FINAL

Conda/Woodall Mountain Mine Superfund Site Remedial Investigation/Feasibility Study

Site-Specific Ecological Risk Assessment Report

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LIST OF ACRONYMS

95UCL	95 Percent Upper Confidence Limit
AET	Apparent Effects Threshold
AMSL	Above Mean Sea Level
AWERA	Area-Wide Ecological Risk Assessment
AWQC	Ambient Water Quality Criteria
AWWQRP	Arid West Water Quality Research Project
BCGs	Biota Concentration Guides
BLM	Bureau of Land Management
BPF	Baseline Problem Formulation
BW	Body Weight
BW/day	Body Weight per Day
C	Concentration
$CaCO_3$	Calcium Carbonate
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cfs	cubic feet per second
COPC	Chemical of Potential Concern
CWA	Clean Water Act
DEQ	Department of Environmental Quality
DOI	United States Department of Interior
DU	Decision Unit
ECOPC	Ecological Chemical of Potential Concern
ECOC	Ecological Chemical of Concern
EcoSSL	Ecological Soil Screening Level
ECSM	Ecological Conceptual Site Model
EPC	Exposure Point Concentration
EPT	Ephemerotera, Plecoptera and Tricoptera
ERA	Ecological Risk Assessment
ERED	Environmental Residue Effects Database
ER-L	Effects Range-Low
ER-M	Effects Range-Medium
EU	Exposure Unit

ACRONYMS (continued)

FETAX	Frog Embryo Teratogenesis Assay Xenopus
FS	Feasibility Study
FSPS	Field-Scale Pilot Study
ft	Feet
GIS	Geographic Information System
HQ	Hazard Quotient
IDAPA	Idaho Administrative Procedures Act
IDEQ	State of Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IFWIS	Idaho Fish and Wildlife Information System
IR	Ingestion Rate
IRQ	Incremental Risk Quotient
ISM	Incremental Sampling Methodology
ITRC	Interstate Technology and Regulatory Council
kg	kilograms
kg/day	kilograms per day
LANL	Los Alamos National Laboratory
LOAEL	Lowest-Observed Adverse Effects Level
LOEs	Lines of Evidence
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/kg-BW/day	milligrams per kilogram body weight per day
mg/kg dw	milligrams per kilogram dry weight
mg/L	milligrams per liter
mm	millimeters
MTBA	Migratory Bird Treaty Act
NAWQC	National Ambient Water Quality Criteria
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observed Adverse Effects Level
NOEC	No Observed Effects Concentration

ACRONYMS (continued)

NPS	National Park Service
NTCRA	Non-Time-Critical Removal Action
NWGAP	Northwest Regional Gap Analysis Project
NWI	National Wetlands Inventory
ODA	Overburden Disposal Area
pCi/g	Picocuries per gram
pCi/L	Picocuries per liter
PEC	Probable Effects Concentration
PRSC	Post-Removal Site Control
RAATM	Risk Assessment Approach Technical Memorandum
RBP	Rapid Bioassessment Program
RI COPCs	Remedial Investigation Chemicals of Potential Concern
RI/FS	Remedial Investigation/ Feasibility Study
RG	Remediation Goal
RME	Reasonable Maximum Exposure
RMM	Residual Mining Materials
SLERA	Screening level Ecological Risk Assessment
SMI	Stream Macroinvertebrate
SQG	Sediment Quality Guideline
SQuiRTS	Screening Quick Reference Tables
SSERA	Site-Specific Ecological Risk Assessment
SUF	Site Use Factor
T/E	Threatened and Endangered
TEC	Threshold Effect Concentration
TIR	Total Ionizing Radiation
TRV	Toxicity Reference Value
TSMD	Tri-State Mining District
UBR	Upper Blackfoot River
UCL	Upper Confidence Limit
UET	Upper Effects Threshold
ug/L	micrograms per liter

ACRONYMS (continued)

USACHPPM	US Army Center for Health Promotion and Preventive Medicine
USDA	US Department of Agriculture
USDOE	US Department of Energy
USEPA	US Environmental Protection Agency
USFS	USDA Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WRCC	Western Regional Climate Center
YCT	Yellowstone Cutthroat Trout

1.0 INTRODUCTION

This report presents the Site-Specific Ecological Risk Assessment (SSERA), conducted by the J.R. Simplot Company (Simplot) as part of the Remedial Investigation (RI) for the former Conda/Woodall Mountain Phosphate Mine (Conda Mine or Site). The Conda Mine is located approximately 8 miles northeast of Soda Springs, in Caribou County, Idaho (Figure 1.0-1).

Simplot voluntarily entered into an Administrative Order on Consent with the Idaho Department of Environmental Quality (IDEQ), US Environmental Protection Agency (USEPA), and the US Department of Interior (DOI) Bureau of Land Management (BLM), to conduct an RI and assess risks to human health and the environment, as well as conduct a Feasibility Study (FS). Pursuant to a July 17, 2000 Memorandum of Understanding concerning contamination from the phosphate mining operations in southeastern Idaho, IDEQ is the "Lead Agency," with USEPA implementing the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The BLM, US Fish and Wildlife Service (USFWS), and the Shoshone-Bannock Tribes (the Tribes) have elected to participate as "Support Agencies." Hereafter, the IDEQ, USEPA, BLM, USFWS, and the Tribes are collectively referred to as the Agencies.

Historical mining activities at the Conda Mine resulted in the release of selenium and other metals/metalloids,[1] also referred to as Chemicals of Potential Concern (COPCs), at levels posing potential adverse effects to ecological receptors. This SSERA evaluates the likelihood that adverse ecological effects occur, using USEPA's eight-step Ecological Risk Assessment (ERA) process (USEPA 1997). The eight steps are:

- Step 1: Screening-Level Problem Formulation;
- Step 2: Screening-Level Exposure Estimate and Risk Calculation;
- Step 3: Baseline Risk Assessment Problem Formulation;
- Step 4: Study Design and Data Quality Objectives Process;
- Step 5: Field Verification of Sampling Design;
- Step 6: Site Investigation and Analysis Phase;
- Step 7: Risk Characterization; and
- Step 8: Risk Management.

[1] The other significant metals/metalloids of concern, in addition to selenium, include: cadmium, chromium, vanadium and zinc.

A flow chart depicting the USEPA ERA process is shown in Figure 1.0-2. The Final Site-Specific Ecological Risk Assessment Baseline Problem Formulation (BPF), approved by the Agencies in October 2012 (Formation 2012a) describes the structure, methods, and underlying assumptions for the SSERA.

1.1 Purpose and Scope

The purpose of the SSERA is to evaluate both current and potential future risks to ecological receptors, in support of the development of Remediation Goals (RGs), and the analysis and selection of remedial action alternatives to manage risks. Extensive information and data on the physical, ecological, and contaminant characteristics of the Site were evaluated and presented in the SSERA BPF (Formation 2012a). Therefore, the SSERA BPF document completed Steps 1 through 5 of the USEPA process. Risk Analysis (part of Step 6) and Risk Characterization (Step 7) are provided in this document and are intended to aid risk managers to collectively make scientifically-defensible risk management decisions (Step 8) as part of the RI/FS process.

1.2 Document Organization

The SSERA is presented in seven sections. Section 2 provides a presentation of the BPF data which includes the Ecological Conceptual Site Model (ECSM) and the selection of the Ecological Chemicals of Potential Concern (ECOPCs). The Risk Analysis and Risk Characterization are provided in Section 3 for Aquatic Receptors and in Section 4 for Terrestrial and Riparian Receptors, respectively. The Uncertainty Analysis is presented in Section 5. Conclusions are provided in Section 6 and cited references are listed in Section 7.

2.0 BASELINE PROBLEM FORMULATION

The following Sub-Sections summarize the general Site information relevant to the SSERA, the ECSM, and the findings of the Screening Level Ecological Risk Assessment (SLERA) such as the identification of ECOPCs, and the identification of the assessment and measurement endpoints for the risk characterization. The Final SSERA BPF (Formation 2012a) and the Revised Draft Final RI Report (Formation 2016a) provide additional detail on Site background, sources for the COPCs, as well as the extent and transport of these COPCs in the environment.

2.1 Summary of Site Information

As previously described, the Conda Mine is located approximately 8 miles northeast of Soda Springs, in Caribou County, Idaho, on the east side of State Highway 34 (Figure 1.0-1). The Site evaluated in the SSERA includes the mined portion at the Site (Mined Area) and the area between the Mined Area boundary and the Site boundary (Non-Mined Area). In addition, areas adjacent to the Site (Offsite Areas), potentially affected by transport of mining-related chemicals were also evaluated.

2.1.1 Setting and Land Ownership

Elevations range from approximately 6,200 feet (ft) above mean sea level (AMSL) at the Former Town Site to approximately 7,700 ft AMSL on Woodall Mountain. The Mined Area consists of approximately 3,033 acres owned by Simplot, and 1,620 acres of Federal lands managed by the BLM ("BLM lands"). Property ownership in the Non-Mined Area consists of approximately 3,998 acres of Simplot lands, 4,834 acres of lands owned by other private parties, 1,470 acres of BLM lands, 95 acres of federal lands managed by the US Department of Agriculture (USDA) Forest Service (USFS), and 0.5 acres of state land (Figure 2.1-1).[2] Mining operations left residual mining materials (RMM)[3] (Figure 2.1-2) containing naturally elevated selenium and other COPCs in the Mined Area.

During the later years of mining and since mining ceased, Simplot reclaimed approximately 580 acres of the disturbed lands. Reclamation consisted of: (1) reshaping angle-of-repose overburden piles; (2) placing topsoil whenever feasible or roughening the surface to improve conditions for plant growth); (3) seeding the area with a mix of grasses, alfalfa and clover; and

[2] Ownership records are current and are based on Caribou County Geographic Information Systems (GIS) data from 2009, supplemented with more current Simplot records including a 2012 land transaction with Monsanto and a 2015 transaction with the Jouglard and Dredge families. In some cases, on-the-ground surveys have been used to improve ownership boundary data from Caribou County.

[3] Waste rock is the rock that was removed during underground mining to access ore. Mill tailings are the solid byproduct (i.e., finely milled host rock material) of the beneficiation process (e.g., milling). The tailings material is what remains after the economically valuable ore has already been extracted. All of these materials contain the seleniferous Waste Shale and Mudstones.

(4) fertilizing the area with inorganic fertilizers. Reclamation activities were halted in the late 1990s and some unreclaimed piles remain on the Site. In addition, Simplot regraded and constructed Dinwoody Formation soil covers over an area of 147 acres in the Pedro Creek Sub-Basin (Figure 2.1-2). A pile was regraded to facilitate the construction of a Plant Selenium Uptake Field-Scale Pilot Study (FSPS) under the RI, and another pile was re-graded as part of a Non-Time-Critical Removal Action (NTCRA). The NTCRA was performed under a Settlement Agreement/Consent Order (SA/CO) (IDEQ/EPA/BLM 2012). Both the NTCRA and FSPS piles were seeded with low-selenium-accumulating grass species.

2.1.2 Climate

The climate in the area is dominated by cool and relatively dry weather, with precipitation of approximately 21 inches annually (Western Regional Climate Center [WRCC] 2012). Total snowfall averages about 110 inches each year (WRCC 2012). The snow cover typically remains on the ground from November to March. Summer temperatures are mild, normally ranging from 42 to 80 degrees Fahrenheit, with the highest temperatures occurring in July. Winter temperatures normally range from 9 to 40 degrees Fahrenheit, while temperatures in spring and fall months range from 16 to 72 and 9 to 70 degrees Fahrenheit, respectively.

2.1.3 Ecological/Biological Setting

The general ecological/biological setting summarized below is based on field observations performed during studies at the Site (Formation Environmental [Formation] 2010; MFG 2003a, 2003b, 2004; NewFields 2008a, 2008b, 2009a, 2009b) and is supplemented with information from regional investigations (BLM 2009a, BLM/USFS 2007, USFS/BLM 2005, BLM/USFS 2002, Idaho Department of Fish and Game [IDFG] 2010a, IDFG 2010b, Kuck 2003, Maxim Technologies, Inc. [Maxim] 2004a, Maxim 2004b, Maxim 2002a, Maxim 2002b, NewFields 2005, Skorupa et al. 2002, Tetra Tech EM, Inc. [TTEMI] 2002, USFS 2003, where applicable). Table 2.1-1 provides a summary of potential aquatic and terrestrial species which may occur in the area, as compiled from regional documents.[4]

2.1.3.1 Aquatic Setting

A number of local drainages exist at the Site. Drainages along the eastern and northern portions of the Site flow into the Upper Blackfoot River Basin, and drainages along the western and southern portions flow into the Bear River Basin (Figure 2.1-3). The upper Blackfoot River (UBR) flows into the Blackfoot River Reservoir located approximately 10 miles northwest of the Site. The UBR from its headwaters area (approximately 15 miles upstream [east] of the Site) to the Blackfoot Reservoir is identified as impaired under Clean Water Act (CWA) Section 303(d),

[4] Not all of the potential species presented are known to occur at the Site, nor is the list in the table all-inclusive.

based on concentrations of selenium, sediment, dissolved oxygen, and high temperatures (IDEQ 2011).

The southwestern and southern portions of the Site consist of much smaller drainages than those comprising the northern and eastern portions of the Site. The southwestern and southern drainages are generally dry, but when they do carry flow, it is lost to infiltration before leaving the Mined Area. The local drainages with intermittent flow include Camp G Creek, Pedro Creek and State Land Creek (Figure 2.1-3). Flow in the upper reaches is often lost to the subsurface and then resurfaces downstream. The headwaters of the intermittent stream drainages are located at elevations between 6,800 and 7,200 ft.

Camp G Creek, Pedro Creek and State Land Creek do not have any special state or federal designations that significantly restrict their use. The USFS did not note these drainages to be eligible for designation as Wild and Scenic Rivers (USFS and National Park Service [NPS] 1998). State Land Creek is listed as impaired under the CWA 303(d), based on selenium and sediment from the headwaters on Woodall Mountain to the confluence with the UBR to the northeast, a distance of approximately 9 miles (IDEQ 2011). The drainages and ponds at the Site are subject to IDEQ's water quality criteria (standards) for designated cold-water biota use.

Other waterbodies include:

- Features containing water year round such as the New Tailings Pond (utilized as a water reservoir for the ore-slurry pipeline), the Hoorah Hollow Pond, the Pit Lake, the FSPS Sedimentation Basin, livestock watering pond PCP-2, and the NTCRA NES-5 Seep Collection Pond.

- Features containing seasonal runoff such as the NTCRA sedimentation ponds, pooling areas for use in livestock watering, and other pooling areas throughout the Site.

The Blackfoot River from its headwaters area (approximately 15 miles upstream [east] of the Site) to the Blackfoot Reservoir is identified as impaired under CWA Section 303(d), based on concentrations of selenium, sediment, dissolved oxygen, and high temperatures (IDEQ 2014). For selenium, the Blackfoot River is in Category 5 which is the list of impaired water bodies under the Clean Water Act Section 303(d). For sediment, the Blackfoot River is in Category 4(a) waters not supporting one or more beneficial uses but a Total Maximum Daily Load (TMDL) is completed and approved by USEPA; for temperature/dissolved oxygen it will be moved to Category 4(a) in the 2014 integrated report since a temperature TMDL has been approved by USEPA.

Site stream surveys were performed using USEPA's Rapid Bioassessment Program (RBP) scoring system (Barbour et al. 1999). The benthic macroinvertebrate community was evaluated and a Stream Macroinvertebrate Index (SMI) was calculated for each stream in accordance with Jessup and Gerritsen (2000). All locations were determined to have an SMI score recorded as

"minimum threshold." The observed low SMI scores are a direct effect of relatively low abundances found in the samples, and a complete lack of one, two or all three Ephemeroptera, Plecoptera and Trichoptera (EPT) taxa.

Physical habitat, quantity and quality of the above-mentioned drainages are limited, primarily due to the low flow regimes and grazing effects. Headwater areas tend to be ephemeral or intermittent, and viable habitat to support a fish population is limited. Habitat quality during late summer and early fall diminishes even further due to reductions in flow. Fish can be present in State Land, Pedro, and Camp G Creeks, near their confluences with the UBR. Typical fish species in the creeks consist of speckled dace (*Rhinichthys osculus*) and redside shiners (*Richardsonius balteatus*), with some sculpin (*Cottus* sp.) and suckers (*Catostomus* sp.). Table 2.1-2 summarizes the species and size of fish caught at the Site. While no trout were collected, presence of cold water species, such as cottids and cyprinids, are consistent with those species observed with trout in other regional streams. Habitat and temperature, among others, may be limiting factors for salmonid species in these streams. No historical data were found reporting the presence of Yellowstone cutthroat trout (YCT) (*Oncorhynchus clarkii bouvieri*) in State Land, Pedro, or Camp G Creeks, although YCT are present in the UBR downgradient of the Site.

Amphibian species identified at the Site include tiger salamander (*Ambystoma tigrinum*) and boreal chorus frog (*Pseudacris maculata*).

2.1.3.2 Terrestrial Setting

Vegetation Communities – The vegetation community at Conda is predominantly comprised of conifer-aspen, mountain brush, and sagebrush-grass communities, with areas of agricultural use. Figure 2.1-4 depicts the vegetation cover types at the Site; the vegetation map is based on field observations and data compiled by the US Geological Survey (USGS) Northwest Regional Gap Analysis Project (NWGAP) (USGS NWGAP 2009).

Higher and mid-elevation sites at Conda are represented by conifers (e.g., Douglas-fir [*Pseudotsuga menziesii*]), Rocky Mountain maple *(Acer glabrum)*, and aspen *(Populus tremuloides)*, with an understory of sticky geranium *(Geranium viscossimum)*, silver lupine *(Lupinus argenteus)*, common snowberry *(Symphoricarpos alba)*, Indian paintbrush *(Castilleja miniata)*, and Kentucky bluegrass *(Poa pratensis)*. Forest openings are dominated by a mixed shrub component that includes species such as common snowberry *(Symphoricarpos alba)* and antelope bitterbrush *(Purshia tridentata)* with an understory consisting of yarrow *(Achillea millefolium)*, bluebunch wheatgrass *(Agropyron spicatum)*, and Idaho fescue *(Festuca idahoensis)*. The lower elevation areas are typified by mixed shrub communities such as mountain big sagebrush *(Artemisia tridentata)* and grassland species such as bluebunch wheatgrass (*Pseudoroegnaria spicata)*, smooth brome *(Bromus inermis)*, and thickspike wheatgrass *(Elymus lanceolatus)*. Forbs commonly found in this cover type include yarrow *(Achillea millefolium)* and leafy aster *(Aster foliaceus)*.

Riparian Areas Surrounding Intermittently Flowing Drainages – State Land Creek, Pedro Creek, and Camp G Creek riparian areas are dominated by willows (*Salix* sp.), sedges and rushes (*Carex* sp.*, Juncus* sp.*, Eleocharis* sp.), cinquefoil (*Potentilla* sp.), and wheatgrasses (e.g., *Elymus* sp.*, Agropyron* sp.). Figure 2.1-5 shows wetlands in the area, as included on the National Wetlands Inventory (NWI) coverage (USFWS 2009a; with classifications according to Cowardin et al. 1979). According to NWI coverage, freshwater wetland resources in the Study Area include emergent wetlands, forested/shrub wetlands, and ponds. The wetlands in the Study Area range from permanently to intermittently flooded. The emergent wetlands (code PEM) within the watershed are generally classified as palustrine emergent wetlands, which include marshy areas with emergent vegetation as well as wet meadows. The forested/shrub wetlands (code PSS1) are classified as palustrine scrub-shrub wetlands, with deciduous, woody vegetation less than 6 meters tall. The freshwater ponds (code PUB) in the watershed are small, shallow ponds that are either isolated or associated with creeks. Many of these ponds are man-created, through the use of dikes, impoundments or excavations.

Terrestrial Wildlife and Birds – Potential mammal species include bats, lagomorphs (rabbits), rodents, carnivores and ungulates (Table 2.1-1). Rodent species that may be found in the area include the meadow vole (*Microtus pennsylvanicus*), long-tailed vole (*Microtus longicaudus*), southern red-backed vole (*Clethrionomys gapperi*), montane vole (*Microtus montanus*), deer mouse (*Peromyscus maniculatus*), chipmunk (*Tamias* spp.), pine squirrel (*Tamiasciurus hudsonicus*), yellow-bellied marmot (*Marmota flaviventris*), porcupine (*Erithizon dorsatum*), and northern flying squirrel (*Glaucomys abrinus*). Lagomorphs are primarily represented by Nuttall's cottontail (*Sylvilagus nuttalli*) and jackrabbit (*Lepus* spp.). During small mammal sampling efforts in August 2009, 100 individuals were captured from 26 locations at the Site. The species included deer mouse, white-footed mouse, meadow vole, chipmunk, ermine (*Mustela erminea*), prairie vole (*Microtus ochrogaster*), red-backed vole, and shrew (*Sorex* sp.). During a small mammal sampling effort in September of 2015, 371 mammals were captured representing 5 species. The majority of species were deer mice (*Peromyscus maniculatus*). Additional species captured were the long-tailed vole (*Microtus longicaudus*), Meadow vole (*Microtus pennsylvanicus*), short-tailed weasel (*Mustela ermine*), and the masked shrew (*Sorex cinereus*).

