - site-specific lowest observed effect concentration (LOEC)

Benthic invertebrate tissue - literature-derived LOEC

Birds - literature-derived lowest observed adverse effect level (LOAEL)

Hazard Quotient Range

1-2

2-5

5-10

10-25

>25

TABLE 8-5

Weight-of-Evidence Summary for Soil-Associated Receptors at Each Subarea of the Site (Avian Risks Based on No Observed Adverse Effect Level)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Sample ID	Al[a]	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mn	Hg	Ni	Se	Ag	Tl	V	Zn	Totals by Subarea: Number of Analytes that Fail	Totals by Subarea: Maximum Number of Receptors that Fail	Totals by Subarea: Total Number of Receptor-Analyte Combinations that Fail
BACKGROUND																							
NCL - North	NCL - Background	NNB																			0	0	0
Wetlands Beach	Beach - Background	WLB																			0	0	0
Wetlands Beach	Breach - Background	BBG																			0	0	0
NCL - NORTH																							
NCL - North	NCL - Ditch	NND				sh, (sp)			(p, i)		sh, (sp), p, i	sh, (sp), p			sh	v, sh, (sp), p			(sp, p)	sh, p, i	8	5	21
NCL - North	NCL - Pond	NNP				sh, (sp), i			(p, i)		sh, (sp)	(sp)	p		sh	v, sh, (sp), p			(sp, p)	p, i	9	5	18
NCL - North	NCL - North	NNB																			0	0	0
NCL - EAST																							
NCL - East	NCL - East (< 8' Elev)	NEL		sh		sh, (sp), p, i			(sp), p, **i**		sh, (sp), p, i	sh, (sp)	p, i		sh, p	sh, p			(sp, p)	sh, (sp), p, i	10	4	26
NCL - East	NCL - East (> 8' Elev)	NEL				(sp)			(p, i)		sh, (sp), p, i	(sp)				(sh, p)				p, i, it	6	5	13
NCL - East	McWane - 5' South	MBS				sh, (sp), i			(p, i)		sh, (sp), p, i	(sp)	p							i	6	4	12
NCL - East	McWane - Center	MBR				sh, (sp)			(p, i)		sh, (sp), p, i	(sp)				(sh, p)				i	6	4	12
HUENEME PARCEL																							
Wetlands Beach	Hueneme Parcel	HUP				(sp)			p, i		sh, (sp)	(sp)				(sh, p)			(p)	p, i	7	4	11
SOUTH OF WASTE MANAGEMENT AREA																							
Wetlands Beach	WMU Ditch	DSA		sh, p		sh, (sp), p, i			sh, (sp), **p**, **i**		v, sh, (**sp**), p, i	sh, (sp), p	sh, p, i		sh, (sp), p	v, sh, (sp), p			(sp, p)	sh, (sp), p, i	10	5	34
Wetlands Beach	WMU Ditch - 05' South	DSB		sh		sh, (sp), p, i			sh, (sp), p, **i**		v, sh, (**sp**), p, i	sh, (sp), p	p, i		sh, (sp), p	v, sh, (sp), p				sh, (sp), p, i	9	5	30
Wetlands Beach	WMU Ditch - 15' South	DSC		sh, p		sh, (sp), p, i			sh, (sp), p, i, it		v, sh, (**sp**), p, i, it	sh, (sp), p	sh, p, i		sh, (sp), p	sh, (sp), p			(sp, p)	sh, (sp), p, i, it	10	6	36
Wetlands Beach	WMU Ditch - 30' South	DSD							(p, i)		sh, (sp), p, i	(sp)							(sp, p)	p, i, it	5	5	12
Wetlands Beach	WMU Ditch - 50' South	DSE							(p, i)		sh, (sp), p, i					(p)			(sp, p)		4	4	9
Wetlands Beach	Wetland - West	WLW																			0	0	0
Wetlands Beach	Wetland - East	WLE									sh, (sp)									it	2	3	3
Wetlands Beach	Beach - Breach	BBR																			0	0	0
Totals by Receptor (Number of Subareas with Risks)																							
California vole			0	0	0	0	0	0	0	0	3	0	0	0	0	4	0	0	0	0	2		
Ornate shrew			0	4	0	8	0	0	3	0	13	5	2	0	6	9	0	0	0	5	9		
Belding's savannah sparrow			0	na	0	10	na	0	4	0	13	11	0	0	3	5	0	na	7	4	8		
Terrestrial plants			0	2	0	4	0	0	12	0	10	4	6	0	4	10	0	0	8	9	10		
Soil invertebrates			na	0	0	6	0	0	12	na	10	0	4	0	0	0	na	na	na	11	5		
Soil invertebrate tissue			na	na	0	na	na	0	1	na	1	0	na	0	na	0	na	na	na	1	3		

Notes:

( ) = risks identified for this receptor are likely acceptable because they are: 1) unlikely, 2) not site-related, or 3) very low (see Section 8 discussion).

EcoSSL = Ecological Soil Screening Levels (from EPA, various years)

EPA = U.S. Environmental Protection Agency

Al = aluminum, Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = chromium, Co = cobalt, Cu = copper, Pb = lead,

Mg = magnesium, Mn = manganese, Hg = mercury, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc

i = soil invertebrate

it = soil invertebrate tissue

na = no benchmark/TRV was available for this analyte/receptor combination

p = terrestrial plants

sh = ornate shrew

sp = Belding's savannah sparrow

v = California vole

TEQ = toxic equivalency quotient

[a] Although aluminum exceeded risk-based concentrations for soil-associated receptors at some locations, risks to were not predicted due to the measured pH range at the Site (7.6 to 8.2) which is well above the EPA limit of 5.5 below which risks may occur.

Risks based on the mean concentration in the subarea and the weight-of-evidence conclusions.

Essential nutrients were excluded from this evaluation.

Risks are for analytes with hazard quotients greater than one that also exceed the background upper tolerance limit, and are based on the following benchmark types:

- Plants and invertebrates - effects concentrations derived from the literature (e.g., EPA's EcoSSLs)
- Invertebrate tissue - literature-derived lowest observed effect concentration (LOEC)
- Birds - literature-derived no observed adverse effect level (NOAEL)
- Mammals - literature-derived lowest observed adverse effect level (LOAEL)

Hazard Quotient Range

- 1-2
- 2-5
- 5-10
- 10-25
- >25

TABLE 8-6

Weight-of-Evidence Summary for Soil-Associated Receptors at Each Subarea of the Site (Avian Risks Based on Lowest Observed Adverse Effect Level)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

Area	Subarea	Sample ID	Al[a]	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Mn	Hg	Ni	Se	Ag	Tl	V	Zn	Totals by Subarea: Number of Analytes that Fail	Totals by Subarea: Maximum Number of Receptors that Fail	Totals by Subarea: Total Number of Receptor-Analyte Combinations that Fail
BACKGROUND																							
NCL - North	NCL - Background	NNB																			0	0	0
Wetlands Beach	Beach - Background	WLB																			0	0	0
Wetlands Beach	Breach - Background	BBG																			0	0	0
NCL - NORTH																							
NCL - North	NCL - Ditch	NND				sh, (sp)			(p, i)		sh, (sp), p, i	sh, (sp), p			sh	v, sh, p			(sp, p)	sh, p, i	8	5	20
NCL - North	NCL - Pond	NNP				sh, (sp), i			(p, i)		sh, (sp), p, i		p		sh	v, sh, p			(sp, p)	p, i	8	5	18
NCL - North	NCL - North	NNB																			0	0	0
NCL - EAST																							
NCL - East	NCL - East (< 8' Elev)	NEL		sh		sh, (sp), p, i			(sp), p, i		sh, (sp), p, i	sh, (sp)	p, i		sh, p	sh, p			(sp, p)	sh, (sp), p, i	10	4	26
NCL - East	NCL - East (> 8' Elev)	NEL							(p, i)		sh, (sp), p, i					(sh, p)				p, i, it	4	5	11
NCL - East	McWane - 5' South	MBS				sh, (sp), i			(p, i)		sh, (sp), p, i		p							i	5	4	11
NCL - East	McWane - Center	MBR				sh, (sp), i			(p, i)		sh, (sp), p, i					(sh, p)				i	5	4	12
HUENEME PARCEL																							
Wetlands Beach	Hueneme Parcel	HUP							p, i		sh, (sp)	(sp)				(sh, p)			(p)	p, i	6	4	10
SOUTH OF WASTE MANAGEMENT AREA																							
Wetlands Beach	WMU Ditch	DSA		sh, p		sh, (sp), p, i			sh, (sp), **p, i**		v, sh, (sp), p, i	sh, (sp), p	sh, p, i		sh, (sp), p	v, sh, p			(sp, p)	sh, (sp), p, i	10	5	33
Wetlands Beach	WMU Ditch - 05' South	DSB		sh		sh, (sp), p, i			sh, (sp), p, **i**		v, sh, (sp), p, i	sh, (sp), p	p, i		sh, p	v, sh, p				sh, (sp), p, i	9	5	28
Wetlands Beach	WMU Ditch - 15' South	DSC		sh, p		sh, (sp), p, i			sh, (sp), p, i, it		v, sh, (sp), p, i, it	sh, (sp), p	sh, p, i		sh, (sp), p	sh, p			(sp, p)	sh, (sp), p, i, it	10	6	35
Wetlands Beach	WMU Ditch - 30' South	DSD							(p, i)		sh, (sp), p, i								(sp, p)	p, i, it	4	4	11
Wetlands Beach	WMU Ditch - 50' South	DSE							(p, i)		sh, (sp), p, i					(p)			(sp, p)		4	4	9
Wetlands Beach	Wetland - West	WLW																			0	0	0
Wetlands Beach	Wetland - East	WLE									sh, (sp)									it	2	3	3
Wetlands Beach	Beach - Breach	BBR																			0	0	0
Totals by Receptor (Number of Subareas with Risks)																							
California vole			0	0	0	0	0	0	0	0	3	0	0	0	0	4	0	0	0	0	2		
Ornate shrew			0	4	0	8	0	0	3	0	13	5	2	0	6	9	0	0	0	5	9		
Belding's savannah sparrow			0	na	0	8	na	0	4	0	13	6	0	0	2	0	0	na	7	4	7		
Terrestrial plants			0	2	0	4	0	0	12	0	10	4	6	0	4	10	0	0	8	9	10		
Soil invertebrates			na	0	0	6	0	0	12	na	10	0	4	0	0	0	na	na	na	11	5		
Soil invertebrate tissue			na	na	0	na	na	0	1	na	1	0	na	0	na	0	na	na	na	3	3		

Notes:

( ) = risks identified for this receptor are likely acceptable because they are: 1) unlikely, 2) not site-related, or 3) very low (see Section 8 discussion).

EcoSSL = Ecological Soil Screening Levels (from EPA, various years)

EPA = U.S. Environmental Protection Agency

Al = aluminum, Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = chromium, Co = cobalt, Cu = copper, Pb = lead,

Mg = magnesium, Mn = manganese, Hg = mercury, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc

i = soil invertebrate

it = soil invertebrate tissue

na = no benchmark/TRV was available for this analyte/receptor combination

p = terrestrial plants

sh = ornate shrew

sp = Belding's savannah sparrow

v = California vole

TEQ = toxic equivalency quotient

[a] Although aluminum exceeded risk-based concentrations for soil-associated receptors at some locations, risks to were not predicted due to the measured pH range at the Site (7.6 to 8.2) which is well above the EPA limit of 5.5 below which risks may occur.

Risks based on the mean concentration in the subarea and the weight-of-evidence conclusions.

Essential nutrients were excluded from this evaluation.

Risks are for analytes with hazard quotients greater than one that also exceed the background upper tolerance limit, and are based on the following benchmark types:

Plants and invertebrates - effects concentrations derived from the literature (e.g., EPA's EcoSSLs)

Invertebrate tissue - literature-derived lowest observed effect concentration (LOEC)

Birds - literature-derived lowest observed adverse effect level (LOAEL)

Mammals - literature-derived lowest observed adverse effect level (LOAEL)

Hazard Quotient Range

1-2

2-5

5-10

10-25

>25

TABLE 8-7

Weight-of-Evidence Summary for Soil-Associated Receptors at Four Stepouts to the East of the Waste Management Unit in the NCL- East (<8' Elev) Subarea of the Site (Avian Risks Based on No Observed Adverse Effect Level)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