Carnivores potentially inhabiting the area include black bear (*Ursus americanus*), mountain lion (*Felis concolor*), bobcat (*Lynx rufus*), striped skunk (*Mephitis mephitis*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), grey wolf (*Canis lupus*), badger (*Taxidea taxus*), marten (*Martes americana*), long-tailed weasel (*Mustela frenata*), and ermine. Ungulates frequenting the area, primarily during spring through fall, include mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), and moose (*Alces alces*), as cited in regional documents.

Several species of birds may occur in or near the area, including raptors, upland gamebirds, passerines, waterfowl, and shorebirds, as cited in regional documents. Raptors that may use the general area for hunting and/or nesting include the bald eagle (*Haliaeetus leucocephalus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsonii*), northern goshawk (*Accipiter gentilis*), Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus cyaneus*),

American kestrel (*Falco sparverius*), boreal owl (*Aegolius funereus*), great horned owl (*Bubo virginianus*), and great gray owl (*Strix nebulosa*). With the exception of northern harriers, these raptor species may be expected to nest in aspen or conifer stands. Northern harriers prefer to nest and hunt in grassland habitat near meadows and marshes.

Game birds which may be present in the area are: Hungarian partridges (*Perdix perdix*), chukar partridges (*Alectoris chukar*), blue grouse (*Dendragapus obscurus*), and ruffed grouse (*Bonasa umbellus*), as cited in regional documents. Blue grouse and ruffed grouse typically are found in dense conifer and aspen stands.

Based on regional documents, additional bird species that might be present in the area are: hairy woodpecker (*Picoides villosus*), American robin (*Turdus migratorius*), tree swallow (*Tachycineta bicolor*), western wood-pewee (*Contopus sordidulus*), house wren (*Troglodytes aedon*), song sparrow (*Melospiza meoldia*), gray-headed junco (*Junco hyemalis*), and chipping sparrow (*Spizella passerina*). A variety of additional resident and migratory bird species, including passerines, shorebirds, and waterfowl are expected to occur within the region, such as tanagers, warblers, sparrows, swallows, wrens, hummingbirds, curlews, killdeer, thrushes, flycatchers, ducks, grebes, jays, teal, among others (USFS 2003). Table 2.1-1 identifies bird species currently included on the Migratory Bird Treaty Act (MBTA) list (USFWS 2012a).

Potential reptiles in the area include rubber boa (*Charina bottae*) and western terrestrial garter snake (*Thamnophis elegans*).

2.1.3.3 Special Status Species

Table 2.1-3 provides a current summary of threatened and endangered (T/E) and special-status species that are potentially present in the region. The table summarizes information provided via correspondence with USFWS, USFS, IDFG, (including Idaho Fish and Wildlife Information System [IFWIS]), and BLM (USFWS 2009b, USFS 2009, USFS 2010, BLM 2009b, IDFG 2009, IDFG 2010a, IDFG 2010b) as well as information obtained from literature sources (BLM 2010, Idaho Administrative Procedures Act [IDAPA] 2009, IDAPA 2011, USFS 2011, USFWS 2011).

Simplot communicated with USFWS in June 2009 seeking feedback on which federally-listed T/E species they expect could occur at the Site and should be specifically included in the SSERA (USFWS 2009c). USFWS responded in 2009 that the only listed species that occurs in the vicinity of the Conda Mine is Canada lynx (*Lynx canadensis*), which is listed as threatened. A publication from the Idaho Fish and Wildlife Office of USFWS (dated August 2011) indicates that the following species are currently federally-listed for Caribou County: wolverine (candidate; *Gulo gulo*), greater sage grouse (candidate; *Centrocercus urophasiunus*), Canada lynx (threatened), and whitebark pine (candidate; *Pinus albicaulis*) (USFWS 2011) (Table 2.1-3). The USFWS is also responsible for the protection of migratory bird species through the MBTA.

IDFG lists several state-listed T/E species in IDAPA 13.01.06 (IDAPA 2009, 2011) (Table 2.1-3). Although the bald eagle was listed as threatened in IDAPA (2009), it was recommended by IDFG for delisting (IDFG 2009) and is now listed as a protected non-game species in IDAPA (2011). A letter was sent to IDFG in 2009 seeking feedback on which T/E species they expect could occur at the Site and should be specifically included in the SSERA; verbal response in 2010 indicated that a request should be submitted to IFWIS to inquire about known at-risk species occurrences in the project area (IDFG 2010a). Information from IFWIS was received in 2010 and historical occurrences of Federally-listed and other special-status species within two miles of the project area were identified (IDFG 2010b), as summarized on Table 2.1-3 and Figure 2.1-6. There have been occurrences of sage grouse, Canada lynx, bald eagle, trumpeter swan (*Cygnus buccinator*), long-billed curlew (*Numenius americanus*), merlin (*Falco columbarius*), Bear lake springsnail (*Pyrgulopsis pilsbryana*), and hoary willow (*Salix candida*) (Table 2.1-3, Figure 2.1-6) within two miles of the Site. The bald eagle and the hoary willow (*Salix candida*) were not encountered within the Site boundary. Of these special-status species, only the sage grouse and Canada lynx are federally-listed species. Although the bald eagle is not currently federally-listed, it is protected under the Bald and Golden Eagle Protection Act.

A letter was sent to USFS on October 21, 2009 seeking feedback on which T/E species they expect could occur on USFS lands within the Site and should be specifically included in the SSERA. USFS also provided feedback on other biological resources of concern (USFS 2009). USFS (2009) indicated that there is potential habitat for Canada lynx (listed as threatened) and grey wolf (currently de-listed). Other sensitive and management indicator species with potential habitat in the Study Area were also listed (USFS 2009) (Table 2.1-3). Trail Canyon Creek, an intermittent channel within the Bear River/Great Basin watershed, is specifically in a USFS Study Area, which also includes the Snake River watershed (USFS 2009). The USFS land within the Site, located in the southeast corner within Trail Canyon, is classified as Critical Winter Range (USFS 2009). Riparian, wetlands, sagebrush and aspen are important habitats for birds protected under the MBTA (USFS 2009). No habitat suitable for sensitive plants currently listed for the Caribou National Forest or other rare plants are known or suspected to occur on USFS land within the Site (USFS 2009). The Caribou National Forest was also contacted to verify the fish species status information (USFS 2010), as requested in USFS (2009). The USFS biologist verified that the Snake River fine-spotted and Bonneville cutthroat trout can be lumped and referred to as Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*; USFS sensitive species) and that the leatherside chub (*Lepidomeda copei*) is a USFS sensitive species for the area as well (USFS 2010). Neither fish species were seen at the Site during aquatic sampling in 2009 (Table 2.1-2). Table 2.1-3 also includes the latest information regarding special-status species for the Caribou National Forest (USFS 2011).

An email was sent to BLM on October 29, 2009 seeking feedback on which BLM special-status species should be included in the SSERA BPF. The response email included an attachment titled “Idaho BLM Special Status Animal Species For Districts and Field Offices” (no date) (BLM 2009b). Type 1 (Rangewide / Globally Imperiled Species), Type 2 (Regional / State Imperiled Species), Type 3 (Regional / State Imperiled Species), and Type 4 (Peripheral Species in Idaho)

species for the Pocatello Field Office were added to Table 2.1-3 based on BLM (2009b). The email did not indicate which species were expected to occur specifically on BLM lands at the Site. Table 2.1-3 was also updated to include more current information available in the BLM Proposed Resource Management Plan for the Pocatello Field Office (BLM 2010).

In summary, three federally-listed T/E species have been identified for Caribou County (Canada lynx, wolverine, and whitebark pine), and these species will be evaluated further in the SSERA. The greater sage-grouse was removed as a potential T/E species in September 2015; however, information about this species is also provided below.

- **Canada lynx –** The Canada lynx is listed as a threatened species in the U.S. due to its limited required habitat and prey supply. The Canada lynx prefers moist boreal forests in cold areas with deep snow and high-density populations of snowshoe hares. They inhabit forests with boreal features (conifer trees) along the Rocky Mountain ranges in the west. In mountainous areas, lynx use a matrix habitat consisting of hardwoods, dry forest, and low hare densities for traveling between patches of boreal forest (USFWS 2012b). In Idaho, the Canada lynx inhabits montane and subalpine coniferous forests typically above 4,000 ft (McKelvey et al. 2000), and this species needs early successional forests for foraging, and mature forests for denning (IDFG 1997). Although they are known or believed to occur in Caribou County, there is no designated critical habitat for the Canada lynx within Caribou County. The nearest designated critical habitat is in Lincoln County in southwestern Wyoming (USFWS 2009d). Information from IDFG 2010b) includes two historical occurrences for Canada lynx near the Site – a 1947 sighting and 1960 sighting – both with poor location information (within 5 kilometer of point on map; descriptions given as “just out of Trail Canyon on Soda Springs side” and “Caribou County, NE of Soda Springs, Trail Canyon”) (Figure 2.1-6).

- **Wolverine –** The North American wolverine requires a cold, snowy habitat especially throughout the spring, and is therefore restricted to high elevations in the West (USFWS 2012c). Since wolverines favor habitats with near-arctic conditions, they depend on deep, persistent snow cover for successful denning. The wolverine is listed as a candidate species in Idaho, but is not known or believed to occur in Caribou County, or in any one of the five surrounding counties (Bannock, Bear Lake, Bingham, Bonneville, and Franklin) (USFWS 2012c). In Idaho, a 1985 survey indicated that the wolverine species inhabits remote, mountainous areas unaffected by human disturbance (IDFG 1997). The Site likely does not provide ideal habitat conditions for denning since deep snow is not maintained into the spring, and temperatures in the summer do not remain cool. There are no known occurrences of this species at the Site.

- **Whitebark pine –** Whitebark pine, a keystone species, is found within montane forests and on thin, rocky, cold soils at or near timberline (4,200 to 12,100 ft AMSL) in western North American (NatureServe 2012). Whitebark pine is not known to or believed to exist in Caribou County, however, the neighboring county Bonneville, is the nearest location

known to host whitebark pine (USFWS 2012e). There are no known occurrences of this species at the Site.

- **Greater sage-grouse –** Greater sage-grouse are highly dependent on sagebrush for habitat and are found at elevations ranging from 4,000 to 9,000 ft AMSL. They are listed as a candidate species in Idaho and are known to be found in Caribou County as well as the surrounding counties (excluding Franklin) (USFWS 2012d). Because the Site ranges in elevation from approximately 6,200 to 7,700 ft AMSL and sagebrush is a dominant shrub in and around the area, there is potential habitat for the greater sage-grouse. Information from IDFG (2010b) indicates that two sage grouse leks (IDFG Lek ID #3C028 and #3C029) were identified/visited at the Site in 2009 but the management status (i.e., active or not) was unknown/undetermined. The IDFG was contacted again in November 2015 (IDFG 2-5) to obtain an updated status of these leks. Lek #3C028 is currently classified as "occupied," with birds present during surveys conducted between 2012 and 2015. Lek #3C029 is currently classified as "undetermined," with no birds present during surveys conducted between 2012 and 2015. The locations of these leks are shown on Figure 2.1-6.

2.1.4 Summary of Environmental Conditions

This subsection summarizes findings of the ongoing RI with respect to COPC sources and transport pathways. Additional detail is provided in the Revised Draft Final RI Report (Formation 2016a).

2.1.4.1 Sources of COPCs

Mudstone and Waste Shale present in the Meade Peak Member of the Phosphoria Formation (ore body) are naturally enriched in selenium and other COPCs. The excavated Mudstone and Waste Shale units were placed in overburden piles within Overburden Disposal Areas (ODAs) and waste rock piles; together with Dinwoody Formation, Rex Chert Member, and Wells Formation rock (Figure 2.1-2). Tailings, being the finely milled non-economically valuable host rock material generated during the beneficiation process, also contain these materials. When the Mudstone and Waste Shale are exposed to air and water, chemical weathering (primarily oxidation) of the metal-sulfide minerals occurs, and selenium and other COPCs associated with the minerals can be released and transported into the environment. Uranium, as part of naturally occurring radioactive materials, can be elevated in phosphate ore from southeastern Idaho as well as other parts of the US and world. Radionuclides can become concentrated in wastes during mining and beneficiation as well as mineral processing.

The overburden piles have the greatest amounts of Mudstone and Waste Shale materials, largest aerial extent, and greatest concentrations of selenium and other COPCs. The material properties of the overburden piles allow for percolation of precipitation through the weathered

Mudstone and Waste Shale, therefore releasing the greatest mass of COPCs directly into groundwater and surface water. Tailings are limited in extent and have lower selenium concentrations compared to the overburden piles. However, the fine-grained particle size of the tailings reduces exposure to the weathering effects of air and water and thus fewer and lower concentrations of COPCs are released into groundwater and surface water. Waste rock piles generated during the underground mining operations are smaller in extent and have the lowest selenium and COPC content.

2.1.4.2 Transport of COPCs

Transport of COPCs released from these sources is predominantly via surface water runoff in the spring and via shallow groundwater. Sediment transport can occur as a result of erosion during precipitation and runoff events. Selenium uptake by plants growing on overburden piles, waste rock, and tailings, although not considered physical transport, represents a potential exposure pathway to receptors. Air transport of overburden dust particles from the overburden piles is negligible, and transport to riparian soils is limited.

Surface Water and Sediment Transport – Transport of COPCs from the Mined Area into the surrounding surface water and sediment within the Non-Mined Area of the Site is most significant along the east side of Woodall Mountain. Transport of COPCs has been the most significant in the Pedro Creek Sub-Basin, with the State Land Creek Sub-Basin showing impacts as well. Camp G Creek has the most limited extent of mining-related releases to surface water and sediment. Transport of COPCs into the drainages along the west side of Woodall Mountain is limited given the topography and configuration of the overburden piles and tailings source materials.

Although transport of COPCs has occurred from the Mined Area and into the Non-Mined part of the Site, off-Site impacts to surface water and sediment in the UBR and Trail Creek appear to be indeterminate. Conda mining-related impacts on the UBR and Trail Creek are greatest during periods of high runoff when contaminated surface water and sediment in State Land Creek and Pedro Creek can reach these waterbodies. Selenium concentrations in surface water and sediment of the UBR and Trail Creek are below comparison levels and do not indicate a measureable change between locations upgradient and downgradient of the Site (Formation 2016a and USGS 2015). There are no surface water releases on the West Side of the Aspen Range and concentrations of selenium in sediment at the mouths of the dry drainages are below comparison values.

Groundwater Transport – Impacts to shallow groundwater in the eastern part of the Site have occurred in groundwater in proximity to the overburden piles. Horizontal transport in groundwater is mostly in shallow hydrostratigraphic systems and limited with the individual extent of the drainages along both the east and west sides of the Aspen Range. The groundwater plumes, containing elevated COPC concentrations, in the shallow

hydrostratigraphic system along the east side of the Aspen Range do not appear to have extended beyond the second set of foothills. Base-flow conditions in the drainages, during flow periods sustained by shallow groundwater discharge, do not indicate COPC concentrations exceeding criteria. The groundwater plumes in the shallow hydrostratigraphic system along the west side of the Aspen Range do not appear to have extended much beyond the New Tailings Pond northward or westward, or much westward beyond the meadows area.

Plant Uptake – The overburden piles contain vegetation with the highest selenium concentrations. Direct uptake of selenium and other COPCs occurs where vegetation is growing in Mudstones and Waste Shale. However, a contributing factor is the type of vegetation. For example, selenium hyperaccumulators can have relatively high concentrations of selenium, even when not growing directly on Mudstones and Waste Shale. Plants growing on parts of the overburden piles containing more Dinwoody Formation or Wells Formation materials, relative to Mudstones and Waste Shale, accumulate less selenium.

Terrestrial and Aquatic Biota – In general, concentrations of selenium and other COPCs were highest in biota collected closest to the source material, and decreased with increasing distance from the source material.

2.2 Ecological Conceptual Site Model

The ECSM identifies the means by which ecological receptors may be exposed to Site contaminants and provides a basis for identifying data and risk analysis needs for the SSERA. The ECSM includes the following elements (USEPA 1997):

- Primary and secondary sources;
- Mechanisms of COPC releases from these source areas;
- Exposure pathways; and
- Receptor groups, exposure scenarios and assessment endpoints.

The ECSM for the Site is shown in Figure 2.2-1. The nature and extent of contamination by COPCs at the Site was characterized through the collection of a broad range of Site-specific physical and chemical information as detailed in the Revised Draft Final RI Report (Formation 2016a). The RI evaluations showed that, relative to all COPCs, selenium generally has the widest spatial distribution and greatest order-of-magnitude of concentrations exceeding screening-level benchmarks in the media at the Site.

COPC Sources and Mechanisms of Release – The primary source of COPCs at the Site is the material comprising the ODAs, and tailings materials deposited in the Old Tailings Pond

area (referred to as RMM).[5] Through weathering and leaching, COPCs can be released from the RMM and other source materials and transported via wind and water to the secondary source media of air, soil, sediment, surface water, and groundwater.

The media that are potential COPC sources at the Site include:

- Soil and RMM (e.g., overburden and tailings);
- Surface water (i.e., streams, ponds, seeps and springs); and
- Sediments.

Additional secondary COPC sources include forage and prey (e.g. plants, invertebrates, and small vertebrates) that may contain COPCs at higher than normal concentrations due to exposure to the primary COPC sources.

Receptors and Exposure Pathways – Potential exposure pathways at the Site were categorized as: (1) potentially complete and significant contributors to exposure; (2) potentially complete, but likely to be insignificant to overall exposure; or (3) incomplete exposure pathway. Only potentially complete pathways that are likely to be significant contributors to exposure were evaluated quantitatively in the SSERA.

(1) Potentially Complete and Significant Exposure. The exposure pathways for general groups of receptors (i.e., terrestrial, riparian, and aquatic) (Figure 2.2-1) included in the quantitative analysis are identified below.

<u>Terrestrial (Upland) Receptors</u>

- Incidental ingestion of source materials, soil, and surface water through feeding, foraging, or grooming;
- Plant uptake of COPCs in source materials and soil; and
- Dietary uptake (food web transfer).

<u>Riparian Receptors</u>

- Incidental ingestion of soil, sediment, and surface water through feeding, foraging, or grooming;

[5] Also includes the ore-slurry overflow storage areas.

- Plant uptake of COPCs in soil, sediment, and surface water; and
- Dietary uptake (food web transfer).

Aquatic Receptors

- Incidental ingestion of sediment and surface water (avian and mammalian wildlife);
- Plant uptake of COPCs in sediment and surface water;
- Dermal contact with surface water (fish and non-fish aquatic life);
- Dermal contact with sediment (non-fish aquatic life only); and
- Dietary uptake (food web transfer).

(2) Potentially Complete, but Insignificant Exposure. Exposure pathways that are complete but either lack the data required to quantitatively assess risks or are insignificant in the total exposure of the receptor include the following (Figure 2.2-1):

Terrestrial Receptors

- Inhalation of source- or soil-derived particulates;
- Dermal contact with source materials, soil, and surface water; and
- External radiation from source materials and soil.

Riparian Receptors

- Inhalation of soil-derived particulates;
- Dermal contact with soil, sediment, and surface water; and
- External radiation from source materials and soil.

Aquatic Receptors

- Direct dermal contact with sediment (fish).

For some insignificant pathways, limited scientific information is available to model exposures accurately for ecological receptors (e.g., respiration of particulates, dermal exposure to metals), but USEPA (2005a) has made recommendations that pathways can generally be considered

insignificant compared to ingestion. Receptors can have dermal contact with source materials, soil, sediment, and surface water. However, dermal exposure of birds and mammals to metals and metalloids are generally expected to be negligible relative to all other exposure routes (USEPA 2005a), and are not evaluated quantitatively. Inhalation of dust in ambient air is a complete pathway but is also assumed to be insignificant relative to the ingestion route of exposure (USEPA 2005a). In addition, the complete incidental ingestion exposure pathway is assumed to include incidental ingestion of windblown particles and dust.

(3) Incomplete Exposure Pathway. It is assumed that there is no direct contact with groundwater. Exposure to groundwater could occur where it daylights as surface water in creeks, ponds, seeps, and springs and is being evaluated as a surface water exposure pathway.

Representative Receptor Species – Ecological receptors in the overall receptor groups listed above differ in ways that may affect their levels of exposure to COPCs. Because it is not practical to model exposure for all potential receptor species, specific species were selected to represent major functional groups based on trophic levels (i.e., primary [1°] producer, or secondary [2°], or tertiary [3°] consumer) and feeding guilds (i.e., herbivorous, omnivorous, carnivorous). Feeding guilds are groups of organisms that exploit similar resources for food. Potentially exposed ecological receptor groups (presented as feeding guilds) and representative receptors for the terrestrial and riparian/aquatic systems at the Site are presented in Table 2.2-1. The representative species were used in the screening-level exposure and risk calculations described in Section 2.3. The representative species list is largely similar to that presented in the Area-Wide Ecological Risk Assessment (AWERA) (TTEMI 2002). The list also includes surrogate species in some cases, which are species that are similar to representative receptors for which more information exists to develop exposure assessment models.

Livestock (cattle, sheep, and horse) grazing occurs at the Site and potential risk to these receptors are evaluated and documented independently from ecological receptors.

2.3 Screening Level Ecological Risk Assessment

The SLERA was conducted as part of the BPF to identify the COPCs that clearly do not represent unacceptable risk, and for which no further analysis is necessary. The remaining chemicals were identified as the ECOPCs for which the more detailed risk assessment was required. The benchmarks and Toxicity Reference Values (TRVs) used for screening of surface water, sediment, fish tissues, and radionuclides are provided in Tables 2.3-1 through 2.3-4. All summary statistics for the Site-wide screening data are provided in Appendix A.