																					Totals by Subarea		
Area	**Subarea**	**Subarea2[a]**	**Al[b]**	**Sb**	**As**	**Ba**	**Be**	**Cd**	**Cr**	**Co**	**Cu**	**Pb**	**Mn**	**Hg**	**Ni**	**Se**	**Ag**	**Tl**	**V**	**Zn**	**Number of Analytes that Fail**	**Maximum Number of Receptors that Fail**	**Total Number of Receptor-Analyte Combinations that Fail**
NCL - East	*NCL - East (< 8' Elev)*			*sh*		*sh, (sp), p, i*			*(sp), p, i*		*sh, (sp), p, i*	*sh, (sp)*	*p, i*		*sh, p*	*sh, p*			*(sp, p)*	*sh, (sp), p, i*	*10*	*4*	*26*
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout		sh, p		v, sh, (sp), p, i	v	(sp)	sh, (sp), **p, i**		v, **sh, (sp)**, p, i	sh, (sp), p	sh, p, i		sh, (sp), p	v, sh, (sp), p			(sp, p)	sh, (sp), p, i	12	5	36
NCL-East	NCL - East (< 8' Elev)	WMU - 2nd Stepout				sh, (sp), p, i			(sp), p, **i**		sh, (sp), p, i	sh, (sp)			sh	(sh, p)			(sp, p)	sh, (sp), p, i	8	4	20
NCL-East	NCL - East (< 8' Elev)	WMU - 3rd Stepout				(sp)			(p, i)		sh, (sp), p, i	(sp)	p		sh	(sh, p)			(sp, p)		8	4	14
NCL-East	NCL - East (< 8' Elev)	WMU - 4th Stepout				(sp)			(p, i)		sh, (sp), p, i	(sp)				(sh, p)			(sp, p)		6	2	10
Totals by Receptor (Number of Subareas with Risks)																							
California vole			0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	6		
Ornate shrew			0	1	0	2	0	0	1	0	4	2	1	0	3	4	0	0	0	2	11		
Belding's savannah sparrow			0	na	0	4	na	1	2	0	4	4	0	0	1	1	0	na	4	2	11		
Terrestrial plants			0	1	0	1	0	0	4	0	3	1	2	0	1	4	0	0	4	2	11		
Soil invertebrates			na	0	0	1	0	0	4	na	3	0	1	0	0	0	na	na	na	2	5		
Soil invertebrate tissue			na	na	0	na	na	0	0	na	0	0	na	0	na	0	na	na	na	0	0		

Notes:

( ) = risks identified for this receptor are likely acceptable because they are: 1) unlikely, 2) not site-related, or 3) very low (see Section 8 discussion).

EcoSSL = Ecological Soil Screening Levels (from EPA, various years)

EPA = U.S. Environmental Protection Agency

Al = aluminum, Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = chromium, Co = cobalt, Cu = copper, Pb = lead,

Mg = magnesium, Mn = manganese, Hg = mercury, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc

i = soil invertebrate

it = soil invertebrate tissue

na = no benchmark/TRV was available for this analyte/receptor combination

p = terrestrial plants

sh = ornate shrew

sp = Belding's savannah sparrow

v = California vole

TEQ = toxic equivalency quotient

italics indicate the risks for the entire NCL - East (<8'Elev) Subarea

[a] The four stepouts to the east of the Waste Management Unit include the following samples:

WMU - 1st Stepout = sample locations NEL-4 through NEL-11

WMU - 2nd Stepout = sample locations NEL-15 through NEL-22

WMU - 3rd Stepout = sample locations NEL-27 and NEL-29 through NEL-34

WMU - 4th Stepout = sample locations NEL-44 through NEL-47

[b] Although aluminum exceeded risk-based concentrations for soil-associated receptors at some locations, risks were not predicted due to the measured pH range at the Site (7.6 to 8.2) which is well above the EPA limit of 5.5 below which risks may occur.

Risks based on the mean concentration in the subarea and the weight-of-evidence conclusions.

Essential nutrients were excluded from this evaluation.

Risks are for analytes with hazard quotients greater than one that also exceed the background upper tolerance limit, and are based on the following benchmark types:

Plants and invertebrates - effects concentrations derived from the literature (e.g., EPA's EcoSSLs)

Invertebrate tissue - literature-derived lowest observed effect concentration (LOEC)

Birds - literature-derived no observed adverse effect level (NOAEL)

Mammals - literature-derived lowest observed adverse effect level (LOAEL)

Hazard Quotient Range

1-2

2-5

5-10

10-25

>25

TABLE 8-8

Weight-of-Evidence Summary for Soil-Associated Receptors at Four Stepouts to the East of the Waste Management Unit in the NCL- East (<8' Elev) Subarea of the Site (Avian Risks Based on Lowest Observed Adverse Effect Level)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

																					Totals by Subarea		
Area	**Subarea**	**Subarea2[a]**	**Al[b]**	**Sb**	**As**	**Ba**	**Be**	**Cd**	**Cr**	**Co**	**Cu**	**Pb**	**Mn**	**Hg**	**Ni**	**Se**	**Ag**	**Tl**	**V**	**Zn**	**Number of Analytes that Fail**	**Maximum Number of Receptors that Fail**	**Total Number of Receptor-Analyte Combinations that Fail**
NCL - East	*NCL - East (< 8' Elev)*			*sh*		*sh, (sp), p, i*			*(sp), p, i*		*sh, (sp), p, i*	*sh, (sp)*	*p, i*		*sh, p*	*sh, p*			*(sp, p)*	*sh, (sp), p, i*	*10*	*4*	*26*
NCL - East	NCL - East (< 8' Elev)	WMU - 1st Stepout		sh, p		v, sh, (sp), p, i	v		sh, (sp), **p, i**		v, **sh**, (sp), p, i	sh, (sp), p	sh, p, i		sh, (sp), p	v, sh, p			(sp, p)	sh, (sp), p, i	11	5	34
NCL-East	NCL - East (< 8' Elev)	WMU - 2nd Stepout				sh, (sp), p, i			(sp), p, **i**		sh, (sp), p, i	sh, (sp)			sh	(sh, p)			(sp, p)	sh, (sp), p, i	8	4	20
NCL-East	NCL - East (< 8' Elev)	WMU - 3rd Stepout				(sp)			(p, i)		sh, (sp), p, i		p		sh	(sh, p)			(sp, p)		6	4	12
NCL-East	NCL - East (< 8' Elev)	WMU - 4th Stepout				(sp)			(p, i)		sh, (sp)	(sp)				(sh, p)			(sp, p)		6	2	10
Totals by Receptor (Number of Subareas with Risks)																							
California vole			0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	6		
Ornate shrew			0	1	0	2	0	0	1	0	4	2	1	0	3	4	0	0	0	2	11		
Belding's savannah sparrow			0	na	0	4	na	1	2	0	4	4	0	0	1	1	0	na	4	2	9		
Terrestrial plants			0	1	0	1	0	0	4	0	3	1	2	0	1	4	0	0	4	2	11		
Soil invertebrates			na	0	0	1	0	0	4	na	3	0	1	0	0	0	na	na	na	2	5		
Soil invertebrate tissue			na	na	0	na	na	0	0	na	0	0	na	0	na	0	na	na	na	0	0		

Notes:

( ) = risks identified for this receptor are likely acceptable because they are: 1) unlikely, 2) not site-related, or 3) very low (see Section 8 discussion).

EcoSSL = Ecological Soil Screening Levels (from EPA, various years)

EPA = U.S. Environmental Protection Agency

Al = aluminum, Sb = antimony, As = arsenic, Ba = barium, Be = beryllium, Cd = cadmium, Cr = chromium, Co = cobalt, Cu = copper, Pb = lead,

Mg = magnesium, Mn = manganese, Hg = mercury, Ni = nickel, Se = selenium, Ag = silver, Tl = thallium, V = vanadium, Zn = zinc

i = soil invertebrate

it = soil invertebrate tissue

na = no benchmark/TRV was available for this analyte/receptor combination

p = terrestrial plants

sh = ornate shrew

sp = Belding's savannah sparrow

v = California vole

TEQ = toxic equivalency quotient

italics indicate the risks for the entire NCL - East (<8'Elev) Subarea

[a] The four stepouts to the east of the Waste Management Unit include the following samples:

WMU - 1st Stepout = sample locations NEL-4 through NEL-11

WMU - 2nd Stepout = sample locations NEL-15 through NEL-22

WMU - 3rd Stepout = sample locations NEL-27 and NEL-29 through NEL-34

WMU - 4th Stepout = sample locations NEL-44 through NEL-47

[b] Although aluminum exceeded risk-based concentrations for soil-associated receptors at some locations, risks were not predicted due to the measured pH range at the Site (7.6 to 8.2) which is well above the EPA limit of 5.5 below which risks may occur.

Risks based on the mean concentration in the subarea and the weight-of-evidence conclusions.

Essential nutrients were excluded from this evaluation.

Risks are for analytes with hazard quotients greater than one that also exceed the background upper tolerance limit, and are based on the following benchmark types:

Plants and invertebrates - effects concentrations derived from the literature (e.g., EPA's EcoSSLs)

Invertebrate tissue - literature-derived lowest observed effect concentration (LOEC)

Birds - literature-derived lowest observed adverse effect level (LOAEL)

Mammals - literature-derived lowest observed adverse effect level (LOAEL)

Hazard Quotient Range

1-2

2-5

5-10

10-25

>25

TABLE 9-1

Risk-Based Concentration Thresholds (mg/kg)

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Sediment RBCs			Soil RBCs					
Analyte	**Benthic Invertebrate**	**Aquatic-Feeding Belding's Savannah Sparrow**	**Western Snowy Plover**	**Terrestrial Plant**	**Soil Invertebrate**	**California Vole**	**Ornate Shrew**	**Terrestrial-Feeding Belding's Savannah Sparrow**	**Soil and Sediment Background UTLs**
Antimony		--	--	5			2.21	--	0.37
Barium	2480		771	500	330		246	246	149
Beryllium	10.3	--	--					--	0.6
Chromium			58.1	1	0.4		78.9	42.9	17
Copper		513	208	70	80	773	16.8	33.0	20.2
Lead			60.7	120	1700		53.4	37.6	14.4
Magnesium	42200	--	--	--	--	--	--	--	8430
Manganese				220	450		700		399
Nickel				38			10.8	73.0	21.2
Selenium		1.12	0.712	0.52		1.85	0.824		0.8
Vanadium			14.4	2	--			22.6	32.5
Zinc		444	306	160	120		239	295	69.7

Notes:

-- = Screening value or TRV not available

= No risk

RBC = risk-based concentration; for birds and mammals, developed by back-calculation of the exposure and risk estimate to obtain a hazard quotient of one (see Appendix H for details)

TRV = toxicity reference value

UTL = upper tolerance limit

Aluminum, arsenic, cadmium, cobalt, silver, thallium, and TCDD TEQs in both soil and sediment presented no risk to ecological receptors; therefore, RBCs are not needed for these analytes.

Mercury in Halaco wastes does not appear to be different than background; therefore, elevated mercury onsite is not likely site-related.

Benthic invertebrate RBC developed from site-specific toxicity tests.

Plant and invertebrate RBCs are represented by the screening values.

Bird and mammal RBCs are based on the lowest observed adverse effect level (LOAEL). LOAEL used for birds because population data indicate risks are unlikely.

TABLE 9-2

Bioavailability-Adjusted Risk-Based Concentration Thresholds (mg/kg) for Wildlife

Baseline Ecological Risk Assessment, Halaco Site, Oxnard, California

	Sediment RBCs Using 100% Bioavailability		Sediment RBCs Using Literature-Based Bioavailability[a]		Soil RBCs Using 100% Bioavailability			Soil RBCs Using Literature-Based Bioavailability[a]			Soil and Sediment Background UTLs
Analyte	**Aquatic-Feeding Belding's Savannah Sparrow**	**Western Snowy Plover**	**Aquatic-Feeding Belding's Savannah Sparrow**	**Western Snowy Plover**	**California Vole**	**Ornate Shrew**	**Terrestrial-Feeding Belding's Savannah Sparrow**	**California Vole**	**Ornate Shrew**	**Terrestrial-Feeding Belding's Savannah Sparrow**	
Antimony	--	--	--	--		2.21	--		2.21	--	0.37
Barium		771		7707		246	246		**2456**	**2467**	149
Chromium		58.1		58.1		78.9	42.9		78.9	42.9	17
Copper	513	208	1438	520	773	16.8	33.0	**2852**	**42.0**	**85.5**	20.2
Lead		60.7		121.5		53.4	37.6		**204**	**76.9**	14.4
Manganese						700			700		399
Nickel						10.8	73.0		**110**	**757**	21.2
Selenium	1.12	0.712	1.85	1.187	1.85	0.824		**2.90**	**1.64**		0.8
Vanadium		14.4		14.4			22.6			22.6	32.5
Zinc	444	306	963	613		239	295		**477**	**628**	69.7

Notes:

-- = TRV not available

= No risk

mg/kg = milligrams per kilogram

RBC = risk-based concentration; developed by back-calculation of the exposure and risk estimate to obtain a hazard quotient of one (see Appendix H for details)

TRV = toxicity reference value

UTL = upper tolerance limit

Aluminum, arsenic, beryllium, cadmium, cobalt, magnesium, silver, thallium, and TCDD TEQs in soil presented no risk to ecological receptors; therefore, clean-up goals are not needed for these analytes.