As defined in the BPF (Formation 2012a), the following overall steps were used to conduct the screen of COPCs and identify ECOPCs:

- For aquatic receptors, maximum concentrations in surface water (Tables 2.3-5 and 2.3-6) and sediment (Tables 2.3-7 and 2.3-8) were compared to concentration-based toxicity screening-level benchmarks (Tables 2.3-1 and 2.3-2, respectively). For fish tissues, maximum concentrations were compared to screening-level benchmarks in Table 2.3-9. For terrestrial plants and invertebrates, maximum concentrations (Table 2.3-10) in soil were compared to concentration-based toxicity screening-level benchmarks. If the maximum concentration exceeded the respective screening level, the chemical was retained for further analysis as an ECOPC. Per the BPF, chemicals detected in less than 5 percent of samples were excluded as ECOPCs. As shown in Tables 2.3-5 through 2.3-10, no ECOPCs that were excluded from further assessment using the 5 percent detection rule had concentrations exceeding their concentration-based toxicity screening-level benchmarks.

- Screening-level exposure modeling was conducted for terrestrial and riparian wildlife receptors. The exposures were estimated based on the equation described in Section 2.3.2. Maximum concentrations in each exposure medium were included in exposure calculations and compared to TRVs as described in Section 2.3.2. If the exposure estimate exceeded the screening-level TRV, the chemical was retained as an ECOPC for that receptor and retained for evaluation in the SSERA.

Additional data treatments were:

- Any chemical not positively detected in 5 percent of the samples (minimum of 20 samples per chemical) was excluded as an ECOPC.

- Chemicals for which no toxicity information (i.e., screening level or TRV) was readily available were identified as ECOPCs of uncertain risk and carried forward into the SSERA and discussed in the uncertainty section of that assessment.

2.3.1 Aquatic ECOPCs

Surface Water ECOPCs – To identify the ECOPCs in surface waters, two evaluations were conducted. Site-wide maximum concentrations in areas considered to be aquatic habitat (streams, creeks, seeps/springs, wetlands, and/or ponds) (Table 2.3-5) were compared to their respective benchmarks. For the second evaluation, maximum concentrations from mine features (e.g., Pit Lake, tailings pond, French Drain, seep ponds, and sediment basins) (Table 2.3-6) were compared against the same benchmarks. The results of both screening level evaluations were used to identify ECOPCs. Chemicals for which no screening benchmarks or criteria exist were carried forward as ECOPCs for further assessment and consideration.

In surface waters for aquatic habitats, based on the Site-wide maximum screening, aluminum, cadmium, iron, lead, selenium, and zinc are ECOPCs (Table 2.3-5). For the aquatic habitats, the following chemicals in surface water were identified as posing *de minimis* risk: antimony, arsenic, barium, beryllium, boron, chromium, cobalt, copper, fluoride, manganese, mercury, molybdenum, nickel, silver, thallium, uranium, and vanadium.

In mine feature surface waters, based on the Site-wide maximum screening, aluminum, cadmium, fluoride, iron, nickel, selenium, vanadium, and zinc are ECOPCs (Table 2.3-6). For the mine features, the following chemicals in surface water were identified as posing *de minimis* risk: antimony, arsenic, barium, beryllium, boron, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, silver, thallium, and uranium.

Sediment ECOPCs – The selection of sediment ECOPCs was conducted by a similar process as described above for surface water. Chemicals for which no screening benchmarks or criteria exist were carried forward as ECOPCs for further assessment and consideration. Based on Site-wide screening for aquatic habitats (Table 2.3-7), chemicals identified as potential ECOPCs included: aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

For the mine features, Site-wide screening based on maximum concentrations (Table 2.3-8), yielded the following ECOPCs, including: aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

For the aquatic habitats, the following chemicals in sediments were identified as posing *de minimis* risk: cobalt, lead, and uranium. Iron is added to this list for the mine features.

Tissue ECOPCs – Fish sampling was conducted in the lower perennial sections of State Land Creek, Camp G Creek, and Pedro Creek. No trout were collected from any of these locations. The predominant species across all locations were redside shiners and speckled dace. A single mountain sucker, Utah sucker and Paiute sculpin each were collected at two locations, but the tissue data from these fish provide little in the way of representative information simply due to the low numbers. Prior to conducting the baseline risk characterization, the initial risk screening was conducted to focus the COPC list and define which of these chemicals are ECOPCs (Table 2.3-9). The initial screening was conducted using the maximum tissue concentration regardless of species. Subsequent risk characterization steps used the cyprinid data to provide representative tissue concentrations for exposure.

The following ECOPCs were identified and are carried forward to the Tier 1 assessment: aluminum, barium, boron, cobalt, copper, iron, manganese, nickel, selenium, and vanadium. Of these ECOPCs, no TRVs were identified for barium and manganese.

2.3.2 Terrestrial ECOPCs

The results of the screening comparison for terrestrial plants and invertebrates are shown in Table 2.3-10.

Screening for mammalian and avian wildlife was conducted by estimating intake of COPCs from food, water and soil; then comparing the intake estimates to TRVs that represent no observed adverse effect level TRVs (NOAEL TRVs). This approach for the wildlife screen was used because Site-specific COPC concentration data were available for all of the relevant media, reducing the uncertainty associated with screening on the basis of generic screening levels that do not reflect conditions at the Site.

The generic equation used to calculate intake is:

$$\text{Dose}_{\text{Total}} = (\text{SUF}) \times \frac{\left[\left(\text{C}_{\text{media}} \text{ x IR}_{\text{media}}\right) + \left(\text{C}_{\text{prey}}\right)\left(\text{IR}_{\text{prey}}\right)\right]}{\text{BW}}$$

Where:

$\text{Dose}_{\text{Total}}$= Daily dose resulting from ingestion of abiotic media and dietary items (milligrams chemical per kilogram body weight per day [mg chemical/kg BW/day]).

C_{media} = Maximum Concentration of chemical in abiotic media (milligrams per kilogram [mg/kg] or milligrams per liter [mg/L]) during incidental ingestion of that media.

C_{prey} = Maximum Concentration of chemical in prey or forage types (mg/kg).

IR = Ingestion Rate (the amount of prey items, surface water, sediment, and soil ingested per day) (kilograms per day [kg/day], kg/kg BW/day).

BW = Body Weight of receptor species (kg).

SUF = Site Use Factor to account for the amount of time that the organism spends using the Site.

The inputs to the exposure assessment model are presented on Tables 2.3-11 and 2.3-12. These tables indicate the Site-specific dietary items and diet percentages used to calculate an estimated total intake for each receptor along with the remaining exposure factors used in the equation above. All exposure factors (e.g., tissue concentrations, ingestion rates) used in the exposure estimation are presented on a dry weight basis.

The exposure parameters, such as daily rates for intake of forage, prey, water, and incidental ingestion of media, used to develop the exposure assessment model are similar to those presented in the AWERA (but with updates to more current sources in some cases) and used for the SSERA for the nearby Smoky Canyon Mine site (Formation 2014). These parameters are largely based on standard source documents (e.g., *Wildlife Exposure Factors Handbook* [USEPA 1993]). The exposure factors were selected during the AWERA process to represent a

reasonable maximum exposure (RME). The SUF was assumed to be 1.0 for all receptors and the maximum Site-wide concentration of each COPC in each medium was used in the exposure model.

The total intake was then compared with a NOAEL TRV to assess whether the chemical was retained as an ECOPC. NOAEL TRVs are measures of effects that represent exposure levels at or below which no adverse effects are expected.

For the COPCs for which USEPA Ecological Soil Screening Levels (EcoSSLs) are available (USEPA 2005a and updates), the NOAEL TRV derived by USEPA and used in the EcoSSL calculation was used as the screening-level TRV for birds and mammals. For all other COPCs, NOAEL TRVs were selected as discussed in the BPF. The NOAEL TRVs are provided in Table 2.3-13 and screening results are provided in Table 2.3-14.

For radionuclides, total ionizing radiation (TIR) risks to aquatic and terrestrial/riparian receptors were evaluated following guidance for general screening provided in the U.S. Department of Energy (USDOE) Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota (USDOE 2002), using the methodology available in the RESRAD-Biota software (USDOE 2009) and assumptions about activity level of U-238 related to uranium concentrations as presented in Agency comments to the Risk Assessment Approach Technical Memorandum (RAATM), dated March 2009. The maximum Site-wide uranium results for water (mg/L), sediment (mg/kg), and soil (mg/kg) were converted to an estimated activity level (picocuries per liter [pCi/L] or picocuries per gram [pCi/g]) of U-238. It is assumed that uranium concentrations can represent U-238 activities, as U-238 comprises at least 95 percent of naturally occurring uranium. The estimated activity level was calculated for U-238, and the same activity level was assumed for daughter products (Pb-210, Po-210, Ra-226, Rn-222) assuming secular equilibrium. These assumptions are more likely to overestimate actual radioactivity for these compounds.

The resulting estimated activity levels were compared to default Level I Biota Concentration Guides (BCGs), which are screening values considered safe to exposed biota, for each type of ecosystem (aquatic, terrestrial, or riparian). BCGs represent the concentration of a radionuclide in an environmental media that would not result in adverse effects to sensitive receptors. The dose rate limits used to derive the BCGs for each organism type are 1 rad/day for aquatic animals, 0.1 rad/day for riparian animals, 1 rad/day for terrestrial plants, and 0.1 rad/day for terrestrial animals. Tables 2.3-15 and 2.3-16 present the radionuclide screening levels (i.e., Level I BCGs). The overall TIR exposure was estimated by using a sum of fractions approach to sum exposures of aquatic, riparian, and terrestrial biota to uranium isotopes in water, sediment, and soil. If the sum of fractions across media is less than 1, then the TIR exposure is considered not likely to cause observable changes in ecological receptors.

As indicated in Tables 2.3-15 and 2.3-16, the only TIR exposure calculation that exceeded 1 was for riparian animals exposed to water. This TIR was heavily driven by the estimated

radium-228 activity (TIR Ratio = 1.8). Since very little data regarding radium-228 activity in water is available at the Site additional risk characterization is limited and uncertain. The potential for risk from radium-228 is discussed in more detail in the Uncertainty Analysis (Section 5).

2.3.3 ECOPCs Selected for Further Assessment

The results of the SLERA are provided as a list of ECOPCs for each media/receptor pair. Table 2.3-17 provides a summary of ECOPCs selected for further assessment in the SSERA for aquatic receptors. Tables 2.3-18 and 2.3-19 summarize the ECOPCs selected for further assessment for the terrestrial receptors.

All COPCs that were not identified as ECOPCs are assumed to be of *de minimis* risk to ecological receptors at the Site and are not discussed further in the SSERA. ECOPCs without screening criteria were designated as uncertain and are discussed in more detail in the Uncertainty Analysis (Section 5).

2.4 Assessment and Measurement Endpoints

As part of problem formulation, USEPA guidance (USEPA 1997) recommends identifying overall site management goals and assessment/measurement endpoints on which the analysis of risk should focus. Assessment endpoints are explicit descriptions of the ecological values to be protected as a result of management actions at a site. Measurement endpoints are specific data collected to address the assessment endpoints in an attempt to answer the risk questions as related to the risk management goals at a site. Assessment and measurement endpoints associated with the potentially exposed receptor groups discussed were presented in the BPF and are provided in Table 2.4-1.

Overall, significant adverse ecological effects are defined as toxicity from site conditions that result in reductions in survivorship or reproductive capability, threatening populations or community function. For species that are afforded additional regulatory protection due to their rare or threatened status, significant adverse effects can occur even if individuals are affected. For other species with stable or healthy populations, the assessment focused on community-level or population-level effects where some individuals may suffer adverse effects, but the effects are not ecologically meaningful because the overall site population is not significantly affected. Risk was assessed in terms of an ‘average reduction in survivorship and fecundity across a population of organisms’ for these species.

Risk to amphibians was evaluated through comparison of surface water concentrations to standards or criteria considered protective of all aquatic organisms. In the case of selenium, additional risk characterization was conducted by comparing fish tissue concentrations (a representative and similarly sensitive exposure receptor surrogate for amphibian tissues) to

tissue based thresholds both for fish and separately derived thresholds for amphibian tissue based thresholds. Reptiles were assessed through evaluation of birds because birds are known to be sensitive to potential Site ECOPCs.

Measures of exposure are defined as those measures that describe the location and concentration of ECOPCs in abiotic and biotic media that are used to estimate exposure to ECOPCs for each receptor considered in the SSERA (USEPA 1998). Exposure estimates were based on exposure units (EUs) appropriate to each receptor type, and using a tiered process with exposure estimated using decreasing conservatism and uncertainty, and increasing representativeness in successive tiers. EUs are shown in Figure 2.4-1. The tiered process is intended to provide more representative exposure estimates and help reduce and characterize uncertainty associated with spatial distribution of ECOPC concentrations.

For the terrestrial assessment, exposures were estimated for each EU using un-weighted data for Tier 1. All available data for the EUs were combined and upper-bound estimates of the average exposure concentrations were calculated. The Tier 1 evaluation provides a reasonable estimate of exposure and risk to the subpopulations of receptors inhabiting the EU. The Tier 1 evaluation does not take home range of the receptors into account (i.e. all calculations have 100% site use within the EU), so for small receptors with limited home ranges, an EU may make up the territory for an entire sub-population. For larger home range receptors, an EU may make up the home range for a few individuals or even only part of the home range for individuals or subpopulations.

The Tier 2 evaluation estimated exposure based on individual sample points. This evaluation provides a more detailed characterization of exposures because it considers data based on the area represented by each sample point within each EU. The Tier 2 evaluation does not, however, represent population-based exposure except for small subpopulations of small home range receptors that inhabit the area near the sampling location. The Tier 2 assessment assumes that the receptors spend all of their time at the sampling location and is, therefore, intended to provide more spatial resolution to risk managers by highlighting areas of the EUs that may have higher or lower ECOPC concentrations and carry more weight spatially in the Tier 1 assessment. Risk managers should consider data from both the Tier 1 and Tier 2 evaluations as part of the decision making process for the Site.

The tiered assessment for aquatics receptors focused on large-scale drainages, and then narrowed to specific habitats within each drainage. For example, the Tier 1 evaluation was conducted by the primary EUs identified in Figure 2.4-2. ECOPCs carried forward from the Tier 1 assessment were then evaluated by habitat types within each EU. For the mine features, the surface water features were standing water, typically ponds, so they were evaluated by mine feature as part of the Tier 1 assessment. For the Tier 2 evaluation, both the aquatic habitats and mine features included less conservative assumptions for the aluminum criteria (as described later in the ERA) and included both chronic and acute criteria comparisons for surface water as well as low and high effects benchmarks (or TRVs) for sediments.

The EUs within which data were aggregated are presented in Figures 2.4-1 and 2.4-2. EUs were developed to be geographically contiguous areas that have common contaminant sources (e.g., an ODA), hydrological basins (e.g., State Land Creek), and/or habitats (e.g., terrestrial/riparian). The EUs are of ecologically meaningful size appropriate to the Assessment Endpoints and representative receptors being considered. The EUs were also identified to correspond to the different areas of the Site for which separate risk management and remediation decisions will be made (e.g., ODAs/mine panels). Exposures to ecological receptors will be calculated based on consideration of the EUs and home range of the receptors. Because all receptors are not expected to use all portions of the Site equally, based on habitat requirements for each species, exposure will also be estimated for each receptor group independently based on available habitat and home range size. Exposures for wide-ranging species that generally utilize areas larger than the EUs (e.g., coyote and harrier) were evaluated using an aggregation of Site-wide data. Exposures for small-ranging species were addressed using data aggregated on an EU basis. Exposures to riparian/aquatic receptors were calculated on a watershed/drainage basis and by aquatic habitat type (i.e. stream vs. wetland/marsh).

The primary risk questions answered in the SSERA are the following:

1) Do ECOPC concentrations in upland and terrestrial habitats represent a significant source of risk capable of adversely affecting populations of common species and/or individuals of T/E species inhabiting the areas potentially affected by current or historical mining at the Site?

2) Do ECOPC concentrations in surface water and/or sediment represent a significant source of risk capable of adversely affecting the aquatic community and/or specific aquatic receptors inhabiting the water bodies and drainages of the Site?

Details of the complete exposure and effects assessments are provided in the following sections.

3.0 AQUATIC RISK ANALYSIS AND CHARACTERIZATION

The estimation of exposure, effects, and the characterization of risk for aquatic receptors are discussed in detail in the following sections. The assessment and measurement endpoints associated with the potentially exposed receptor groups were discussed in Section 2.4.

3.1 Exposure Assessment

The ECSM (Figure 2.2-1) presents the complete exposure pathways. The Site-wide screening level assessments were based on comparison of maximum concentrations in aquatic habitats and mine features for each Remedial Investigation Chemical of Potential Concern (RI COPC) to respective screening level effects thresholds. Sites included for each of these respective assessments are shown in Figures 3.1-1 and 3.1-2. The assessment was narrowed to aquatic habitats where likely exposure occurs. From this secondary assessment, the following ECOPCs were identified:

- Surface water – aquatic habitats: aluminum, cadmium, iron, lead, selenium, and zinc.
- Surface water – mine features: aluminum, cadmium, fluoride, iron, nickel, selenium, vanadium, and zinc.
- Sediment – aquatic habitats: aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.
- Sediment – mine features: aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.
- Fish Tissue – aluminum, barium, boron, cobalt, copper, iron, manganese, nickel, selenium, and vanadium.

The ProUCL-calculated exposure point concentrations (EPCs) (Appendix A) are expressed as the 95 percent upper confidence limit on the mean (95UCL)[6] and were estimated using results

[6] Consistent with EPA guidance (USEPA 1992), exposure point concentrations in the SSERA were represented by the 95 percent UCL on the mean (i.e., $p<0.05$). Data that were reported as less than detection were included in the EPC calculations. The statistical program ProUCL (USEPA 2013) was used to calculate the 95th UCL, including non-detected concentrations and allowing the program algorithms to estimate a UCL through bootstrapping methods. The output from Pro UCL recommends a 95th UCL and that value was used unless it was greater than the maximum concentration. If the 95th UCL was greater than the maximum concentration, and more than 9 samples are available, then the maximum concentration was used as the EPC, consistent with the Agency approved BPF. In the event that the sample count is less than 9, and the maximum concentration was used as the EPC, the uncertainty surrounding the value is described.

from soil, surface water, and sediment samples collected during the RI. For the Tier 1 risk characterization, EPCs were derived for each EU. For the Tier 2 risk characterization, the data are further subdivided by habitat within each EU (Figures 3.1-1 and 3.1-2) to derive parameter specific EPCs.

3.1.1 Tier 1 Exposure Assessment

Surface Water – Based on the initial screening using maximum concentrations from aquatic habitats as described in Section 3.1, aluminum, cadmium, iron, lead, and selenium were carried forward as ECOPCs for surface waters. Surface water EPCs are presented in Appendix A-1, Table A-1.1. Data compiled for the derivation of EPCs within each EU were screened to include locations with intermittent or perennial aquatic habitats and included three primary types: stream/rivers, wetlands, and ponds. Because hardness plays a role in ameliorating toxicity for several chemicals, ambient hardness data were compiled for each EU (Table 3.1-1). These data will be utilized later in the risk characterization for hardness-based metal criteria calculations. For the Tier 1 risk characterization (Table 3.1-2), EPCs were based on the inclusions of all three habitats for each EU. Summary statistics provided in Table 3.1-2 show the range of ECOPC concentrations in surface waters for each exposure unit for aquatic habitats. Table 3.1-3 presents similar information focusing on the specific surface waters considered to be mine features.

Sediment – EPCs for sediments were derived for ECOPCs within each EU and are presented in Appendix A-1, Table A-1.2. Of the sediment ECOPCs, no readily available sediment quality benchmarks or toxicity data could be identified for beryllium and vanadium; therefore, these analytes were carried forward as ECOPCs due to uncertainties concerning the concentrations measured and no comparable thresholds to assess effects. Sediment data for the Tier 1 risk characterization were treated similarly to surface water data where perennial and intermittent habitats were used and grouped together to derive the EU specific EPCs (Table 3.1-4). Likewise, Table 3.1-5 presents the summary statistics for sediments from aquatic mine features.

Fish Tissue – To further evaluate the potential risks of fish tissue residues in the Tier 1 risk characterization, the redside shiner and speckled dace data were combined because both species are in the same family (*Cyprinidae*) and have similar feeding strategies yet occupy different levels in the water column. Redside shiners are pelagic free swimming fish while speckled dace are benthic fish found on and within the benthic substrate. EPCs for fish tissues were derived for ECOPCs for each stream given the few locations where fish were collected. Fish tissue data for State Land Creek were combined to derive an EPC; only two fish were available from SLC-2 and three fish were available from SLC-0. The concentrations of cadmium and selenium are similar between species. For example, at SLC-1 (State Land Creek), selenium in redside shiners ranged from 11.1 to 18.8 mg/kg dw while in speckled dace selenium ranged from 14.5 to 19.3 mg/kg dw. At SLC-1, cadmium in redside shiners ranged from 0.094 to 0.263 mg/kg dw while in speckled dace selenium ranged from 0.055 to 0.353 mg/kg dw. Fish

tissue data were not combined from differently sized fish because all fish were small (less than 100 millimeters [mm] in length). Fish-tissue data are presented in Appendix A-1; the results of Pro UCL outputs are provided in Table A-1.3. The Tier 1 risk characterization information for fish tissues is provided in Table 3.1-6.