Mercury in Halaco wastes does not appear to be different than background; therefore, elevated mercury on-site is not likely site-related.

Bird and mammal RBCs are based on the lowest observed adverse effect level (LOAEL). LOAEL used for birds because population data indicate risks are unlikely.

Bold values are cases for which the literature-based bioavailability information was used to re-calculate the RBC.

[a] Literature-based bioavailability values (see Appendix H text for details):

Ba = 10%

Cu = 40%

Pb = 26.2% mammals and 50% birds

Ni = 2.4% soil and 10% diet

Se = 60%

Zn = 50%

Figures

Aerial image © Google Earth, 2007. Annotation by CH2M HILL, 2008.

FIGURE 1-1
Halaco Superfund Site Areas
Halaco Site Remedial Investigation

LEGEND

Site Areas and Sub Areas

Historical OID Alignment

1929 OID

1959 OID

1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

2 ft Contour

10 ft Contour

N

0 200 400

Feet

1 inch = 400 feet

FIGURE 2-1
Halaco Superfund Site
Areas and Subareas
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

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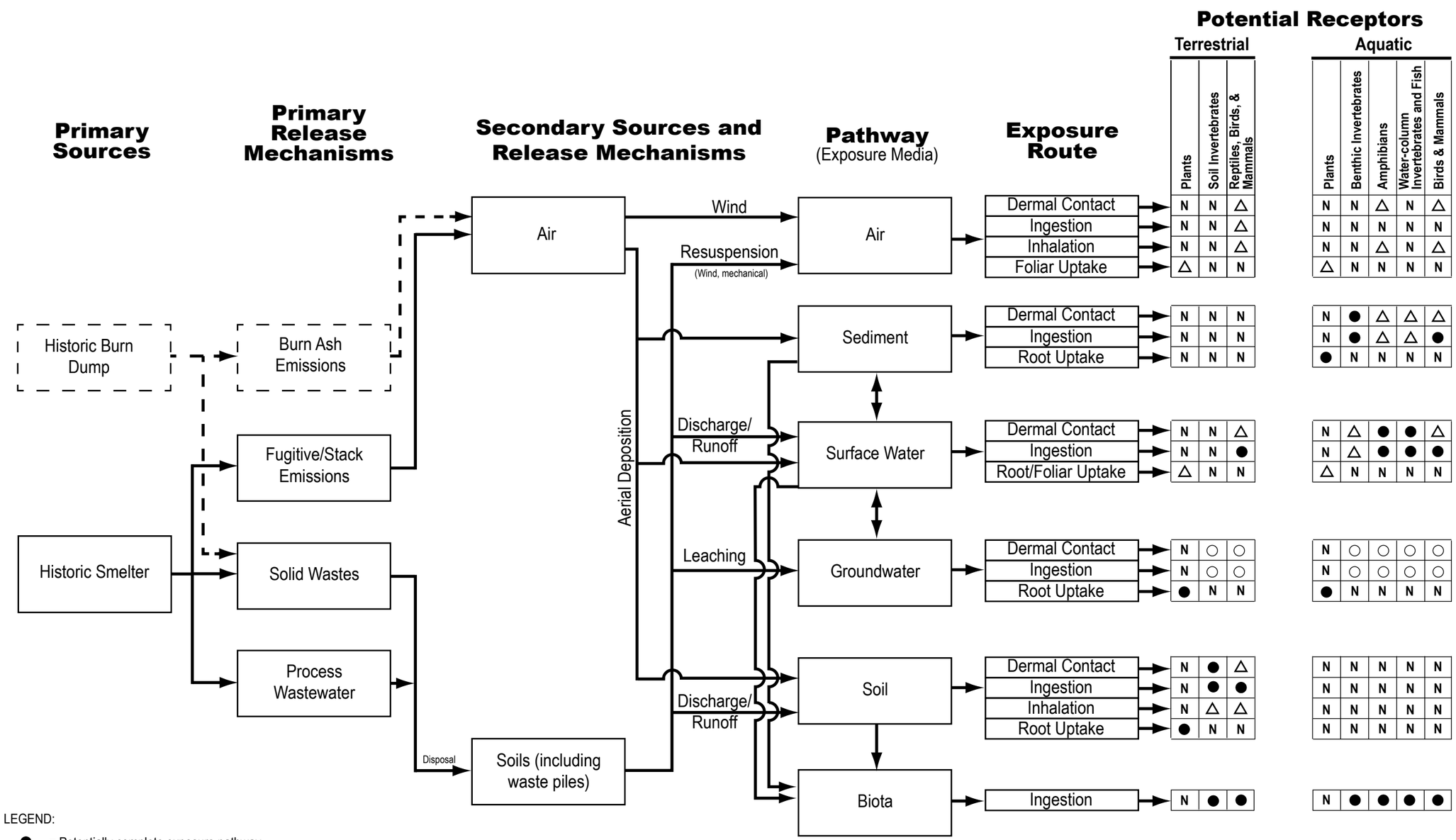

LEGEND:

- ● = Potentially complete exposure pathway
- ○ = Incomplete exposure pathway
- N = Pathway not applicable
- △ = Possibly complete exposure pathway, but likely not significant or insufficient data for analysis in a Screening Level Ecological Risk Assessment

* Data required to evaluate exposure and effects to reptiles are lacking; therefore reptiles were not evaluated. Instead, analyses for birds were assumed to be representative of reptiles.

FIGURE 2-2
Ecological Conceptual Site Model Diagram
Baseline Ecological Risk Assessment
Halaco Site, Oxnard, California

CH2MHILL

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LEGEND

- RI Surface Water Sample Locations
- Ormond Beach Regional Investigation (AMEC 2006)
- Halaco Routine Monitoring
- Integrated Assessment (Weston, 2007)

Ground Elevation Contours, ft msl (AMEC 2006)

- 2 ft Contour
- 10 ft Contour

N

0 300 600
Feet
1 inch = 600 feet

FIGURE 2-3
Surface Water Sampling Locations

HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

LEGEND

2010 and 2011 Remedial Investigation Locations

Matrix	Sample Depth (ft bgs)
Soil	0
Sediment	0
Soil	0,2
Sediment	0,2
Soil	0,0,2
Soil	Deep
Sediment	0,2,4

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

N

0 200 400

Feet

1 inch = 400 feet

FIGURE 2-4
Solid Matrix Sample Locations
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

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LEGEND

2011 Tier 2 ERA Biological Sampling Locations

Aquatic Locations

- Low Metals Concentration
- Medium Metals Concentration
- High Metals Concentration

Terrestrial Locations

- Low Metals Concentration
- Medium Metals Concentration
- High Metals Concentration

Historical OID Alignment

- 1929 OID
- 1959 OID
- 1969 Pond

Ground Elevation Contours (ft msl) (AMEC, 2006)

- 2 ft Contour
- 10 ft Contour

NEL-21* - 2011 location that was sampled from biological tissue at an alternate location from the 2010 sample

N

0 200 400

Feet

1 inch = 400 feet

FIGURE 2-5
Tier 2 Biological Sample Locations
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

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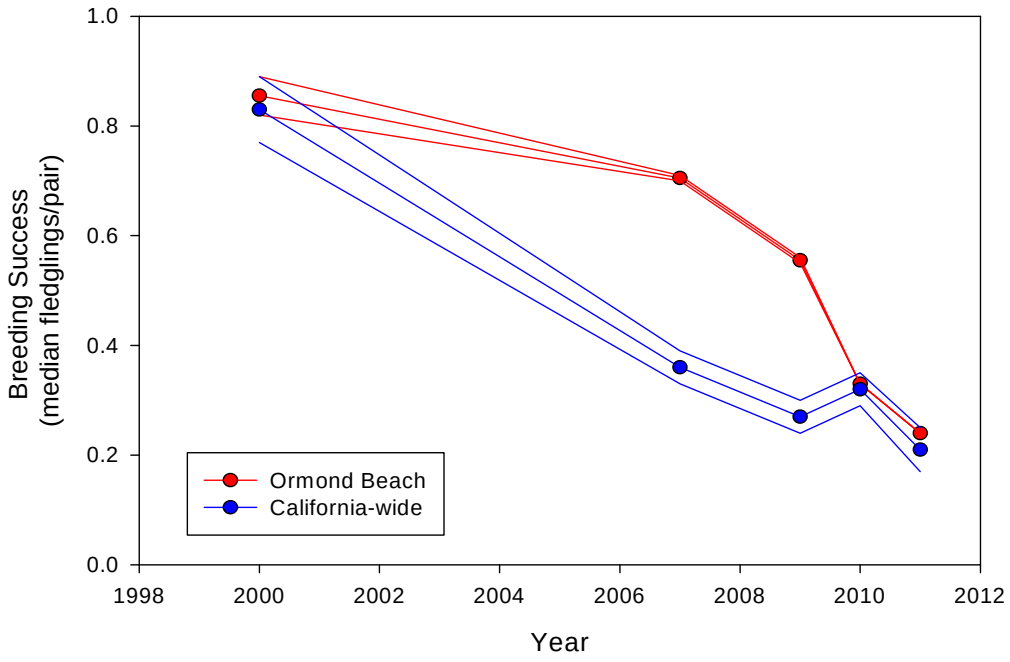
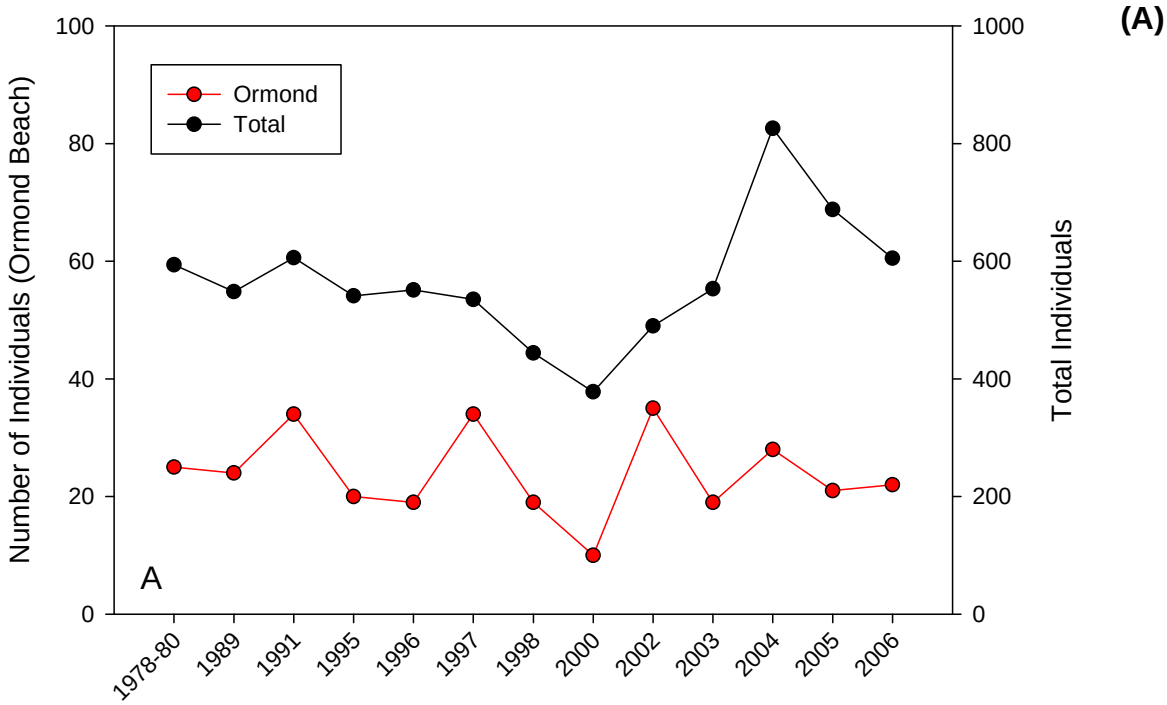
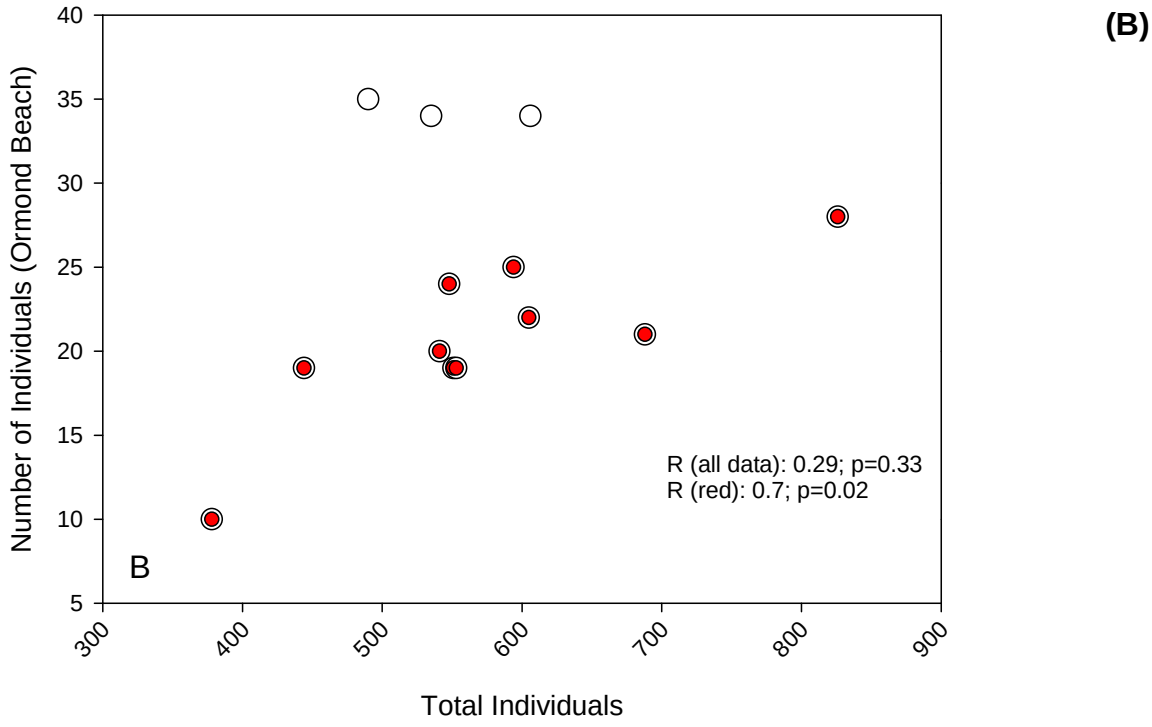