Amphibian Tissue – Only a single amphibian tissue sample was collected. Site fish tissue data and effects thresholds were used as a comparative evaluation with the assumption that fish bioaccumulation of ECOPCs and effects are at least as sensitive if not more sensitive than amphibians. This was done primarily because of the overall lack of amphibian effects thresholds. For selenium, a single amphibian effects threshold was found and used to assess selenium tissue residues in fish and the single amphibian tissue sample. Table 3.1-7 shows the data utilized for the Tier 1 amphibian assessment.

Benthic Tissue – Like amphibian tissues, effects data for benthic macroinvertebrates based on tissue residues are lacking. A single effect threshold for benthic macroinvertebrates was found for selenium. As part of the RI data collection (Formation 2016a), benthic macroinvertebrate tissue samples were collected from a number of locations across the Site. Each sample for a location was a composite of the representative community from that location based on visual observation of the sample. Individual invertebrates were picked from sample debris and composited into a tare-weighted jar to achieve as near as possible a 5 gram sample for tissue analysis of RI COPCs. Table 3.1-8 presents the Tier 1 risk characterization for selenium in benthic macroinvertebrate tissues from different locations.

3.1.2 Tier 2 Exposure Assessment

Surface Water and Sediment – Tier 2 risk characterization for surface waters and sediments involved deriving EPCs for each habitat within each EU (Appendix A-1, Tables A-1.4 and A-1.5, respectively). For mine features, the only aquatic features were ponds, so no further habitat divisions were made. For surface water habitats comprised of several sampling locations, additional risk characterization was conducted on a Site basis through time and by flow characteristic if necessary. Tier 2 risk characterization was conducted for any ECOPC that was carried forward from the Tier 1 assessment. In addition, the Tier 2 risk characterization included the derivation of an incremental risk quotient (IRQ) which is defined as the habitat or site hazard quotient (HQ) minus the background HQ. The IRQ provides an estimate of risks due to the Site and/or risks due to background. Background chemical concentrations were derived as described in Appendix B. Because inorganic contaminants can be naturally occurring, it is important to understand the contribution of naturally present concentrations of ECOPCs versus concentrations due to the Site. IRQs were derived in Tier 2 for both surface water and sediment ECOPCs.

For surface waters, the Tier 2 risk characterization for aquatic habitats and mine features is presented in Table 3.3-1, while for sediments the Tier 2 risk characterization is presented in Table 3.3-2.

Fish Tissue – As the primary bioaccumulative ECOPC, selenium in fish tissues was further assessed by individual species data from each of the three drainages where fish were collected. The purpose in this additional assessment was to evaluate if any different conclusions would be drawn from the Tier 1 assessment for selenium based on the concentration disaggregated tissue data. For example, in State Land Creek, where three locations were sampled, all of the selenium tissue data were combined in the Tier 1 assessment to derive a single EPC for selenium in State Land Creek. Table 3.3-3 shows the concentration data by species and location to further evaluate potential risks.

3.2 Effects Assessment

The effects assessment includes the development of toxicity benchmarks, called TRVs. The TRVs represent known levels of toxicity (or lack thereof), and are developed based on scientific literature or other sources of toxicity data. The EPCs are compared to the TRVs to help determine whether exposures at the Site are potentially ecotoxic. The following subsections present the TRVs for surface water, aquatic sediments, and fish tissues. Numeric thresholds of toxicity were available for all surface water COPCs and most sediment COPCs, with the exception of beryllium and vanadium.

3.2.1 Surface Water TRVs

The TRVs for this SSERA were derived primarily from chronic Idaho State standards (IDAPA 2012; 58.01.02). Where standards were not available, USEPA's Ambient Water Quality Criteria (AWQC) were used. Water quality values from both of these sources are based on potential toxicity of chemicals to a broad range of aquatic organisms, with the concentrations being protective of 95 percent of the species. Numeric surface water values used as TRVs are listed in Table 2.3-1.

In cases where neither chronic Idaho State standards nor AWQC were available, other state water quality standards or secondary chronic values (Tier II) derived by the Michigan Department of Environmental Quality (DEQ) (2015)[7] were used. If a Tier II value was available and a USEPA approved state standard was available from another state, then the approved state standard was used. Secondary chronic values (Tier II) are derived similarly to AWQCs, but without the required eight families necessary to derive a Tier I value. Following is a brief

[7] Michigan DEQ frequently revisits and revises its Tier II Rule 57 values based on the availability of new toxicity data for different parameters. The process is conducted under the Great Lakes Water Quality Initiative. Suter and Tsao (1996) values were developed using the same process as Michigan's Tier II values, but have not been updated since 1996.

discussion of the surface water TRVs and their origin. For those analytes with hardness-based criteria or standards, the lower 95th percent confidence limit of the mean hardness was used to derive the criteria.

Chronic values were the first choice for use as TRVs because these values represent a threshold of acceptable effects levels over a long period of time. Continuous exposure of organisms over an extended period of time can affect survival, growth, reproduction, and physiological and biochemical internal processes. For most studies used in the derivation of chronic values, effects thresholds for multiple life stages, including sensitive early life stages or organisms, are typically included in the derivation. In addition, sensitive endpoints such as growth and reproduction are often used in the derivation process.

TRVs for arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc are chronic State of Idaho water quality standards (Table 2.3-1). Of these, cadmium, copper, lead, nickel, silver, and zinc are hardness-based standards. Hardness-based standards account for hardness in the derivation of the value because hardness can affect the bioavailability and toxicity of certain metals. As hardness increases, so does the derived hardness-based standard. For the purpose of this SSERA characterization, and because multiple hardness values were collected over different flow conditions at each sample location, the lower 95th percent confidence interval of the mean hardness for an EU (Table 3.1-1) was used as a representative conservative screening hardness value from which to derive hardness-based TRVs.

Selenium is of particular importance at this Site. The State of Idaho surface water quality standard is 0.005 mg/l (Table 2.3-1). USEPA recently (July 2016) released a Final National Criterion for Selenium that is based on maternal bioaccumulation from dietary exposure, and the resulting developmental effect on fish embryos and early life stage fish. The new criterion is based on an effects threshold for egg/ovary tissue concentrations rather than selenium concentrations in water. Selenium accumulated via the diet is stored in egg tissues, sometimes months in advance of oviposition, which can result in early life stage mortality and teratogenic effects that in turn can result in mortality.

The developmental effects at the sensitive early life stages of fish have been the focus of USEPA's Final National Criterion which was released in July 2016. While this criterion focuses on egg/ovary tissues, it allows for translation of egg/ovary effects thresholds to whole body tissue residues, and/or water column concentrations of dissolved selenium.

For this SSERA, the selenium TRVs utilized include both the State of Idaho Water Quality Standard (0.005 mg/l) as a screening TRV, and in later stages, the egg/ovary effects threshold for the cyprinid, fathead minnow *(Pimphales promelas)* (USEPA 2016) which is discussed in more detail for identification of the fish tissue TRV in Section 3.2.3 below.

The benchmark for iron was taken from USEPA's (2014b) National Water Quality Standards Table, which references back to USEPA's 1986 Goldbook, Quality Criteria for Water. Limited

data were available then as they are now for this criterion, as it is based on a single limited field study. While USEPA (1986) is cited as the source of the iron criterion, the iron value has its origins back in the USEPA Red Book circa 1976. A single field effect study was used as the basis for the 1 mg/L value, and there has been little corroborating evidence since. For this reason, EPRI (2004) undertook the task to develop a scientifically defensible iron criterion; however, they found that the availability of usable laboratory studies was limited. Instead they used an extensive bioassessment dataset from West Virginia to derive a value consistent with the CWA 101(a) goal (i.e., maintain the chemical, physical, and biological integrity of the Nation's waters). The result of their analysis was that a value of 1.74 mg/L would be protective of those aquatic biological communities. While it is not intended that this value is applicable to the Site, the research from that document and compilation of studies reviewed indicates that a number of factors govern iron toxicity, which is likely site-specific due to these compounding factors. Therefore, the surface water TRV for iron may have significant uncertainty and is likely biased low.

Aluminum TRVs include threshold criteria from two different sources. The first source is based on the chronic benchmarks from USEPA's AWQCs (1988) for aluminum for all waters where pH levels are between 6.5 and 9. Aluminum solubility is highly affected below pH 6.5, with a subsequent increase in Al^{+3} as pH decreases; however, USEPA's criterion does not account for this. Since 1988, a number of additional acute and chronic aluminum toxicity studies have been published, many of which meet USEPA guidelines for AWQC development (Stephan et. al. 1985). Additionally, efforts by the Arid West Water Quality Research Project (AWWQRP 2006) and a review by Parametrix (2009) have provided additional evidence that aluminum toxicity is not only pH dependent (the current AWQCs are only valid for waters with pH between 6.5 and 9.0) but hardness-dependent as well. The current chronic AWQC is driven by brook trout and striped bass studies that were carried out with very low hardness test waters (between 12 and 14 mg/L as calcium carbonate [$CaCO_3$]) at low pH, much lower than is typically observed in the southwestern states. Using the new species toxicity data, recalculated hardness-based criteria for aluminum have been developed (Parametrix 2009). In 2012, USEPA Region 6 approved the use of the hardness based equation in New Mexico. They stated, "Based on an extensive review of the supporting documentation, we are approving the application of the hardness-dependent equation for aluminum to those waters of the State at a pH of 6.5 to 9.0 because it will yield criteria that are protective of applicable uses in waters within that pH range" (USEPA 2012).

These criteria are expressed using the following formulas:

$$\text{Acute Criterion (micrograms per liter [µg/L])} = e^{(1.3695[\ln(\text{hardness})]+1.8309)}$$

$$\text{Chronic Criterion (µg/L)} = e^{(1.3695[\ln(\text{hardness})]+0.9162)}$$

Applicable hardness values for the acute and chronic criteria equation above range from 26 to 220 mg/L $CaCO_3$. The original AWQC for aluminum was based on minimal species data that did not consider hardness and included studies conducted at the low end of the pH range for

natural waters. The more recent criteria derivation recognizes these limitations and adds additional toxicity data to a recalculation of the aluminum criteria values.

Michigan DEQ (MDEQ 2015) derived secondary chronic criteria for barium, beryllium, boron, cobalt, molybdenum, thallium, and vanadium. These secondary ("Tier II") values tend to be highly conservative. Because fewer toxicity tests than the number of tests used to derive National criteria are used in the derivation of a Tier II value, an additional safety factor is used in the derivation process. Higher numbers of test results allow for the use of a lower safety factor, while lower numbers of test results require using a higher safety factor.

Hardness-based TRVs for manganese and uranium were obtained from Colorado Department of Public Health and Environment (CDPHE) standards for the Arkansas River (CDPHE 2007). These values are used as state water quality standards and have been approved for use by USEPA Region 8.

3.2.2 Sediment TRVs

Chemical-specific-benchmarks for sediments are available in the literature for many chemicals. Following the initial screening, additional literature searches were conducted to augment any benchmark data gaps. Following the literature search, only beryllium and vanadium remained as ECOPCs with no sediment benchmarks. Sediment TRVs are listed in Table 2.3-2.

In the screening level assessment, COPC maximum concentrations were compared to the lowest benchmark of the (1) threshold effect concentrations (TEC), the concentration below which no effects are expected, and (2) National Oceanic and Atmospheric Administration Screening Quick Reference Table (NOAA SQuiRT) values (a compendium of sediment benchmarks). This provided a conservative assessment for determining ECOPCs from the COPC list. Each of these benchmarks represents no-adverse-effects concentrations and is appropriate for screening level evaluations.

For the baseline ERA, the probable effects concentrations (PECs) were added for the risk characterization. Sediments were compared to both the lower and TEC level value (TRV_{low}) as well as the upper or PEC value (TRV_{high}) to characterize risks. Information about the derivation of sediment benchmarks and or sources of sediment toxicity data is described more fully below.

There are several different methods for deriving benchmarks and there is variability in the endpoints and responses used. Each approach has certain advantages and limitations that influence their application in the sediment quality assessment process (MacDonald et al. 2000). The majority of the available benchmarks for sediments have been developed based on invertebrate responses to chemicals in sediments.

The primary sources of literature reviewed in developing benchmarks included the following documents:

- MacDonald et.al. (2000) – Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems.
- Buchman (2009) – NOAA Screening Quick Reference Tables (SQuiRTS).
- Ingersoll et al. (1996) – Calculation and evaluation of sediment effects concentrations for the amphipod *Hyallela azteca* and the midge *Chironomus riparius*.
- MacDonald et al. (2003) – Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters: Technical Report.

Methods for determining sediment benchmarks vary widely in the species used, exposure regimes, endpoints, and interpretation of data. Most sediment benchmarks are derived based on responses of invertebrate taxa such as amphipods, midges, mayflies, oligochaetes, daphnids, various bivalves, and bacteria. This is primarily due to the fact that such taxa are in intimate contact with sediments and control of exposures is both precise and accurate, making interpretation of results more straightforward.

Endpoints used in testing range from survival, growth, deformities, and reproduction to more subtle effects such as changes in biochemical biomarkers. Testing includes both field and laboratory exposures of organisms to individual chemicals and mixtures of chemicals.

Sediment quality guidelines (SQGs) presented by MacDonald et al. (2000) are widely accepted and based on empirical data from a wide range of testing conditions. SQGs from MacDonald et al. (2000) were available for arsenic, cadmium, chromium, copper, lead, nickel, silver, and zinc. Values presented in MacDonald et al. (2000, 2003) are based on sediment dry weights.

Aluminum, manganese, and iron TRVs were compiled from the NOAA SQuiRTS guidelines (Buchman 2009). An additional manganese sediment toxicity value, apparent effects threshold (AET) was also found in the Washington guidelines (Cubbage et al. 1997).

The barium TRV was from USEPA (1977) which compiled values for evaluating Great Lakes Harbor sediments.

The cobalt TRVs were derived from two sources including Ontario's open water disposal guideline (Persaud et al. 1993) and the USEPA's (2003) derived lowest cleanup goal at the Blackbird Mine where cobalt was one of the primary COPCs.

For silver, an AET from Cubbage et al. (1997), based on *Hyallela azteca* testing was used as the TRV. The AET is defined as the concentration of a given chemical above which a

statistically significant ($p<0.05$) biological effect ("hit"), for example, mortality, is always expected to occur.

The selenium value for sediments from Lemly (2002) has been widely cited as a benthic effect TRV. However, as noted in Lemly (2002), the value is a potential threshold for bioaccumulative effects to higher trophic levels not as an effects threshold for benthic invertebrates. While this is a conservative benchmark for screening sediment selenium concentrations, it does not provide an adequate benchmark for assessing the potential risks of selenium in sediments to aquatic invertebrates.

VanDerveer and Canton (1997) suggested, based on their analysis of selenium concentrations from numerous western streams and rivers, that a conservative threshold for potential effects of selenium to fish and wildlife is 4.0 mg/kg. This value represents the 10th percentile of observed effects from the data evaluated. They found that organic carbon binds selenium allowing accumulation in stream sediments. In low organic carbon systems such as western streams, selenium accumulation in sediments is reduced as compared to those sediments evaluated by Lemly (2002).

For selenium, while neither study provides a sediment benchmark to assess toxicity to benthic invertebrates, they do provide thresholds for protection of upper level trophic consumers. Both values from Lemly (2002) and VanDerveer and Canton (1997) are used to characterize selenium risks in sediments.

3.2.3 Aquatic Tissue TRVs

Fish Tissue TRVs – The TRVs for fish tissues were derived from two primary compilations. Jarvinen and Ankley (1999) compiled fish tissue effects thresholds for a number of parameters across a wide range of species depending upon the availability of data from the literature. Similarly, an electronic database (Environmental Residue Effects Database [ERED]), maintained by the US Army Corps of Engineers, contains many of the same studies cited in Jarvinen and Ankley (1999) as well as some more current data from the literature. Because both of these sources represent compilations of other published and some unpublished works, when possible the original study was obtained. Fish tissue TRVs are shown in Table 2.3-3 for both trout species and other non-trout species. While speckled dace and redside shiners were the only two species collected at the Site in sufficient numbers to evaluate bioaccumulation risks, no species-specific TRVs were available. The use of interspecies tissue residues may have some associated uncertainty in over- or under-prediction of risks which will be discussed more fully in the Uncertainty Analysis (Section 5).

The USEPA has developed a tissue-based Final AWQC (USEPA 2016) for selenium that focuses on effects to young developing fish. Chronic reproductive effects data for several species are provided in USEPA (2016), but the majority of the data available are for salmonid

species. The tissue of choice for measuring this endpoint is egg/ovary tissue but conversion factors are available to translate egg/ovary selenium concentrations to whole body tissue concentrations. Based on the available species data, USEPA (2016) derived a whole body equivalent selenium threshold of 8.5 mg/kg dw, which is the 5th percentile of the available EC10 data. This value of 8.5 mg/kg dw is used as the initial screening TRV to evaluate selenium exposure (Table 2.3-9) as a conservative measure.

In the subsequent steps of the risk characterization, potential risk due to concentrations of selenium in fish tissues is evaluated relative to the 2016 AWQC and a family-specific value for cyprinids (17 mg/kg dw; used for Tier 2 risk characterization, see Table 2.3-3) . Schultz and Hermanutz (1990) data for fathead minnows (a cyprinid in the same family as dace and shiners) is included in the 2016 AWQC and is used in this SSERA as a family level comparison point to assess cyprinid fish tissue data from the Site to a reproductive effects threshold. However, this study was not used to derive the criterion value due to some uncertainties in the endpoints measured. Nonetheless, USEPA considered the study useful as an evaluation of reproductive endpoints within the range of effects for other species, and summarized it in the 2016 document. The ovary tissue LOEC for the fathead minnow is 5.89 micrograms per gram (mg/kg) wet weight. A species-specific dry weight whole body tissue TRV can be calculated as follows:

1) 5.89 / [(100-75.3) x 0.01] = 23.85 mg/kg dry weight Se in ovary

2) 23.85 / 1.4 = 17.03 mg/kg dry weight Se in whole body

Therefore, the fish whole body TRV value using Schultz and Hermanutz (1990) study, with a conversion factor of 1.4 for fathead minnows and a 75.3 percentage of ovary moisture is 17.03 mg/kg dry weight. Given that USEPA presents most aquatic life criteria to two significant figures, the Agencies recommend the use of the 17 mg/kg whole body dry weight Se fish tissue concentration for the tissue TRV against which to compare resident fish selenium concentrations at the Site.

Both values (8.5 mg/kg dw for Tier 1 and 17 mg/kg dw for Tier 2) are used to derive and characterize risks for fish tissues because the range includes a conservative estimate threshold (e.g., AWQC) and a less conservative but representative threshold (e.g., cyprinid).

Amphibian TRVs – Data available for developing TRVs and assessing risk to amphibians is much more restricted than for invertebrates and fish. Those studies found are discussed in more detail below. Risk to amphibians was assessed using two of the lines-of-evidence (LOEs) that are being used for fish: water quality (i.e., RI COPC concentrations in surface water) and potential tissue residues in adult and larval amphibians. The overall approach to assessing risk to amphibians was to first conduct a literature search and review to determine whether information is available to indicate that amphibians are either more sensitive to RI COPCs than fish (i.e., experience toxicity at lower exposure levels), or are likely to accumulate higher RI COPC concentrations.

Recent reviews of scientific literature suggest that in general amphibians are less sensitive to the effects of the majority of environmental contaminants compared to fish (Kerby et al. 2009, Weltje et al. 2012).

Kerby et al. (2009) evaluated a large number of exposure and toxicity tests including invertebrates, fish, and amphibians and found that amphibians may be less sensitive to inorganics than other aquatic biota. The authors grouped contaminants by contaminant classes such as inorganics, heavy metals, and pesticides for their analysis.

Weltje et al. (2012) conducted a comparative analysis of acute and chronic sensitivity of fish and amphibians for approximately 50 chemicals, including some metals, but mostly organic chemicals. Of the RI COPCs, only cadmium, copper, and zinc were evaluated. The study compared chronic no observed effects concentration (NOEC) concentrations reported in the literature and/or regulations of various regulatory agencies. They found that amphibian NOECs were generally higher than sensitive fish species. The authors concluded that NOECs and water quality criteria generated for fish species will be generally protective of amphibians. They also concluded that additional amphibian testing may not be necessary for chemical risk assessment.

An overall conclusion from the Kerby et al. (2009) and Weltje et al. (2012) studies, is that amphibians are generally less sensitive than fish or other aquatic organisms to a broad range of environmental contaminants in water. However, neither of these analyses included dietary pathways that are important for exposure of aquatic vertebrates to selenium. Hopkins et al. (2006) examined developmental effects of selenium accumulation in maternal adults and transfer to developing embryos in eastern narrow-mouthed toads (*Gastrophryne carolinensis*). Female adult toads would have obtained most of the selenium body burden through dietary pathways. Similar to fish, selenium accumulated by the maternal parent is transferred to eggs, and can affect developing young. The highest selenium accumulation in toad eggs (up to 80-100 mg/kg dw) was substantially higher than for trout eggs. Egg viability was higher, and deformities were lower than for reference eggs for all but one endpoint (craniofacial). These data suggest that *G. carolinensis* embryo development is less sensitive than fish to selenium in eggs. However, small samples sizes at the higher concentrations may have affected the ability to detect statistical differences.

Unrine et al. (2007) evaluated metal concentrations in mollusks, insect larvae, bullfrog tadpoles, and fish, collected from a coal-ash affected swamp area of the USDOE Savannah River Site in South Carolina. Bullfrog tadpoles (*Rana catesbeiana*) accumulated from 1 to 4 times higher concentrations of several metals than other invertebrates and fish. For selenium, concentrations (whole body) in tadpoles were marginally higher (~1.5x) than concentrations in aquatic insect larvae (dragonfly genera *Tramea* and *Erythemis*), smallmouth bass (*Micropterus salmonoides),* and spotted sunfish (*Lepomis punctatus*). The swamp collection site from which these data were collected is a lentic system, and the pattern of relative concentrations among these groups may not be comparable to the lotic systems at the site. However, similar concentrations among the

tadpoles and other aquatic biota suggest that anuran amphibians will not bioaccumulate substantially higher selenium concentrations than fish at the site.

Few data are available to set TRVs for amphibians based on tissue concentrations or surface water. However, the available information suggests that surface water concentrations that are protective of fish are also protective of amphibians. Data on bioaccumulation and developmental toxicity for metals suggest that at least anuran amphibians do not accumulate substantially higher concentrations of metals than fish, and that tissue-based TRVs for fish are protective of the amphibians.

Tissue concentration data and corresponding effects information for amphibians are extremely limited. While the effects of selenium on amphibians are largely unknown (Hopkins 2007; Stuart et al. 2004; Wake and Vredenburg 2008), there are a few studies (Hopkins et al. 2006 and Masse et al. 2014) available that can be used to set TRVs for amphibians based on tissue concentrations. The studies by Hopkins et al. (2006) and Masse et al. (2014) indicate that amphibians can bioaccumulate selenium, with selenium maternally transferred to eggs, and effects manifested in developing young. Interpretation of the Hopkins et al. (2006) study reveals an estimated NOAEL threshold value of about 20 mg/kg dw[8] can be derived. In a more recent study, Masse et al. (2014 unpublished, but cited in USEPA [2016]) derived an EC10 for the *Xenopus laevis*, a toad that is a standard test species in the Frog Embryo Teratogenesis Assay Xenopus (FETAX) toxicity assessment procedures. The study identified an EC_{10} value of 24.8 mg/kg dw in eggs and reported a 1:1 ratio of selenium in eggs and whole body, thus whole body concentrations at the effect threshold would also be 24.8 mg/kg dw.

The tissue effect thresholds presented above for selenium (e.g., 20 and 24.8 mg/kg dw) will be used to assess potential selenium risks to amphibians by comparing fish tissue data from the Site (as a surrogate for amphibian data) to the thresholds. Section 3, Table 3.3-7 shows these comparisons.

Benthic Macroinvertebrate TRVs – Benthic invertebrate tissue residues are not typically used to quantify risks. However, because selenium is the primary ECOPC at this Site and because tissue data are available from several locations evaluated, the literature was reviewed to determine if an appropriate benthic invertebrate tissue TRV could be located.

Conley et al. (2009) conducted a dietary feeding study on uptake of selenium in mayflies. Measureable effects on fecundity were found at dietary concentrations of selenium less than 11

[8] When all developmental criteria were considered collectively, offspring from the contaminated site experienced 19% lower viability, although egg Se and egg viability were not statistically related (Hopkins et al. 2006). While a true effects threshold related to amphibian body burdens was not derived in this study, there was a demarcation of effects relative to controls at the contaminated sites. The mean value of 42.4 mg/kg dw in whole body tissues has a large degree of uncertainty associated with it based on the Standard error presented. The mean value (n=10) for the contaminated sites was based on data spanning a wide range of body burdens, and Hopkins et al (2006) state that their statistical power for detecting functional relationships between concentrations and effects was probably limited within the range of concentrations where effects should be predominant (e.g., egg selenium concentrations > 20 mg/kg dw).

mg/kg. The diet was comprised of algae which concentrate selenium several times the abiotic concentration and also convert selenium into methylated forms which are much more bioavailable. Conley et al. (2009) demonstrate that, like fish, benthic invertebrate exposure to and effects from selenium are based on the dietary intake. Using the bioaccumulation factor of 2.2 provided by Conley et al. (2009), the 11 mg/kg dietary value corresponds to an adult mayfly tissue selenium concentration equal to 24.2 µg/g dw. In subsequent work, Conley et al. (2011) found that bioaccumulation and influence of selenium on mayfly performance may be tied to resource availability and quantity. Conley et al. (2013) reported a bioaccumulation or trophic transfer factor of 2.1 and defined secondary reproductive effects at a dietary concentration of 12.8 mg/kg dw, thus supporting their earlier work that effects occur at dietary concentrations greater than 11 mg/kg dw. Again, using the bioaccumulation factor and applying it to the dietary concentration of 12.8 mg/kg dw, a whole body tissue threshold of 26.9 mg/kg dw was derived.

Selenium concentration data for benthic tissues were available from several locations, thus potential risks can be characterized by comparing empirical benthic tissue data from the Site to the Conley et al. (2009 and 2013) no and low effect dietary thresholds derived above for whole body tissues as part of the Tier 3 risk characterization. This characterization will be compared to those locations where sediment thresholds for selenium were exceeded to provide for a more accurate assessment of risks to benthic invertebrates.

3.3 Risk Characterization

The risk characterization phase of the ERA process is the point at which information on nature and extent of contamination, the exposure assessment, and the effects assessment are integrated to characterize risks to assessment endpoints (USEPA 1997, 1998). In this section, estimates of exposure are compared to TRVs to estimate the potential for adverse effects for each of the ECOPCs. In addition, direct measures of the biological communities at the Site are examined to determine whether adverse effects are observable and to assess correlation of effects with trends in chemical concentrations and seasonal variation. These two lines of evidence are then integrated to help determine the potential for adverse effects at the Site, the likelihood that the effects result from Site-specific releases or conditions, and the primary conditions contributing to effects and/or risk.

Estimating risk based on exposure is conducted by comparing EPCs (or doses) derived in the analysis step with the media and or receptor-specific TRVs. Results are expressed as HQs (USEPA 1997):

$$HQ = \text{Exposure Point Concentration} \div TRV$$

If the HQ is equal to or less than 1 (indicating the exposure concentration or dose is less than the TRV), the occurrence of adverse effects is unlikely. If the HQ is greater than 1 (indicating the exposure is equal to or greater than the TRV), there is a potential for adverse effects to occur

(USEPA 1997). However, there is no clear consensus from either USEPA guidance or the scientific literature concerning the significance of the level of departure from 1.

An HQ greater than 1 by itself does not indicate the magnitude of effect or provide a measure of potential population-level effects (Menzie et al. 1992). For instance, a high sediment HQ for a chemical may be the result of a small, isolated area of high concentration rather than widespread contamination. A high sediment HQ also may not indicate potential population/community-level effects because, no matter how high the HQ is above 1, the risk is limited to receptors in the vicinity of the high-concentration area. For this reason, the distribution of metals at levels above TRVs will be examined to provide information about the potential spatial extent of adverse effects.

If an HQ cannot be calculated because insufficient data are available to establish a toxicity threshold, COPCs are carried through the risk characterization as COPCs of uncertain risk. These COPCs are qualitatively discussed in the Uncertainty Analysis in Section 5 of this SSERA.

3.3.1 Tier 1 Risk Characterization

Summary statistics for the derived EPCs used in the Tier 1 risk characterization are shown in Appendix A, Table A-1.1 to A-1.3 for each media.

3.3.1.1 Surface Water – Aquatic Habitats

Tier 1 analysis involved deriving EPCs for sample data within each EU for those ECOPCs carried forward from the initial risk screening and comparing the EPC to their respective TRVs (Table 3.1-2). Eight different EUs were identified as well as an individual spring site. From the screening level assessment, aluminum, cadmium, iron, lead, selenium, and zinc were carried forward. Results of the EU assessment for Tier 1 are summarized as follows:

Camp G Creek EU – Aluminum, iron and selenium all had HQs greater than 1, while cadmium, lead, and zinc had HQs of 1 or less.

Pedro Creek EU – Aluminum and selenium had HQs greater than 1, while cadmium, iron, lead and zinc concentrations resulted in HQs of 1 or less.

State Land Creek EU – Aluminum and selenium had HQs greater than 1, while cadmium, iron, lead, and zinc concentrations resulted in HQs of 1 or less.

Trail Canyon Creek EU – Aluminum and iron had HQs greater than 1, while cadmium, lead, selenium, and zinc concentrations resulted in HQs of 1 or less.

Westside Ponds EU – Aluminum and selenium had HQs greater than 1, while cadmium, lead, iron, and zinc concentrations resulted in HQs of 1 or less.

Woodall Springs EU – Aluminum had an HQ greater than 1, while cadmium, iron, lead, selenium and zinc concentrations resulted in HQs of 1 or less.

Formation Creek EU – All ECOPCs had HQs less than 1.

Northwest Reference Area EU – Aluminum had an HQ greater than 1, while cadmium, iron, lead, selenium, and zinc concentrations resulted in HQs of 1 or less.

Jouglard Canyon Spring (JSC-1) – Aluminum and iron had HQs greater than 1, while cadmium, lead, selenium, and zinc concentrations resulted in HQs of 1 or less.

3.3.1.2 Surface Water – Mine Features

Tailings Pond – Aluminum had an HQ greater than 1, while cadmium, fluoride, iron, nickel, selenium, vanadium, and zinc had HQs of 1 or less.

French Drain – Aluminum, cadmium, and selenium had HQs greater than 1, while fluoride, iron, nickel, vanadium, and zinc concentrations resulted in HQs of 1 or less.

Pit Lake – Aluminum, cadmium, selenium, and vanadium had HQs greater than 1, while fluoride, iron, nickel, and zinc concentrations resulted in HQs of 1 or less.

Sedimentation Basin – Aluminum, cadmium, iron and selenium had HQs greater than 1, while fluoride, nickel, vanadium, and zinc concentrations resulted in HQs of 1 or less.

NE Seep Pond – Cadmium, nickel, selenium, and zinc had HQs greater than 1, while aluminum, fluoride, iron, and vanadium resulted in HQs of 1 or less.

From the Tier 1 analysis for aquatic habitats and mine features, a subset of ECOPCs will be carried forward for Tier 2 risk characterization. Aluminum, iron, and selenium were found to be ECOPCs warranting further evaluation in one or more EUs for aquatic habitats (Table 3.1-2). For mine features, aluminum, cadmium, fluoride, iron, nickel, selenium, vanadium, and zinc had concentrations warranting further evaluation for one or more of the mine features (Table 3.1-3).

3.3.1.3 Sediment – Aquatic Habitats

Sediment ECOPCs carried forward from the early screening analysis included: aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc. Of these,

beryllium, boron, molybdenum, thallium, and vanadium had no screening level TRVs (i.e., TECs or low effect level values from NOAA SQuiRTs). Similar to surface water, sediment data considered for the Tier 1 and Tier 2 risk characterization included those data from perennial aquatic habitats. While additional sediment data were collected throughout the Site, some of these data were collected from dry draws of ephemeral or intermittent channels where the probability of ECOPC exposure was likely diminished.

In the Tier 1 assessment, the 95UCLs were derived as EPCs for EU specific areas for each ECOPC and compared to their respective TRVs (Table 3.1-4). Sediment TRVs used for comparison and estimation of risks at the Tier 1 and Tier 2 levels included some additional TRVs not used in the screening assessment that were compiled based on additional literature searches. In addition, for the Tier 1 and 2 risk characterization steps, the Probable Effects Concentration (PEC) was included as an upper or high TRV value. A range of HQs was derived for sediment EPCs compared to their respective TRVs as shown in Table 3.1-4. The TRVs were categorized as low or no effects thresholds (TRV_{low}) and high or probable effects thresholds (TRV_{high}). Correspondingly, HQs derived using these TRVs were similarly defined as HQ_{low} and $HQ_{high.}$ With addition of these risk characterization TRVs, only beryllium and vanadium remained as ECOPCs with no TRVs and are carried forward to Tier 2.

Camp G Creek EU – Barium, cadmium, manganese, and selenium EPCs exceeded the TRV_{low}, while selenium exceeded the TRV_{high}.

Pedro Creek EU – Barium, cadmium, chromium, copper, manganese, mercury, nickel, selenium, silver, and zinc EPCs equaled or exceeded the TRV_{low}, while cadmium, chromium, nickel, and selenium exceeded the TRV_{high}.

State Land Creek EU – Barium, cadmium, chromium, nickel, selenium, and zinc EPCs equaled or exceeded the TRV_{low}, while cadmium and selenium exceeded the TRV_{high}.

Trail Canyon Creek EU – Barium, cadmium, manganese, and zinc EPCs equal or exceeded the TRV_{low}, while cadmium exceeded the TRV_{high}.

West Side Ponds EU – Arsenic, barium, cadmium, chromium, copper, manganese, mercury, nickel, selenium, silver, and zinc EPCs equaled or exceeded the TRV_{low}, while arsenic, cadmium, chromium, nickel, and selenium exceeded the TRV_{high}.

Woodall Springs EU – Barium and selenium EPCs equaled or exceeded the TRV_{low}, while none of these ECOPCs exceeded the TRV_{high}.

Formation Creek EU – Barium, cadmium, selenium and zinc EPCs equaled or exceeded the TRV_{low}, while cadmium and selenium exceeded the TRV_{high}.

Downgradient EU – Barium was the only EPC in this EU that exceeded the TRV_{low} and no ECOPCs exceeded the TRV_{high}.

North Woodall Creek EU (Northwest Reference Area) – Barium, manganese, and mercury EPCs equaled or exceeded the TRV_{low}, while manganese exceeded the TRV_{high}.

3.3.1.4 Sediment – Mine Features

Sediments from mine features were assessed in Tier 1 similar to the approach described above for aquatic habitats. Table 3.1-5 shows the Tier 1 assessment for aquatic sediments found in the various mine features.

Pit Lake – Antimony, arsenic, barium, cadmium, chromium, copper, mercury, nickel, selenium, silver, thallium and zinc EPCs equaled or exceeded the TRV_{low}, while antimony, cadmium, chromium, nickel, selenium, silver, and zinc exceeded the TRV_{high}.

Tailings Pond – Barium, cadmium, and mercury EPCs equaled or exceeded the $TRV_{low,}$ while cadmium exceeded the TRV_{high}.

French Drain – Arsenic, barium, cadmium, chromium, copper, manganese, mercury, nickel, selenium, thallium, and zinc EPCs equaled or exceeded the TRV_{low}, while cadmium, chromium, manganese, nickel, selenium, and zinc exceeded the TRV_{high}.

Sedimentation Basin – Cadmium, chromium, selenium, and zinc EPCs equaled or exceeded the TRV_{low}, while cadmium, chromium, and selenium exceeded the TRV_{high}.

3.3.1.5 Aquatic Biota Tissue

The primary biotic media sampled for the RI for aquatic resources was fish tissue. The following ECOPCs were identified: aluminum, barium, boron, cobalt, copper, iron, manganese, nickel, selenium, vanadium, and zinc. Of these ECOPCs, no TRVs were identified for barium and manganese. As described previously, the bulk of the available data for use in risk characterization includes the tissue concentrations from redside shiner and speckled dace. Because the fish tissue data are limited to the lower reaches of the perennial creeks, an assessment of the data by EUs is meaningless.

Fish Tissue – Table 3.1-6 presents the EPCs compared to the tissue TRVs to derive HQs for each ECOPC. There were a limited number of fish captured for tissue residue analysis. The fish tissue data were evaluated on a site-by-site basis where sufficient data were available to derive a 95UCL for the EPC. For State Land Creek, fish were found at three locations, but lower numbers were found at each; therefore, given the relatively close proximity of these

locations within the same drainage, the fish tissue data for State Land Creek were combined to derive the EPC. These results and HQs are presented as part of the Tier 1 assessment.

Camp G Creek – Of the 10 ECOPCs carried forward, aluminum (HQ = 7), iron (HQ = 7), and zinc (HQ = 2) resulted in HQs greater than 1. All other tissue ECOPCs were lower than their respective TRVs.

Pedro Creek – Of the 10 ECOPCs carried forward, four had HQs greater than 1. The aluminum HQ equaled 11, iron HQ equaled 8, selenium HQ ranged from 2 to 4, and zinc HQ equaled 2. All other tissue ECOPCs were lower than their respective TRVs.

State Land Creek – Of the 10 ECOPCs carried forward, four had HQs greater than 1. The aluminum HQ equaled 7, iron HQ equaled 6, selenium HQ ranged from 1 to 3, and zinc HQ equaled 2. All other tissue ECOPCs were lower than their respective TRVs.

The following is an expanded discussion of results for the ECOPCs with HQs greater than 1 for Tier 1.

Aluminum – Aluminum concentrations in fish tissues from the three streams evaluated ranged from a low of 19.4 mg/kg dw to a high of 503 mg/kg dw (both in State Land Creek) resulting in high HQs for fish tissues from each stream. Based on concentrations of aluminum in surface waters from the different EUs, it is clear aluminum is a Site-wide contaminant. It is uncertain however, whether or not aluminum bioaccumulation in these tissues is actually accumulated to levels toxic to the fish. More discussion of the potential for aluminum to pose a bioaccumulative risk to fish will be presented in the Uncertainty Analysis (Section 5).

Barium – No TRVs were available for barium. Barium is not typically considered a bioaccumulative metal and the concentration of barium that may elicit effects due to tissue concentrations in fish is unknown. Barium EPCs were similar across the three drainages where fish tissues were collected, thus a logical conclusion for barium is that it is naturally present and some uptake may occur, but risks to fish due to uptake are uncertain.

Iron – Iron concentrations in fish tissues across the three streams evaluated were relatively similar as were the resulting EPCs that yielded HQs ranging from 6 to 8. As an essential micronutrient, the division between essentiality and toxicity is unclear for the species evaluated, particularly because a fish, as any other organism is capable of regulating iron pools for essential physiological processes. More discussion of the potential for iron to pose a bioaccumulative risk to fish will be presented in the Uncertainty Analysis (Section 5).

Manganese – The tissue residue concentrations for manganese in Camp G Creek, Pedro Creek, and State Land Creek were variable with the highest EPC found in Camp G Creek. The lack of a tissue residue TRV for manganese relegates this ECOPC as uncertain relative to potential risks to fish due to bioaccumulation.

Selenium – Selenium concentrations in cyprinid fish tissues from each of the three streams were compared to reproductive effects thresholds translated to whole body equivalent concentrations. In both Pedro Creek and State Land Creek where tissue HQs were greater than 1, potential risk to the aquatic community and fish receptors in particular may be present. The potential magnitude of risk is higher in Pedro Creek than in State Land Creek. Use of a two TRV assessment illustrates that the HQ range is narrow between the two different TRVs when compared to ambient fish tissue concentrations.

Zinc – Zinc exceedances of the TRV were for the most part low with HQs equal to 2. More discussion of the potential for zinc to pose a bioaccumulative risk to fish will be presented in the Uncertainty Analysis (Section 5).

Amphibians – Because of relatively sparse data available on environmental toxicity of metals, amphibians were not included in the BPF (Formation 2012a) as a specific receptor group to be evaluated quantitatively in the ERA. A literature search was conducted to evaluate the sensitivity of amphibians, compared to fish and other aquatic life that are being evaluated quantitatively in the ERA. The comparison is summarized in Section 3.2.3 and indicated that amphibians were not more sensitive or potentially more exposed than fish (Kerby et al. 2010, Weltje et al. 2012).

During additional literature reviews, amphibian effect threshold data were found that would allow for comparisons of Site data to no and low effect concentrations. Table 3.1-7 shows a comparison of the Site fish tissue data for selenium to the amphibian TRVs, along with a single salamander sample collected from Hoorah Hollow. Based on the HQs derived, the NOEC TRV was exceeded in Pedro Creek and State Land Creek at SLC-2 (HQs = 2) while the LOEC TRV was never exceeded for any sample. The single salamander sample from Hoorah Hollow resulted in HQs less than 1. Based on these fish tissue data comparisons to the amphibian TRVs, risks to amphibians due to selenium uptake may occur in Pedro Creek and some isolated reaches of State Land Creek; however, these risks are not expected to have population wide effects as HQs >1 occurred only at the NOEC TRV, but not at the LOEC TRV. No amphibian risk is expected in Camp G Creek at least in the lower reaches.

Benthic Macroinvertebrates – A single selenium benthic macroinvertebrate threshold based on mayflies was found in the literature, discussed previously in Section 3.2.3. Benthic macroinvertebrate tissue data collected from a number of locations across the Site were compared to the NOEC and LOEC TRVs from this literature source. Table 3.1-8 shows the comparisons and resulting HQs. Only a few aquatic habitat locations resulted in HQs greater than 1, including Camp G Creek (CGC-4A) and Pedro Creek (PC-1). The Pedro Creek finding is consistent with the fish tissue and amphibian characterization that selenium in Pedro Creek may be accumulating in aquatic organisms to levels that potentially pose a risk. Although for each tissue type (fish, amphibian, and benthic) the HQs are low (e.g. 3 or less). Camp G Creek at CGC-4 is high in the headwaters region of this drainage downstream of an old waste rock dump. It appears that the elevated concentrations of selenium in Camp G Creek are isolated to

this upper headwater region as the benthic tissue residues from locations much lower in the Camp G Creek drainage both resulted in HQs well below 1.