Breeding success (number of fledglings/pair) of California least terns at Ormond Beach as compared to Califonia-wide from 2000 through 2011. Values represent median (range) breeding success.

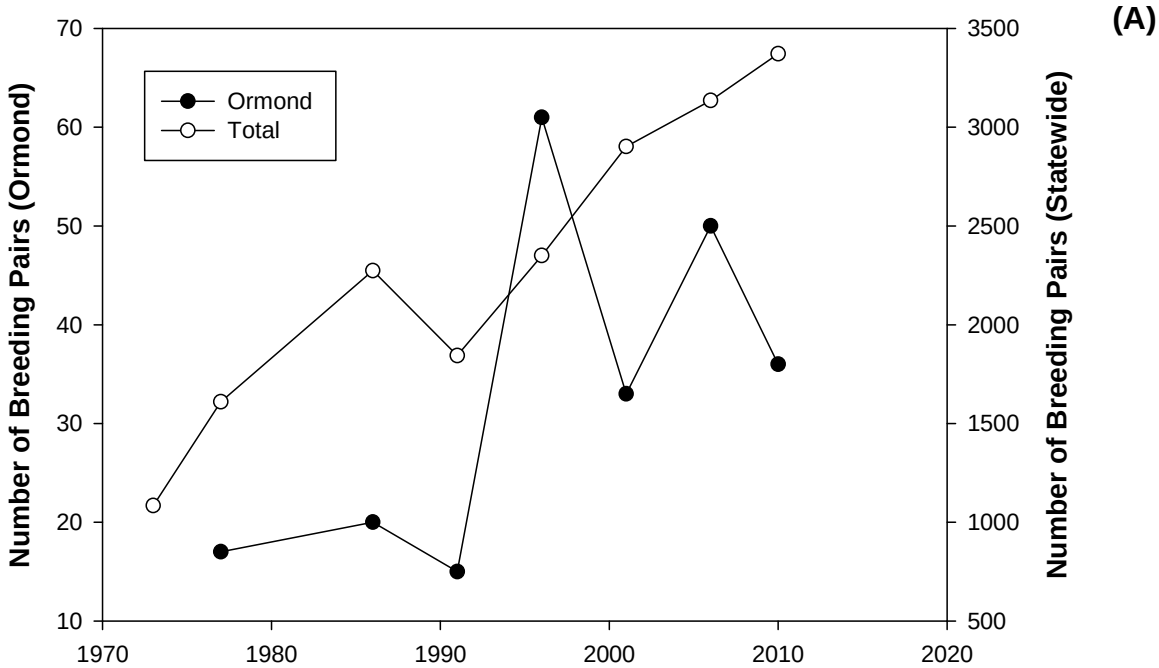
FIGURE 2-6
Breeding Success of California Least Terns at Ormond Beach
Halaco Superfund Site, Oxnard, California