Of the three mine features where benthic invertebrate tissues were collected, the French Drain and Pit Lake had selenium in benthic tissues sufficient to yield HQs greater than 1 relative to the NOEC and LOEC. Selenium accumulation in benthic tissues and higher order organisms that feed on those benthic invertebrates, such as amphibians and terrestrial wildlife, may be at risk due to ingestion of benthic invertebrates from these areas.

3.3.2 Tier 2 Risk Characterization

The Tier 2 Assessment involves evaluating ECOPCs on a more habitat-specific basis within an EU. This was done primarily because there were several different types of aquatic habitats present across the Site. In addition, as part of the narrower focus of Tier 2 assessment, two individual locations were added at this stage of the assessment because those sites were not within in any of the EUs. Those sites included in this stage of the assessment are JCS-1 and SLP-3 (Figure 3.1-3).

3.3.2.1 Surface Water

Table 3.3-1 shows HQs derived for each habitat within each EU for ECOPCs where HQs were greater than 1. The EPCs derived for surface water in each habitat are shown in Appendix A, Table A-1.4. Like the Tier 1 assessment, the Tier 2 assessment uses Site-specific hardness for hardness-based criteria to derive criteria for each of the EUs (Table 3.3-1). As shown in Table 3.3-1, aluminum and selenium are relatively consistent ECOPCs found in the different aquatic habitats. Aluminum, cadmium, and selenium are relatively consistent ECOPCs found in the different mine features. Discussion of the results from the Tier 2 assessment focuses on those ECOPC combinations where risk was identified (i.e., HQ >1). Findings of the Tier 2 assessment are as follows:

Aluminum – The existing National Ambient Water Quality Criteria (NAWQC) for aluminum from 1988 was developed using minimal species data. Furthermore, the driving studies in the derivation of the chronic value were conducted at the low end of the pH range at low hardness conditions.

Aluminum solubility in low pH waters is high and it is toxic at low pH. However, aluminum solubility at a pH above about 5.0 is negligible and it occurs in an insoluble form (“gibbsite”). In the pH range of most natural waters, aluminum concentrations must be very high to be toxic to aquatic life. USEPA Region 6 has approved a revised aluminum criterion (Parametrix 2009) for use at the Los Alamos National Laboratory in New Mexico. The revised criterion integrates hardness and includes data for species tested over a more natural range of pH. The aluminum

TRV from 1988 overestimates potential aluminum toxicity due to the paucity of data from which it was developed, and the pH range from which the test species exposures occurred.

Using the hardness-based aluminum TRV described previously, the EPCs were compared to both acute and chronic hardness based aluminum thresholds. The TRV values were developed based on a range of hardness from 26 to 220 mg/l as $CaCO_3$ (Table 3.3-1). As noted above, pH can play a role in the toxicity of aluminum, with low pH waters increasing the solubility and toxicity of aluminum. Table 3.1-1 shows the pH ranges for each of the areas evaluated if the data were available. Overall the available data indicates pH ranging from 6.5 to 9.3, well above the solubility level.

EPCs for each aquatic habitat exposure unit are lower than the chronic hardness-based threshold (e.g., HQ<1), except at Trail Canyon Creek EU. Using the hardness-based aluminum TRV results in chronic and acute HQs of 5 and 2, respectively. Data for this EU were derived from a single location, a pond located south across the road and upstream from Margarette Creek. It appears that one or more springs may be present upstream of the TCC-2 pond. Data from the TCC-2 location indicated a moderate hardness concentration (127 mg/L as $CaCO_3$) compared to other locations across the Site. Of the three total aluminum measurements, only one would exceed the hardness-based criterion, which was the maximum concentration measured (7.92 mg/l). The corresponding dissolved aluminum concentration was 0.0192 mg/L. On the same day, the concentration of total suspended solids (TSS) was relatively elevated at 37 mg/L. There is a high likelihood that the high total aluminum concentration was a direct result of the high TSS. Further, the proximity of the pond to the road and its distance from Site-related mine features suggests that high aluminum at the TCC-2 pond is not related to the Site.

Aluminum concentrations at the JCS-1 wetland location (based on 3 samples) resulted in an HQ of 2 (Table 3.3-1). The maximum concentration (4.62 mg/L) for total aluminum had a corresponding dissolved aluminum concentration of 0.014 mg/L and TSS concentration of 93 mg/L. However, considering that the JCS-1 wetland is in a drainage with no upgradient disturbance and the low HQ based on comparison to the chronic criteria suggests that risks to aquatic receptors is low.

Negative IRQ values across most of the Site indicate aluminum in surface water is present at higher concentrations in background than in Site waters. The single sample at Trail Canyon Creek is the exception, where total aluminum was higher than background concentrations. This is reinforced by negative IRQs in surface waters for all of the mine features. For mine features, HQs for aluminum were less than 1 except at the sedimentation basin where the chronic HQ was 3 and the IRQ was less than zero, indicating that the aluminum present is due to background concentrations.

Cadmium – In the Tier 1 assessment, dissolved cadmium concentrations from each of the EUs evaluated were lower than their respective hardness-based TRVs and cadmium was not carried

forward for Tier 2 analysis for the habitat EUs. Cadmium in surface waters from different habitats on the Site does not pose a risk for aquatic receptors.

Mine features including the Pit Lake, French Drain, Sedimentation Basin, and NE Seep Pond had chronic cadmium HQs greater than 1. At the Pit Lake and Seep Pond, acute TRVs were exceeded suggesting acute risks in these areas. Background cadmium in surface waters is minimal thus the cadmium present in these areas is all likely Site-related.

Iron – Iron was carried forward from the Tier 1 assessment for two of the eight EUs, including Camp G Creek and Trail Canyon Creek. For the Camp G Creek EU, two habitats were evaluated including stream habitat and wetland habitat. In both habitats, the iron EPCs resulted in chronic HQs of 2 (Table 3.3-1). In the Trail Canyon Creek EU, the TCC-2 pond had a chronic HQ of 6 (Table 3.3-1). At the JCS1 wetlands, the iron HQ was 4.

The local background concentrations for iron derived in the RI (as revised in Appendix B) for surface waters found that the low flow iron concentration was 2.5 mg/L. Using the base flow conditions, representing the predominant exposure condition, the IRQ for iron in Camp G Creek habitats are both less than zero suggesting that iron in background surface waters exceeds Site waters in Camp G Creek and the resulting risks predicted for iron in Camp G Creek are likely a function of background concentrations. The IRQ for the JCS1 site was 1.6 indicating that Site risks exceeded the background risk, thus in the absence of background iron concentrations, the Site may still pose a risk due to iron concentrations.

In the mine features, iron was identified with an HQ greater than 1 only in the Sedimentation Basin (HQ = 3). The IRQ was 0.6. While the Sedimentation Basin surface water EPC for iron exceeds the background concentration, in the absence of background, the Site would likely not pose a risk to aquatic receptors due to iron concentrations.

The EPRI (2004) work described previously in Section 3.2.1 suggests that there is considerable uncertainty associated with paucity of the existing iron toxicity data. Elevated background concentrations and uncertainty in the TRV suggests that while iron may pose unacceptable risks to aquatic receptors in the Trail Canyon Creek Pond, JCS-1 Wetland, and Sedimentation Basin the risks are likely to be low and highly influenced by background concentrations of iron.

Selenium – Selenium was carried forward as an ECOPC for four of the eight EUs, including Camp G Creek, Pedro Creek, State Land Creek, and the Westside Ponds. These four EUs were further characterized as part of the Tier 2 assessment by habitats within each EU, and by individual locations within EUs. Where appropriate, flow conditions that may affect exposure, and risks, were also considered. Background concentrations of selenium (0.00068 mg/L) have a negligible influence on observed Site EPCs.

In the Camp G Creek EU surface waters, selenium exceeded the chronic TRV in the stream and wetland habitats (HQs = 2 and 4, respectively) (Table 3.3-1). The wetland habitat at CGC-4A is

higher up in the EU drainage, and downstream of an old waste rock pile. The individual sample data from this location indicates that regardless of the flow condition, the selenium concentration exceeds the TRV (0.005 mg/L). Selenium does not appear to be significantly transported downstream from CGC-4 to the perennial stream sections of Camp G Creek; the highest concentration measured at locations CGC-0, CGC-1A, and CGC-1 was 0.0042 mg/L. Potentially unacceptable risks from selenium to aquatic receptors in Camp G Creek appear to be isolated to the upstream segment adjacent to and immediately downstream of old waste rock piles.

In the Pedro Creek EU, selenium EPCs exceeded the chronic TRV in all three habitats, including streams (chronic HQ = 19), wetlands (chronic HQ = 425), and ponds (chronic HQ = 27) (Table 3.3-1). The HQs based on the acute TRV were 5, 106, and 7 for the stream, wetland, and pond habitats, respectively (Table 3.3-1).

At the PCP-2 pond high in the headwaters of Pedro Creek EU, selenium concentrations were consistently higher than the TRV during the most recent 2014 sampling (0.023 to 0.284 mg/L), with similar concentrations during 2013. Downstream at the Pedro Creek wetland (PC-5), selenium concentrations were higher than the more upstream locations during 2014 (1.81 to 1.86 mg/L), with higher concentrations observed in 2013. Farther downstream in the Pedro Creek mainstem perennial sections, selenium concentrations were lower than the upstream segments. The data from Pedro Creek precede the NTCRA that was completed at the Site in 2014. The NTCRA was intended to reduce infiltration into the overburden pile.

By separating these data by their seasonal flow conditions, concentrations in the lower segment were observed to be distinctly higher during high-flow than low-flow periods. Pedro Creek HQs were typically higher than 1 for high flow, but 1 or lower during low flow periods (Figure 3.3-1).

The State Land Creek EU is comprised of three tributaries, including wetland areas (Figure 3.1-1), and the mainstem stream channel at the northeast section of the Site (Figure 3.1-3). For two of the three primary habitats identified, streams and wetlands both had HQs >1, with the wetlands HQ equal to 33, and the stream HQ equal to 18 (Table 3.3-1). Both stream and wetland habitats in State Land Creek exceeded the acute TRV (HQs = 5 and 8, respectively) (Table 3.3-1). The pond habitat had an HQ less than 1.

In the perennial segment of State Land Creek downstream of the three primary tributaries, selenium concentrations were variable. High flows in State Land Creek resulted in elevated selenium concentrations, often with HQs greater than 1, whereas HQs less than 1 were observed during low flow conditions (Figure 3.3-2).

Further examination of the different tributaries that comprise the State Land Creek EU reveals that wetlands in Tributary 3 (Figure 3.1-1), which included samples SW02-SP, SLCT3-1, SLCT3-5, and SLCT3-4, all had selenium concentrations in surface waters lower than the TRV (0.005 mg/L). At the mouth of Stand Land Creek Tributary 3 (SLCT3-0), which was identified as a stream habitat, selenium concentrations were 0.0011 mg/L or lower.

Selenium concentrations at locations in wetlands of State Land Creek Tributary 2 (SLCT2-0, SLCT2-1, SLCT2-2B, and SW08-ST) were elevated, but only during high flow periods. During low flow periods, all selenium concentrations were lower than the TRV (0.005 mg/l). Tributary 2 descends directly from Woodall Mountain on the northeastern side and the finding that selenium concentrations are only elevated during high flow periods indicates that runoff from the old mine workings is being transported down this tributary. The low base flow conditions however reflect that without this transport mechanism, selenium concentrations in State Land Creek Tributary 2 are consistently low. During high flows in State Land Creek, wetlands often had HQs >1, whereas HQs <1 were observed during low flow conditions (Figure 3.3-3).

Aquatic habitat is not present in the upper mainstem of State Land Creek, between Tributary 2 and Tributary 1, primarily because of the intermittent presence of surface water. Data from this segment were not included in the risk characterization. However, following the observations of selenium dynamics in the lower two tributaries, the upper mainstem and Tributary 1 data were queried to examine if similar observations would be found. The mainstem sites (SLC-3, SLC-3A, SLC-3D, SLC-3E, SLC-5, SLC-6, and SW13-ST) showed a relatively consistent pattern with the high and low flow dynamics observed in lower tributaries, with HQs predominantly greater than 1 during high flows (Figure 3.3-4). During low base flows, selenium concentrations were less than the TRV, while during high flows, selenium concentrations were typically elevated. Samples from State Land Tributary 1 locations (SLCT1-0, SLCT1-1, and SW13-ST) were all less than the TRV and HQs were below 1 with the exception of one sample from 2008 (Figure 3.3-5). The selenium concentration in that sample (0.101 mg/l) is inconsistent with all other measurement data through time for Tributary 1, as shown on Figure 3.3-5.

Overall, for State Land Creek, Tributary 2 and the upper mainstem of State Land Creek which both originate near the northeast corner of the mine site have elevated selenium concentrations during high flow periods that may pose a risk to aquatic receptors. Wetlands in Tributary 3 and intermittent stream samples from Tributary 1 pose no risks to aquatic receptors due to low selenium concentrations (e.g., <0.005 mg/L). Due to transport from Tributary 2 and the upper mainstem creek, selenium concentrations in the lower mainstem of State Land Creek are periodically elevated primarily during high flow events, but occasionally during low flows as well.

The Westside Ponds EU includes data from pond and wetland habitat types where chronic HQs were 10 and 2, respectively (Table 3.3-1). Only the pond habitat had an acute HQ greater than 1 (HQ = 2). These habitats are located south of the Old Tailings Pond. Sample locations within the wetland habitat type included data from the Hoorah Hollow (HH1) area and the southwest ponds spring (SWS-2). Samples from pond locations included SWP-2, SWP-3, and HHP-1. Pond and wetland habitats from the Hoorah Hollow area all had selenium concentrations in surface water less than the selenium TRV. Selenium concentrations at location SWP-3 were relatively higher overall (0.0091 to 0.08 mg/L), whereas selenium concentrations at location SWS-2 were lower and ranged from 0.0003 to 0.018 mg/L. The pond farthest to the south in the Westside Ponds EU is represented by sample location SWP-2 which had selenium concentrations ranging from 0.0005 to 0.0096 mg/L. Of the complex of ponds and wetlands

representing the Westside Ponds EU (Figure 3.1-1), Hoorah Hollow habitats pose no risk to aquatic receptors Habitats farther south of the French Drain (Figure 3.1-3), show decreasing potential for risk with increased distance from the French Drain.

Selenium concentrations at the JCS1 wetland were sufficiently low to result in HQs less than 1. No risk to aquatic receptors is expected due to selenium exposure at this location.

Selenium in the Pit Lake surface waters resulted in a chronic HQ of 50 and acute HQ of 12 while in the Tailings Pond the surface water HQ for selenium was less than 1. In the French Drain, chronic and acute HQs were 66 and 17, respectively, while in the Sedimentation Basin, chronic and acute HQs were 127 and 32. The NE Seep Pond had some of the highest chronic and acute HQs encountered, at 1474 and 369, respectively. It is not surprising that four of the five mine features contain high selenium. These areas are near old mine workings, and were designed to capture water near the active mine site. While not considered aquatic habitats, these waterbodies may play host to benthic invertebrates and amphibians as well as terrestrial wildlife, thus the high selenium risks at these locations were evaluated since they may serve as potential drinking water and food reservoirs for higher aquatic feeding organisms. Considerations should be given to these mine site features during remediation to eliminate their potential use by aquatic feeding organisms due to the high selenium concentrations.

While the high acute HQs for Pedro Creek and mine site features suggest acute toxicity and therefore high levels of risk are present in these areas, it is important to recognize that the current science for toxic effects of selenium as presented in USEPA's 2016 Final National Criterion indicates that "Although selenium may cause acute toxicity at high concentrations, the most deleterious effect on aquatic organisms is due to its bioaccumulative properties; these chronic effects are found at lower concentrations than acute effects." The primary exposure mechanism for selenium is food web uptake which occurs over longer exposure periods. High surface water concentrations may translate to acute effects, but there are several factors affecting the acute toxicity of selenium which increase the uncertainty in the SSERA of predicting acute effects using the current acute State Standard value (20 µg/L) for selenium. These factors are discussed more thoroughly in the Uncertainty Analysis (Section 5). Concentrations are sufficiently high in these areas to pose a chronic risk and may pose an acute risk to aquatic receptors.

3.3.2.2 Sediments

Table 3.3-2 shows the Tier 2 sediment HQs by EU and habitats within each EU for those drainages identified to have ECOPCs with HQs greater than 1 from the Tier 1 risk characterization. Summary statistics and EPCs derived for the ECOPCs by EU and habitat are presented in Appendix A, Table A-1.5. Local background concentrations of ECOPCs and their potential influence on EPCs and resulting HQs were also evaluated in Tier 2. Because no TRVs

for comparison were available for beryllium and vanadium, habitat EPCs within each EU for Tier 2 were compared to the local background concentrations for these ECOPCs.

For the discussion of potential sediment risks, it is important to keep in context the difference between the TRV_{low} and TRV_{high} and their relationship to potential effects. Below the TRV_{low}, effects are generally not present, while above the TRV_{high}, effects are expected. Between these thresholds, there is considerable uncertainty as to whether effects are present or not. Adding to this complexity is the presence of natural background concentrations which may exceed the Site EPC and one or both of the TRVs. Background concentrations that exceed one or both TRVs may contribute risks, but in the absence of additional Site-related concentrations, risks may or may not be diminished due to organisms that have adapted to higher concentrations.

Antimony – Antimony was carried forward and had an HQ of 2 for the Pit Lake and an IRQ of 1.4. Antimony in sediments may pose a risk in Pit Lake sediments given that the antimony TRV is an upper effect threshold value.

Arsenic – The Pedro Creek EU and Westside Ponds EU were the only EUs where arsenic concentrations in sediments were high enough to exceed TRVs. Stream, wetland, and pond habitats were present in Pedro Creek. The arsenic HQ_{low} were 1 for stream habitats, 2 for wetland habitats, and 0.5 for pond habitats. The HQ_{high} was not exceeded in any of the three habitats (Table 3.3-2). Both low and high IRQs for the Pedro Creek habitats were 1 or less indicating that background arsenic contributes a negligible risk to site-related risks.

For the West Side Pond EU, ponds and wetlands were present. Arsenic in the pond habitat resulted in an HQ of 0.3 corresponding to the TRV_{low}. In the wetland habitat, the arsenic HQ was 3. Arsenic in neither habitat exceeded the TRV_{high} (Table 3.3-2).

The local background concentration of arsenic in sediments is 3.82 mg/kg dw. The pond habitat IRQ was less than zero while the wetland habitat IRQ was 2.2. IRQs greater than 1 indicate that Site risk exceeds background risk. Overall, the wetland habitat in the Pedro Creek and Western Pond EU are the only habitats with potential arsenic risks from sediment. For all remaining habitats, arsenic risks are expected to negligible.

Barium – Barium in sediments in aquatic habitats in each of the EUs exceeded the TRV_{low} and TRV_{high}. The local background concentration determined was 181 mg/kg dw (Table 3.3-2), which is about 9 times higher than the TRV_{low}. Based on the $IRQ_{high,}$ site risks do not exceed background risks for any of the sediments in aquatic habitats, although some risk due to background concentrations may be present due to IRQ_{low} values of up to 1.7 (northwest reference wetland) Table 3.3-2). Barium is likely a Site-wide naturally occurring element

Barium in the mine features showed a similar pattern to that found for the aquatic habitats, where background barium in sediments exceeded the Site concentrations and the TRV_{low} and TRV_{high} for all mine features except the French Drain. In the French Drain, the barium EPC was

909 mg/kg dw (Table 3.3-2), about 4 times higher than background. Exceedance of background does not imply effects; however, the high barium concentration in this area may pose risks to benthic receptors due to Site-related activities. Barium is not known to be particularly toxic to aquatic life, thus high concentrations may pose more of a physical risk, than a toxic risk. For all remaining habitats, barium risks are expected to be negligible.

Beryllium – No TRVs were available for beryllium. With no TRV for comparison, the beryllium EPC from each habitat was compared to the beryllium background (0.841 mg/kg dw). None of the aquatic habitats resulted in a background HQ greater than 1.

For the Pit Lake, the beryllium HQ was 2, while in the French Drain, the HQ was also 2. EPCs for the Pit Lake (1.6 mg/kg dw) and French Drain (1.65 mg/kg dw) were the highest observed for beryllium across the entire Site. While there is uncertainty in this approach, it is typically accepted that if Site concentrations do not exceed local background, they likely do not pose an unacceptable risk. Beryllium in the Pit Lake and French Drain may pose a small risk to aquatic receptors.

Cadmium – Where cadmium was carried forward from the Tier 1 risk characterization, EPCs exceeded the TRV_{low} in most habitats. Cadmium also exceeded the TRV_{high} at the Pedro Creek EU streams (HQ_{high} = 3) and wetlands (HQ_{high} = 6), State Land Creek streams (HQ_{high} = 2) and wetlands (HQ_{high} = 2), Trail Canyon Creek streams (HQ_{high} = 2), and Westside Ponds wetlands (HQ_{high} = 3) (Table 3.3-2).

Cadmium EPCs in mine features equaled or exceeded the TRV_{high} in the following: Pit Lake (HQ_{high} = 22), Tailings Pond (HQ_{high} = 2), French Drain (HQ_{high} = 15), and Sedimentation Basin (HQ_{high} = 2) (Table 3.3-2).

The local background concentration of cadmium in sediments was 2.63 mg/kg dw (Table 3.3-2), which exceeded the TRV_{low} (1.0 mg/kg dw). IRQs exceeding zero were found at the Camp G Creek wetlands, Pedro Creek stream and wetlands, State Land Creek streams and wetlands, Trail Canyon Creek stream, Westside Ponds wetlands and ponds, and Formation Creek. Areas where cadmium in sediments likely poses the greatest risks to benthic macroinvertebrates include Pedro Creek streams and wetlands, State Land Creek streams and wetlands, Westside Ponds wetlands, and Formation Creek.

Cadmium in sediments from each of the mine features exceeded the $TRV_{high.}$ Despite the elevated background concentration of cadmium in sediments, cadmium risks to benthic invertebrates in the mine features is likely present.

Chromium – Chromium was carried forward to the Tier 2 risk characterization for Pedro Creek, State Land Creek, and the Westside Ponds EUs.

In Pedro Creek streams the HQ_{low} and HQ_{high} were 4 and 2, respectively, while in Pedro Creek wetlands the HQ_{low} and HQ_{high} were 8 and 3, respectively. The State Land Creek stream and wetland HQ_{low} was 3 and 2, respectively, (Table 3.3-2), but neither exceeded the HQ_{high}. Westside Ponds wetlands had an HQ_{low} and HQ_{high} of 6 and 2, respectively. Chromium was not particularly elevated in local background sediments (24.13 mg/kg dw) (Table 3.3-2), thus it likely has little effect on observed EPCs and resulting exceedances of the TRV_{high}. Potential risk of chromium in sediments to benthic invertebrates in these habitats due to Site-related activities may be present.

Chromium in the Pit Lake, French Drain, and Sedimentation Basin exceeded the TRV_{low}, while chromium in the Pit Lake and French Drain exceeded the TRV_{high} (HQ_{high} = 5 and 2, respectively). Chromium risks in sediments from the Pit Lake and French Drain are likely present.

Copper – Copper was only carried forward for two EUs: Pedro Creek and the Westside Ponds. In the three habitats in the Pedro Creek EU, copper exceeded the TRV_{low} only in stream (HQ_{low} = 2) and wetland habitats (HQ_{low} = 2) (Table 3.3-2). In the Westside Ponds EU the copper HQ_{low} was 3 in the wetlands and less than 1 in the ponds. Copper in local background sediments was 21.18 mg/kg dw but did not exceed the TRV_{low} of 32 mg/kg dw (Table 3.3-2). Resulting IRQs in Pedro Creek and Westside Ponds habitats suggest that absent background, copper may pose a low risk to benthic invertebrates.

Copper in sediments at the mine features resulted in an HQ_{low} for the Pit Lake and French Drain of 5 and 2, respectively, with no HQ_{high} greater than 1 for either area. Similar to the habitat EUs, Copper IRQs indicate that absent background, copper risks are likely low for mine features.

Manganese – Manganese was carried forward as an ECOPC for many EUs, including: Camp G Creek, Pedro Creek, Trail Canyon Creek, Westside Ponds, and North Woodall Creek. Where manganese was carried forward, manganese in sediments exceeded the TRV_{low} in all habitats except the Pedro Creek wetlands; however, manganese in sediments never exceeded the TRV_{high}.

Manganese was an ECOPC for mine features only in French Drain sediments, and similarly had an HQ greater than 1 for the TRV_{low} and less than 1 for the TRV_{high}.

Local background for manganese in sediments is 1258 mg/kg dw. Most IRQs for manganese, due to this high background concentration, were less than zero, indicating background concentrations exceed Site concentrations and risks present are almost solely due to background. Exceptions include Camp G Creek streams and wetlands, Pedro Creek ponds, and the Northwest reference streams and wetlands where IRQ_{low} values were 2.2 or less (e.g., at the Northwest reference habitats). Where potential manganese risk to benthic invertebrates in sediments is present, background concentrations contribute the bulk of the total concentrations measured.

Mercury – Mercury was only carried forward as an ECOPC in the Pedro Creek and Westside Ponds EUs. In Pedro Creek, the stream and wetland habitat HQ_{low} were both 2 (Table 3.3-2). For Westside Ponds wetland habitat, the HQ_{low} was 4, while for ponds the HQ_{low} was less than 1. Neither habitat type had mercury concentrations in sediments that exceeded the TRV_{high}.

Mercury in sediments from the mine features resulted in the following: Pit Lake HQ_{low} = 3, Tailings Pond HQ_{low} = 5 and French Drain HQ_{low} = 3. None of these waterbodies had mercury concentrations in sediments that exceeded the TRV_{high}.

Mercury in local background sediments is 0.16 mg/kg dw (Table 3.3-2). Low IRQ_{high} values (e.g., slightly greater than zero) suggest mercury risks to benthic invertebrates in habitats and mine features are likely negligible.

Nickel – Nickel was carried forward as an ECOPC for the following EUs: Pedro Creek, State Land Creek, Westside Ponds, and Formation Creek. In the Pedro Creek EU, nickel concentrations in sediments resulted in an HQ_{low} of 6 and HQ_{high} of 3 in stream habitat, HQ_{low} of 7 and HQ_{high} of 3 in wetland habitat, and did not exceed either TRV in the pond habitat (Table 3.3-4). In the State Land Creek EU, nickel concentrations in sediments resulted in an HQ_{low} of 4 and HQ_{high} of 2 in stream habitat, and an HQ_{low} of 3 and HQ_{high} of 1 in wetland habitat. In the Westside Pond EU, nickel concentrations in sediments resulted in an HQ_{low} of 9 and HQ_{high} of 4 in wetland habitat, and an HQ_{low} of 1 in wetland habitat (Table 3.3-2). In the Formation Creek EU, nickel concentrations in sediments resulted in an HQ_{low} of 1.

Mine feature sediment concentrations of nickel resulted in an HQ_{low} of 7 and HQ_{high} of 3 in the Pit Lake, and an HQ_{low} of 10 and HQ_{high} of 5 in the French Drain.

Local background for nickel in sediment was 25.64 mg/kg dw (Table 3.3-2). Where nickel concentrations in sediment exceed the TRV_{high}, nickel IRQs were greater than 1 suggesting that Site risks are greater than background risks. Nickel may pose a risk to benthic invertebrates due to Site-related activities in the Pedro Creek, State Land Creek, Westside Ponds, Pit Lake, and French Drain areas.

Selenium – Selenium was carried forward for all EUs except the Downgradient East and Downgradient West areas. Locations and habitats where HQ_{high} exceed 1 include the following: Camp G Creek wetland habitat (HQ_{high} = 2), Pedro Creek habitats (stream HQ_{high} = 27; wetland HQ_{high} = 358), State Land Creek habitats (stream HQ_{high} = 4, wetland HQ_{high} = 2), Westside Ponds wetland (wetland HQ_{high} = 10), Formation Creek (HQ_{high} = 1), Pit Lake (HQ_{high} = 63), French Drain (HQ_{high} = 150), and Sedimentation Basin (HQ_{high} = 10) (Table 3.3-2).

Unlike other TRVs where the foundation is based on effects to benthic organisms, the selenium TRVs are not based on effects to benthic invertebrates, rather they are intended as screening levels for protection of higher order consumers. Therefore, exceedances of the TRV do not provide any indication of selenium risk to benthic invertebrates. The best risk estimates for

higher order consumers will come from the evaluation of fish tissue residues and the terrestrial assessments. Comparison of the sediment selenium TRVs to Site EPCs does however provide a relative scale by which to assess selenium concentrations in sediments and the potential for those sediments to potentially pose a risk to higher order consumers. As a bioaccumulative ECOPC, selenium effects are manifested via dietary uptake, thus for benthic invertebrates, much like fish and terrestrial receptors, the primary line of evidence for risk is derived from tissue data, as presented in Tier 1 Section 3.1.1. See the Benthic Macroinvertebrates subsection in Section 3.3.2.3 for more discussion about locations, sediment concentrations, and potential effects.

Silver – Silver HQs greater than 1 were only identified for the Pedro Creek and Westside Ponds EUs. In the Pedro Creek stream and wetland habitats, the HQ_{low} was 2. In the Westside Ponds wetland habitat, the HQ_{low} was 3, while in the pond habitat, the HQ_{low} was 1. Silver concentrations in aquatic habitat EUs did not result in HQ_{high} values greater than 1 (Table 3.3-2).

Mine feature concentrations of silver resulted in an HQ_{low} for the Pit Lake of 9 and HQ_{high} of 4. Local background concentrations of silver were low (0.15 mg/kg dw) (Table 3.3-2). The potential risk of silver in sediments to benthic invertebrates in aquatic habitats is likely low, but may be present in Pit Lake sediments.

Thallium – Thallium was only identified as an ECOPC in mine feature waterbodies. Thallium HQ_{low} values for both the Pit Lake and French Drain were equal to 2. Background in sediments for thallium was 0.48 mg/kg dw. With an IRQ of 1.8 for the Pit Lake, sediment concentrations there exceed the risk threshold over and above background, whereas the lower than 1 IRQ in the French Drain suggests thallium in sediments there only slightly exceeds background and the risks are low.

Vanadium – Vanadium was carried forward as an ECOPC because no TRVs for vanadium in sediment were available. Local background for vanadium in sediments was 45.4 mg/kg dw. The EUs and habitats where vanadium in sediments exceeded the local background concentration included Pedro Creek (streams and wetlands), State Land Creek (streams and wetlands), Trail Canyon Creek (streams), and the Westside Ponds (wetlands).

In mine feature waterbodies, vanadium exceeded the local background in sediments from the Pit Lake, French Drain, and Sedimentation Basin.

For the habitats and mine features, the magnitude of vanadium in sediments over the local background concentrations suggests a possible contribution from Site-related activities. The actual risks posed by concentrations of vanadium in Site-sediments greater than background are uncertain, however, due to the lack of a toxicity threshold.

Zinc – Zinc was carried forward as an ECOPC for the Pedro Creek, State Land Creek, Trail Canyon Creek, Westside Ponds, and Formation Creek EUs. In the Pedro Creek stream habitat,

the zinc HQ_{low} was 4, while the HQ_{high} was 1, in wetlands the HQ_{low} was 5 and the HQ_{high} was 1 (Table 3.3-2). Pedro Creek pond habitat did not exceed the TRV_{low}.

The State Land Creek stream habitat HQ_{low} was 3 and the HQ_{high} was <1, while the wetland habitat HQ_{low} was 2 and the HQ_{high} was <1. The Trail Canyon Creek stream habitat HQ_{low} was 2 and the HQ_{high} was <1. The Westside Ponds wetland habitat had an HQ_{low} of 6 and HQ_{high} of 2, while the ponds had an HQ_{low} of 1 and an HQ_{high} of <1. Formation Creek EU HQ_{low} was 2 while the HQ_{high} was <1 (Table 3.3-2).

Zinc concentrations in mine features resulted in the following HQs: Pit Lake HQ_{low} was 8 while the HQ_{high} was 2, French Drain HQ_{low} was 11 while the HQ_{high} was 3, and Sedimentation Basin HQ_{low} was 3 while the HQ_{high} was <1.

The local background concentration of zinc was 129.4 mg/kg dw. IRQs for the aquatic habitat EUs suggest that the risk due to zinc in sediments over background concentrations is relatively low but present indicating some Site contribution to the potential risks. This is evident based on the HQs and IRQs for the mine features where zinc was present. Based on these data and the local background zinc concentration in sediments, risks to benthic invertebrates due to Site related activities is likely low in aquatic habitats except at the Westside Ponds wetland habitat where Site zinc concentrations likely contribute more to potential risks.

3.3.2.3 Biota Tissue

Fish Tissues – The Tier 1 evaluation found that concentrations of aluminum, iron, and zinc in fish tissues were elevated in all three drainages, but these ECOPCs were also elevated in background surface water and/or sediments. Site related risks to fish due to concentrations of these ECOPCs in fish tissues, therefore is likely to be low. The lack of barium and manganese TRVs provides no comparable measure of effects, thus potential risk due to these two EPCs is uncertain.

Table 3.3-3 separates the fish tissue samples by location and/or species to discern whether combined sites and or species for the Tier 1 assessment had any effect on the interpretation of these data. Based on the evaluation presented in Table 3.3-3, no changes in the interpretation of the data are necessary.

Selenium concentrations in fish tissues suggest that the perennial sections of Pedro Creek and State Land Creek may pose a risk to aquatic receptors due to selenium exposure. Lower perennial sections of Camp G Creek however had tissue concentrations below the effects thresholds and thus selenium risk in these lower sections is likely negligible.

Amphibians – As discussed previously in Section 3.2.3, the available evidence suggests that amphibians have a similar sensitivity as fish and other aquatic life to many of the ECOPCs.

Data on bioaccumulation and developmental toxicity for metals suggest that at least anuran amphibians do not accumulate substantially higher concentrations of metals than fish, and that tissue-based TRVs for fish are protective of the amphibians. For aluminum, barium, iron, manganese, and zinc, risks to amphibians are expected to be no greater than those identified for fish.

Table 3.1-7 compared fish tissue concentrations of selenium to amphibian effects thresholds and found NOEC HQs of 2 for Pedro Creek and State Land Creek, with no LOEC HQs greater than 1. Using amphibian thresholds and fish tissue from the Site presents some uncertainties related to the use of intra-species tissue data and effects thresholds; however, the literature review discussed previously suggests that these uncertainties are minimized based on the collective information about the similarities of amphibian and fish responses to contaminants.

Benthic Macroinvertebrates – Selenium is a bioaccumulative ECOPC and the best measure of potential effects for aquatic biota is based on tissue data. So far, the literature has suggested that fish are more sensitive than benthic invertebrates to selenium, so ideally, if a stream or waterbody does not have concentrations of selenium that bioaccumulate in fish to a level greater than a sensitive fish threshold, then the waterbody would not be considered a risk with respect to selenium. However, not all streams support fish, but many that cannot support fish do support thriving benthic invertebrate communities. Until recently, no benthic invertebrate effects thresholds were available; therefore, outdated and likely inadequate thresholds for effects were used by default. With the recent literature (Conley 2009, 2011, 2013) providing studies defining mayfly effect thresholds, investigators can now compare site benthic tissue data to these thresholds to estimate potential effects due to dietary uptake.

In the Tier 1 evaluation, these comparisons were made to estimate potential risks. In the Tier 2 assessment, it is important to evaluate the relationship, if any, between the sediment TRVs and the benthic tissue TRVs, and if data gaps can be filled through this process. Table 3.3-4 was compiled to examine the differences between risks predicted using the selenium TRVs and sediment EPCs for selenium versus using the tissue data.

The Camp G Creek wetland data is confirmed via the tissue data that potential selenium risks to benthic macroinvertebrates are present in the upper headwaters.

Pedro Creek is more complex. In the upstream wetland areas, concentrations of selenium are high resulting in very high HQs (715). Benthic tissue data is only available for lower Pedro Creek stream sites, but even there sediment data compared to selenium TRVs suggests large risks HQ_{high} = 27 while the tissue data suggests low or minimal risk.

State Land Creek sediments compared to selenium TRVs are predicted to pose a risk with HQ_{high} values of 4 and 2 in the two habitats, while the benthic tissue data indicates no risk is present.

For Hoorah Hollow Pond in the Westside Ponds EU, both the benthic tissue data and sediment TRV evaluation agree. Similarly, for the North Woodall Creek EU, sediment TRVs and the tissue predictions agree. For both of these areas, however, selenium in sediment is relatively low.

At the highest sediment concentration found (360 mg/kg dw) at SWP-4 which is part of the French Drain complex sites, the highest tissue HQ was 18 based on the NOEC, while the sediment TRVs predicted an HQ_{low} of 300 based on a sediment concentration of 600 mg/kg dw.

3.4 Offsite Conditions: Qualitative Risk Evaluation

This section discusses the extent of Conda-related releases offsite to the UBR and Bear River subwatersheds. Figure 3.4-1 presents the monitoring locations considered as part of this offsite analysis.

3.4.1 Upper Blackfoot River

Several historical and active mining operations are present along the UBR upgradient of Conda, as well as across the river from Conda. By the time the UBR flows past the Site, it is a multi-order river receiving flow from several drainages including Lanes, Diamond, Mill Canyon, Dry Valley, Maybe, Chicken, Angus, Wooley Valley, and Slug Creeks. Site drainages flowing into UBR include State Land Creek, Pedro Creek, and Camp G Creek. State Land Creek discharges directly to the UBR. Pedro and Camp G Creeks discharge to Trail Creek before it discharges into the UBR (Figure 3.4-1).

Flow – In evaluating potential Site-related effects on the UBR, it is important to consider the magnitude of surface water flows in the Blackfoot River and the Site tributaries. Flows in the UBR and Site drainages are as follows:

- Flows in the UBR (based on USGS gauge 13063000 from 2001 through 2012) range from 20 to 80 cubic feet per second (cfs) (low flow), and 400 to 1,500 cfs (high flow);[9]

- Flows at the mouth of Trail Creek range from 0.6 to 6.4 cfs (low flow), and 1.2 to 23 cfs (high flow);

- Pedro Creek contributes up to 0.2 cfs (low flow) and from 0.007 to 4 cfs (high flow) to Trail Creek;

- Camp G Creek contributes up to 0.7 cfs (low flow), and from 2.5 to 3 cfs (high flow) to Trail Creek; and

[9] The USGS Blackfoot River gauge (13063000) is located approximately 5 miles upgradient of the Blackfoot Reservoir and downgradient of the Site.

- Flows at the mouth of State Land Creek range from 0.03 to 0.3 cfs (low flow), and 0.07 to 12 cfs (high flow).

Based on the above data, it is clear that Site tributary flows represent a small fraction of the overall seasonal high and low flows occurring in the UBR.

Surface Water Quality – Selenium concentrations in UBR surface water near the Site are provided in the Revised Draft Final RI Report (Formation 2016a) and summarized below. From upgradient to downgradient, the average total selenium concentrations in the UBR surface water, near its confluence with the Site tributaries, were as follows:

- 0.0038 mg/L (ranging from non-detect to 0.008410 mg/L) upgradient of Trail Creek;
- 0.0015 mg/L (ranging from non-detect to 0.026 mg/L) in Trail Creek;
- 0.0034 mg/L (ranging from non-detect to 0.008 mg/L) downgradient of Trail Creek;
- 0.0036 mg/L (ranging from 0.0016 to 0.0076 mg/L) upgradient of State Land Creek; and
- 0.0033 mg/L (ranging from non-detect to 0.0083 mg/L) downgradient of State Land Creek.

Based on the average and range of these selenium concentrations in surface water, there is no apparent increase in selenium concentration in UBR due to Conda tributary discharges. The chronic criteria for chromium, nickel, and zinc were not exceeded. Cadmium exceeded its chronic criterion only three times, and for each sample, the exceedance was reported as a less than detectable concentration.

Sediment Quality – Selenium concentrations in UBR sediment near the Site are provided in the Revised Draft Final RI Report (Formation 2016a) and summarized below. All sediment COPC concentration data presented herein are on a dry weight basis.

Selenium concentrations in sediments in the UBR upgradient and downgradient of its confluence with the Site tributaries were as follows:

- 0.58 mg/kg (ranging from 0.5 to 0.66 mg/kg) upgradient of Trail Creek;
- 0.75 mg/kg (ranging from non-detect to 0.83 mg/kg) downgradient of Trail Creek;
- 0.89 mg/kg upgradient of State Land Creek; and

[10] Upper values of the ranges presented include the maximum detected concentrations. In the summary statistics tables, both the maximum value and maximum detected value are presented.

- 0.63 mg/kg downgradient of State Land Creek.

Selenium concentrations in sediments at all UBR locations were less than the 2 mg/kg screening level. Pedro Creek, State Land Creek and Trail Creek had the only concentrations of selenium in sediments that exceeded the comparison value (2 mg/kg). Of the Site tributaries, Pedro Creek (3.8 mg/kg) had the highest average selenium concentration in sediment, followed by State Land Creek (2.1 mg/kg). The selenium concentration in sediment (0.96 mg/kg) in Camp G Creek was less than the 2 mg/kg comparison value.

Aquatic Biota – To evaluate the extent of mining-related effects in aquatic biota, this discussion focuses on the concentrations of selenium in fish tissues.[11] Because multiple species of fish may be captured, fish were divided into salmonids (trout) and non-salmonids (primarily forage fish). Selenium concentrations in UBR fish tissue near the Site are provided in the RI (Formation 2016a) and summarized below. All fish tissue data are presented on a dry weight basis (mg/kg dw) for whole body tissues.

Selenium concentrations in fish tissues from the UBR are as follows:

- No trout tissue data were available for locations upgradient of Trail Creek. A forage fish tissue sample collected from ST022 upgradient of Trail Creek had a selenium concentration of 12 mg/kg. This concentration exceeds the USEPA (2016) Final National Criterion (8.5 mg/kg dw) but does not exceed the cyprinid threshold of 17 mg/kg.

- At ST021 near the Fox Ranch, trout tissue selenium concentrations averaged 4.5 mg/kg (ranging from 2.2 to 7.1 mg/kg). No trout tissue concentrations of selenium at this site exceeded the comparison value (13.2 mg/kg[12]). Forage fish tissue samples from ST021 averaged 9.9 mg/kg (ranging from 8.1 to 13 mg/kg). The forage fish tissue concentrations are within the range of the USEPA 2016 criterion (8.5 mg/kg) and the cyprinid threshold 17 mg/kg.