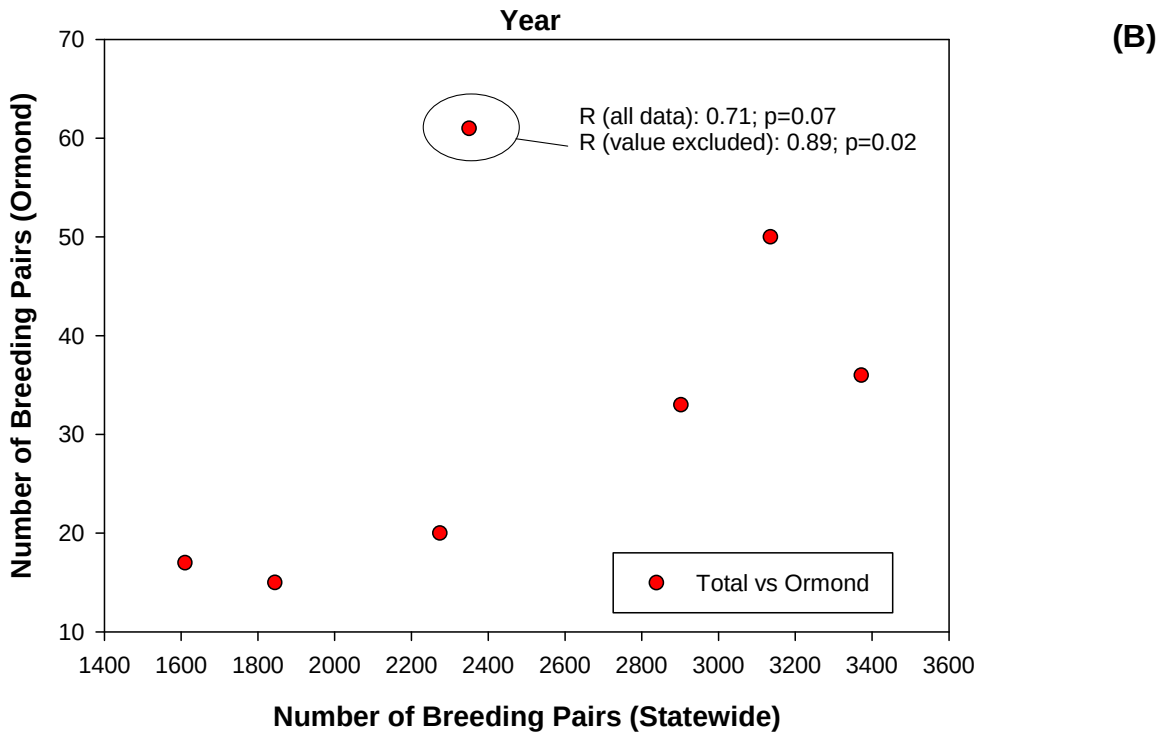




Results of breeding season window surveys of abundance of western snowy plovers at Ormond Beach and total abundance in San Luis Obispo, Santa Barbara, and Ventura Counties. Summary of survey results displaying yearly variation (A), and summary of Ormond Beach results versus total abundance in San Luis Obispo, Santa Barbara, and Ventura Counties (B).

FIGURE 2-7
Breeding Season Abundance of Western Snowy Plovers at Ormond Beach
Halaco Superfund Site, Oxnard, California





Abundance of Belding's savannah sparrow breeding territories at Ormond Beach versus the total number of territories in five Southern California counties between 1973 and 2010. Summary of survey results displaying yearly variation (A), and summary of Ormond Beach results versus total abundance in five Southern California counties (B).

FIGURE 2-8
Abundance of Belding's Savannah Sparrow Breeding Territories at Ormond Beach
Halaco Superfund Site, Oxnard, California

LEGEND

- 0 - No Exceedances for any Receptor or Analyte
- 1 - No Net Exceedances [a]
- 2 - 1 or 2 Net Exceedances
- 3 - 3 to 5 Net Exceedances
- 4 - 6 to 10 Net Exceedances
- 5 - 11 or More Net Exceedances

Historical OID Alignment

- 1929 OID
- 1959
- 1969

Ground Elevation Contours, ft msl (AMEC, 2006)

- 2-foot Contour
- 10-foot Contour

Notes:

[a] Uncertainties due to exceedances based on ND concentration data and/or uncertain benchmarks.

ft msl = feet mean sea level.

RI = Remedial Investigation.

Net Exceedances = Total exceedances minus exceedances due to Non Detect concentration data and/or uncertain benchmarks.

Wildlife risk estimates for barium, copper, lead, nickel, selenium, and zinc use literature-based bioavailability values that are less than 100 percent (see Table 9-2).

N

0 200 400

Feet

1 inch = 400 feet

Figure 9-1
Relative Ecological Risk for Soil/Sediment, Surface
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

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LEGEND

- 0 - No Exceedances for any Receptor or Analyte
- 1 - No Net Exceedances [a]
- 2 - 1 or 2 Net Exceedances
- 3 - 3 to 5 Net Exceedances
- 4 - 6 to 10 Net Exceedances
- 5 - 11 or More Net Exceedances

Historical OID Alignment

- 1929 OID
- 1959
- 1969

Ground Elevation Contours, ft msl (AMEC, 2006)

- 2-foot Contour
- 10-foot Contour

Notes:

[a] Uncertainties due to exceedances based on ND concentration data and/or uncertain benchmarks.

ft msl = feet mean sea level.

RI = Remedial Investigation.

Net Exceedances = Total exceedances minus exceedances due to Non Detect concentration data and/or uncertain benchmarks.

Wildlife risk estimates for barium, copper, lead, nickel, selenium, and zinc use literature-based bioavailability values that are less than 100 percent (see Table 9-2).

N

0 200 400

Feet

1 inch = 400 feet

Figure 9-2
Relative Ecological Risk for Soil/Sediment, 2-foot Depth
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

LEGEND

- 0 - No Exceedances for any Receptor or Analyte
- 1 - No Net Exceedances [a]
- 2 - 1 or 2 Net Exceedances
- 3 - 3 to 5 Net Exceedances
- 4 - 6 to 10 Net Exceedances
- 5 - 11 or More Net Exceedances

Historical OID Alignment

- 1929 OID
- 1959
- 1969

Ground Elevation Contours, ft msl (AMEC, 2006)

- 2-foot Contour
- 10-foot Contour

Notes:

[a] Uncertainties due to exceedances based on ND concentration data and/or uncertain benchmarks.

ft msl = feet mean sea level.

RI = Remedial Investigation.

Net Exceedances = Total exceedances minus exceedances due to Non Detect concentration data and/or uncertain benchmarks.

Wildlife risk estimates for barium, copper, lead, nickel, selenium, and zinc use literature-based bioavailability values that are less than 100 percent (see Table 9-2).

N

0 200 400

Feet

1 inch = 400 feet

Figure 9-3
Relative Ecological Risk for Soil/Sediment, 4-foot Depth
HALACO SITE REMEDIAL INVESTIGATION
OXNARD, CALIFORNIA

Appendix A
Tier 2 Biological Sampling and Analysis Results

Appendix B
Consolidated Data Tables and Lead Concentration Figures

Appendix C
Summary and Analysis of Sediment Bioassays

Appendix D
Summary and Analysis of Bioaccumulation Data

Appendix E
Summary of Literature-Derived Fish Tissue Toxicity Data

Appendix F
Summary of Literature-Derived Invertebrate Tissue Toxicity Data

Appendix G
Evaluation of Pyrethroid and Organophosphate Pesticides in Sediment

Appendix H
Calculation of Risk-Based Concentrations for Wildlife

Appendix I
Sample-by-Sample Comparison of Soil and Sediment Concentrations to Risk-Based Concentrations for Ecological Receptors