- One forage fish sample was collected at ST230 (upstream of State Land Creek). The selenium concentration in fish tissue was 9 mg/kg, which exceeded the criterion value (8.5 mg/kg) but not the threshold for cyprinids (17 mg/kg).

- One forage fish tissue sample was collected at MST020, just downgradient of State Land Creek. The selenium tissue concentration was 11 mg/kg, which exceeded the criterion value (8.5 mg/kg) but not the threshold for cyprinids (17 mg/kg).

[11] Due to the paucity of available UBR fish tissue data, tissue samples collected prior to 2001 were also included in this analysis.
[12] This value represents the whole body tissue threshold for brown trout derived in USEPA 2016. It is an EC10 value translated from the egg/ovary effect threshold for this species and is the more sensitive of the two trout species present in Southeast Idaho.

3.4.2 Trail Creek

On Trail Creek, the range of locations encompasses those upgradient of Camp G Creek to its mouth. As previously discussed, Camp G Creek and Pedro Creek discharge into Trail Creek, with Pedro Creek's confluence downgradient of the Camp G confluence.

Surface Water Quality – Average selenium concentrations in surface water in Trail Creek from upgradient of Camp G Creek to downgradient near its discharge to the UBR are provided in the RI (Formation 2016a) and presented below:

- 0.00029 mg/L (ranging from non-detect to 0.00039 mg/L) upgradient of Camp G Creek;
- 0.00083 mg/L (ranging from non-detect to 0.0026 mg/L) downgradient of Camp G Creek;
- 0.00063 mg/L (ranging from (0.00024 to 0.0011 mg/L) upgradient of Pedro Creek; and
- 0.0037 mg/L (ranging from 0.00029 to 0.026 mg/L) downgradient of Pedro Creek.

Sediment Quality – Average selenium concentrations in Trail Creek and tributary sediments are provided in the RI (Formation 2016a) and summarized below:

- 0.32 mg/kg (ranging from 0.15 to 0.48 mg/kg) upgradient of Camp G Creek;
- 0.41 mg/kg downgradient of Camp G Creek;
- 0.78 mg/kg upgradient of Pedro Creek; and
- 3.6 mg/kg downgradient of Pedro Creek.

Aquatic Biota – Selenium concentrations in fish tissues from Trail Creek and tributaries are presented in the RI (Formation 2016a) and summarized below:

- Selenium concentrations in trout tissues averaged 4.2 mg/kg (ranging from 2.8 to 6.4 mg/kg) at TC-5 upgradient of Camp G Creek on Trail Creek. All selenium concentrations from this site did not exceed the screening benchmark (13.2 mg/kg). Selenium concentrations in forage fish tissues averaged 5.5 mg/kg (ranging from 2.6 to 7.5 mg/kg). All selenium concentrations in forage fish tissues at TC-5 were less than the 2016 National Criterion (8.5 mg/kg).
- At TC-1, also upgradient of Camp G Creek on Trail Creek, forage fish tissue samples averaged 5.1 mg/kg selenium (ranging from 1.5 to 12.5 mg/kg). Of the 11 samples collected at this location, only one exceeded the Final National Criterion (8.5 mg/kg). No trout were observed or captured at TC-1.

- Downgradient of Camp G Creek, at site TC located at the Trail Creek road bridge, selenium in forage fish tissues averaged 5.7 mg/kg (ranging from 2.2 to 10.5 mg/kg). Of the 8 samples collected at this location, only one exceeded the National Criterion (8.5 mg/kg). No trout were observed or captured at the TC location.

- No fish tissue samples were collected in Trail Creek downgradient of Pedro Creek.

3.4.3 Bear River

Conda drainages that could convey flow into the Bear River subwatershed during large storm events were evaluated including the dry draws along the western side of the Woodall Mountain Panels and the dry draw in North Trail Panel. Throughout the period of monitoring no active flows were recorded at the mouths of these draws. The draws are likely ephemeral at best, flowing only in response to precipitation heavy enough to result in runoff.

Sediment data are available for the Woodall Mountain Creek draws (WMC1-WMC5) and were previously discussed in Section 6.3.5 of the Revised Draft Final RI Report (Figure 3-8, Formation 2016a). At the mouth of these draws, selenium concentrations at WMC1-1, WMC2-1, WMC3-1, WMC4-1A, and WMC5-1A were 5.7, 1.6, 0.59, 5.2, and 4.9 mg/kg, respectively. With little or no flows present, no aquatic habitat is present and thus little if any exposure occurs to aquatic biota from these drainages.

In the Trail Canyon Creek drainage at the south end of the Site, Margarette Creek (MC-1) and Trail Canyon Creek (TCC-1, TCC-1A, and TCC-2) locations were monitored. A single sediment sample was collected in 2008 for Margarette Creek that had a selenium concentration of 109 mg/kg (Figure 3-8, Formation 2016a); however, this sample was not in the creek but in a catchment pond.

At TCC-2 upgradient of the Margarette Creek drainage, selenium concentrations in surface water were less than 0.001 mg/L (Figure 3-7, Formation 2016a). One sediment sample was collected at this location with a selenium concentration of 0.24 mg/kg. Downgradient of the Margarette Creek drainage, no flows were present, and only sediment data were collected. All selenium concentrations in sediment in Trail Canyon Creek downgradient of Margarette Creek were less than the 2 mg/kg screening level. Similar to the Woodall Mountain Creek draws, Trail Canyon Creek appears to be ephemeral to intermittent, with some spring flow. While the Margarette Creek catchment pond had elevated selenium concentrations in sediments, it appears that the catchment pond is effective in preventing runoff into Trail Canyon Creek as all sediment concentrations of selenium downgradient of Margarette Creek were low (ranging from 0.37 to 0.76 mg/kg).

3.4.4 Summary of Conditions Offsite

Surface Water Quality – The effects of Conda tributary discharges on total selenium in the UBR are indeterminate. Several factors influence this: (1) the UBR has flow volumes many times those of the tributary streams discharging to the UBR; (2) existing selenium concentrations in the UBR upgradient of the Site may mask any tributary inputs from Conda, as the average selenium concentrations at locations upgradient of Trail Creek and State Land Creek are relatively unchanged, (3) data for selenium and flows over an appropriate spatial and temporal scale are lacking in the UBR resulting in uncertainty about the influence of Conda tributaries on the UBR, and (4) the range of selenium concentrations at locations downgradient of State Land Creek and Trail Creek inflows is variable due to episodic high-flow events from tributary inflows that may temporarily increase selenium concentrations at localized points in the UBR although these increases lack duration and sufficient frequency to sustain lasting effects. Overall, the variability of incoming selenium concentrations both from upstream and Conda tributaries and the lack of data to quantify this variability provide no certainty on potential impacts or lack of impacts of the Conda Site on the UBR.

In Trail Creek surface waters, selenium concentrations are typically low and below the chronic aquatic life criterion (0.005 mg/L); however, at Trail Creek below Pedro Creek, high flows during 2011 resulted in high selenium concentrations in Trail Creek corresponding to elevated concentrations that occurred in Pedro Creek. Of the two tributaries to Trail Creek from the Site, Pedro Creek appears to have the most potential for effects to Trail Creek. Selenium concentrations at the mouth of Camp G Creek were consistently lower than the chronic criterion, while Pedro Creek selenium concentrations were consistently elevated. In terms of potential effects of the Conda Site to off-site waterbodies, the largest effect is in Trail Creek due to discharges from Pedro Creek.

In the Bear River subwatershed, contributions of selenium via the surface water pathway appear to be extremely limited due to the lack of flows.

Sediment Quality – Selenium concentrations in sediments of the UBR upgradient and downgradient of Site tributaries are lower than the screening level for selenium in sediments.

In the Bear River drainage, contributions of selenium via the sediment pathway appear to be extremely limited due to the lack of flows.

Aquatic Biota – The limited trout tissue data does not allow for any conclusions related to tissue concentrations of selenium. The forage fish tissue data, however, are more abundant. Limited data in the upper sections of the UBR influenced by Trail Creek do not provide enough information to suggest that Trail Creek is affecting tissue concentrations in the UBR. Based on average concentrations, the selenium concentrations in tissues appear to be declining downgradient in the UBR. However, the average concentrations downgradient are more variable and have the highest and lowest concentrations measured. Elevated concentrations of

selenium in fish tissues from State Land Creek provide some indication that it is a source of selenium for aquatic biota in this creek and possibly to the UBR. However, it is also clear based on concentrations of selenium in fish tissue from the UBR upgradient from State Land Creek and the Site that elevated selenium concentrations in different media are occurring upgradient of the Site as well.

In Trail Creek, tissue concentrations of both forage fish and trout from upgradient of Camp G Creek were all less than the USEPA Final National Criterion (USEPA 2016). Limited exceedances of the comparison value occurred in forage fish tissues from a location immediately upgradient of Camp G Creek and concentrations at both locations were similar to those observed for Camp G Creek fish.

Pedro Creek had clearly elevated concentrations of selenium in fish tissues. However, no samples of fish tissue were available from Trail Creek downgradient of Pedro Creek to discern what effect, if any, selenium concentrations in Pedro Creek have on Trail Creek prior to its discharge to the UBR.

3.5 Aquatic Risk Summary

Potential risks to aquatic receptors are summarized in this section across all three media by EU in an effort to compile the lines of evidence (LOE) that were used to draw conclusions from the risk characterization. The focus of this summary is primarily on selenium concentrations that may or likely pose a risk to aquatic receptors. Other ECOPCs identified as potentially posing a risk to aquatic receptors in EUs (Figure 2.4-1 and 2.4-2) are also summarized. Tables 3.5-1 to 3.5-14 provide a matrix that summarizes risk in each media, considered background, and provides a risk characterization narrative. Barium was identified as a Site-wide background contaminant because it exceeded all Site EPCs except barium in sediments from the Sedimentation Basin.

Camp G Creek – Selenium concentrations in surface waters and sediments from Camp G Creek lower in the drainage likely do not pose a risk to aquatic receptors in the lower reaches. Fish tissue data compared to both fish tissue and amphibian no effects endpoints results in HQs ≤ 1. Benthic invertebrate tissue from lower in the basin compared to benthic no effect thresholds also result in an HQ ≤ 1. In Camp G Creek higher up in the drainage (intermittent or wetland areas) surface water and sediment concentrations of selenium are elevated sufficiently to pose a risk to aquatic receptors. The benthic tissue HQ was 3, while no fish data were available for Camp G Creek higher up in the drainage. With no fish tissue data available from Camp G Creek wetlands, the magnitude of surface water concentrations being double that found in the stream segment and the benthic tissue data exceeding the tissue LOEC TRV suggests sufficient selenium is available for dietary uptake and accumulation in the upper headwater wetlands at Camp G Creek. Risks due to selenium in Camp G Creek appear to be relatively isolated to the wetland habitats adjacent to and downstream of old waste rock piles. Selenium in the Camp G Creek wetlands near the headwaters poses a risk to aquatic receptors (Table 3.5-1).

Pedro Creek EU – Surface water, sediments, and biotic tissues (fish, amphibian, and benthic) in Pedro Creek habitats had concentrations of selenium that exceeded their respective TRV resulting in HQs greater than 1. HQs greater than 1 in surface waters were always a function of high flows, whereas low base flows always had HQs less than 1.

Fish tissue data from the lower perennial segment of Pedro Creek also resulted in an HQ greater than 1 for selenium. Comparison of fish tissue data to amphibian thresholds resulted in HQs greater than 1 only at the NOEC, but not the LOEC. Benthic tissues compared to tissue thresholds similarly resulted in HQs greater than 1 only for the NOEC, but not for the LOEC. In sediments, selenium concentrations in all three habitats also resulted in HQs greater than 1, with HQs greatest in wetland habitats and lowest in pond habitats. Based in large part on the fish tissue concentrations, selenium in Pedro Creek likely poses a risk to aquatic receptors (Table 3.5-2). The sediment data is uncertain given the large discrepancy between predicted risks for sediments using non benthic effects based thresholds and benthic tissues compared to benthic tissue effects based thresholds.

Cadmium in the Pedro Creek wetland and stream sediments exceeded the TRV_{high} resulting in an HQ_{high} of 6 and 3, respectively. Despite local background concentrations, cadmium concentrations found in the Pedro Creek wetlands and streams likely pose a risk to benthic invertebrates from Site-related activities (Table 3.5-2).

Chromium was elevated in Pedro Creek wetland and stream sediments sufficient to produce HQs greater than 1 (Table 3.5-2) relative to the TRV_{high}. Chromium in sediments from these habitats likely poses a risk to benthic receptors.

Nickel in surface water and fish tissues did not exceed their respective TRVs; however, in sediment, nickel exceeded the TRV_{high} in stream and wetland habitats (Table 3.5-2). Despite the

background concentration of nickel in sediments (e.g., >TRV_{low}), Site nickel concentrations are sufficiently elevated above background to pose a risk to aquatic receptors.

Vanadium in Pedro Creek habitats exceeded background concentrations in sediments; however, no sediment TRV was available. Vanadium was not detected in surface waters or fish tissues at concentrations greater than the TRVs. Vanadium concentrations exceeding background in Pedro Creek suggest some Site-related contributions, although potential for risks to aquatic receptors is uncertain.

State Land Creek EU – Selenium concentrations in surface waters for both stream and wetland habitats yielded chronic HQs greater than 1 (Table 3.5-3), with the wetland HQ (33) being higher than the stream HQ (18). Selenium in wetland surface waters from Tributary 3 was consistently lower than the TRV. In the lower perennial segment of State Land Creek, downstream of Tributary 3, selenium measured during high flows almost always resulted in HQs greater than 1, whereas during low flows, HQs were always less than 1. Tributary 2 wetland surface waters yielded a similar pattern of HQs greater than 1 during high flows and HQs less than 1 during low flows. Likewise, the upper mainstem of State Land Creek upstream of Tributary 2 showed a similar pattern. Tributary 1 selenium concentrations in surface water were less than the TRV, except for a single concentration in 2008. Selenium in State Land Creek surface waters is primarily a function of transport during high flows from Tributary 2 and the Upper mainstem which both originate near old mine workings.

The fish tissue data for the lower perennial segment of State Land Creek yielded a similar finding (HQ = 3), as did the amphibians (HQ = 2), and sediments in streams (HQ_{high} = 4) and wetlands (HQ_{high} = 2). Overall, selenium risks to aquatic receptors are present in lower State Land Creek, Tributary 2, and the upper mainstem of State Land Creek. Each of these areas is connected directly or indirectly to the old mining areas near Woodall Mountain. Tributaries 3 and 1 appear to be largely unaffected and have low selenium concentrations in aquatic media.

Additional risks to benthic invertebrates may be present due to cadmium and nickel in State Land Creek wetland sediments (likely in Tributary 2). Both metals exceeded the TRV_{high}, resulting in an HQ_{high} of 2 for cadmium and an HQ_{high} of <1 for nickel.

Trail Canyon Creek EU – No selenium risks were identified in this EU for surface water or sediments. Both aluminum and iron were identified as posing a potential risk due to HQs greater than 1 (Table 3.5-4), but background concentrations in surface waters and/or sediments for these ECOPCs, high TSS during sample collection, and at least for iron, uncertainty in the TRV, suggest that neither of these ECOPCs in surface waters likely pose a risk to aquatic receptors due to Site-related activities. Cadmium in stream sediments downstream of Margarette Creek resulted in an HQ_{high} of 2 and may pose a risk to benthic macroinvertebrates.

Westside Ponds EU – The Westside Ponds EU includes data from pond and wetland habitat types where selenium chronic HQs were 10 and 2, respectively (Table 3.5-5). Acute HQs were

2 and ≤1 for pond and wetland habitats, respectively. Wetland habitat sediments had an HQ_{high} of 10 for selenium, while tissue HQs were ≤ 1. These habitats are located south and east of the Old Tailings Pond. Of the complex of ponds and wetlands representing the Westside Ponds EU, Hoorah Hollow habitats pose no risk to aquatic receptors. The greatest risk is posed in those pond habitats near the French Drain. Habitats farther south of the French Drain, show decreasing potential for risk with increased distance from the French Drain. No other ECOPCs were identified for surface waters for the Westside Ponds EU habitats.

A number of ECOPCs were identified in the Westside Ponds EU habitat sediments with HQs greater than 1 relative to the TRV_{high} (Table 3.5-5). In the wetland habitat, cadmium, chromium, nickel, and zinc exceeded the TRV_{high} with resulting HQs of 3, 2, 4, and 2, respectively. The Westside Ponds habitats, primarily in the French Drain area pose a risk to aquatic receptors due to a number of metals, primarily in sediments.

Woodall Springs EU – Selenium in surface water was not elevated above the TRV, while in sediments, selenium exceeded the TRV_{low} (Table 3.5-6). Potential risks due to selenium in sediments may be present but is uncertain because the sediment TRV is not based on effects to benthic invertebrates, but rather to higher order consumers. No other ECOPCs were identified as posing a risk to aquatic receptors.

Formation Creek EU – No surface water EPCs exceeded their respective TRVs in Formation Creek. Barium, cadmium, and selenium exceeded sediment TRV_{low} values, but not the TRV_{high} values (Table 3.5-7). Risks due to concentrations of these ECOPCs in sediments of Formation Creek are not anticipated.

Downgradient EU (JCS1) and Northwest Reference Area – The JSC1 wetland area had aluminum and iron ECOPCs in surface waters that exceeded TRVs. However, only a single sample was collected thus potential risks due to these ECOPCs is uncertain (Table 3.5-8).

In the Northwest Reference Area, no surface water EPCs exceeded their respective TRVs. Manganese was elevated in sediments, but did not exceed the $TRV_{high.}$ Benthic tissue data for selenium was also low resulting in an HQ ≤ 1 (Table 3.5-9).

Pit Lake – In Pit Lake surface waters, cadmium, selenium and vanadium exceeded their respective chronic TRVs resulting in HQs of 8, 50, and 3, respectively. Antimony, cadmium, chromium, nickel, selenium, silver, and zinc each exceeded their respective TRV_{high} values resulting in HQs of 2, 22, 5, 3, 63, 2, and 2, respectively. Benthic tissue from the Pit Lake also exceeded the benthic tissue effect threshold for selenium resulting in an HQ >1 (Table 3.5-10).

Tailings Pond – No surface water ECOPCs exceeded their respective TRVs and all HQs were ≤ 1. Cadmium was the only ECOPC in sediments to exceed the TRV_{high} resulting in an HQ of 2 (Table 3.5-11).

French Drain – Only selenium and cadmium in surface waters exceeded their respective TRVs resulting in HQs of 2 and 66, respectively. In sediments, cadmium, chromium, nickel, selenium, and zinc exceeded the TRV_{high} resulting in an HQ_{high} of 15, 2, 5, 150, and 3, respectively. Benthic tissue from the French Drain also exceeded the benthic tissue effect threshold resulting in an HQ >1 for selenium (Table 3.5-12).

Sedimentation Basins – Surface water in the Sedimentation Basin had aluminum, cadmium, iron, and selenium concentrations that exceeded the TRV resulting in HQs of 3, 5, 3, and 127, respectively. Cadmium and selenium were the only sediment ECOPCs to exceed their respective TRV_{high} values resulting in HQs of 2 and 10, respectively (Table 3.5-13).

NES-5 Seep Pond – Only surface water data was available from this waterbody. Cadmium, nickel, selenium, and zinc each had concentrations in surface waters exceeding their respective TRVs resulting in HQs of 32, 3, 1474, and 4, respectively (Table 3.5-14).

4.0 TERRESTRIAL AND RIPARIAN RISK ANALYSIS AND CHARACTERIZATION

The estimation of exposure, effects, and the characterization of risk for terrestrial and riparian receptors are discussed in the following sections. The assessment and measurement endpoints associated with the potentially exposed receptor groups were discussed in Section 2.4.

4.1 Exposure Assessment

For terrestrial and riparian receptors, measures of exposure are defined as those measures that describe the location and concentration of ECOPCs in abiotic and biotic media that are used to estimate exposure to ECOPCs. Exposures and risks were assessed in a tiered approach based on a scale, as follows:

- Tier 1 – by EU.
- Tier 2 – by EU using location-specific data for terrestrial receptors and drainage-specific data for riparian receptors.

Tier 1 provides a reasonable estimate of exposure and risk to the subpopulations of receptors inhabiting the EU. The Tier 1 assessment does not take home range of the receptors into account (i.e. all calculations have 100% Site use), so for small receptors with limited home ranges, an EU may make up the territory for an entire subpopulation. For larger home range receptors, an EU may make up the home range for a few individuals or even only part of the home range for individuals or subpopulations. Tier 1 should be considered as the most appropriate tier for large home range receptors. Risks to smaller home range receptors can be more precisely described using the Tier 2 data; however, Tier 1 should be used to assess population level risks.

Tier 2 is used to estimate exposure based on individual sample points and provides a more detailed characterization of exposures because it considers data based on the area represented by each sample point within each EU. Tier 2 does not represent population-based exposure except for small subpopulations of small home range receptors that inhabit the area near the sampling location. The Tier 2 assessment assumes that the receptors spend all of their time at the sampling location and is, therefore, intended to provide more spatial resolution to risk managers by highlighting areas of the EUs that may have higher or lower ECOPC concentrations and carry more weight spatially in the Tier 1 assessment.

The location-specific analysis included in Tier 2 was conducted primarily to identify the parts of the EUs that contribute most to the overall exposure and risk estimates. This information will aid in identifying FS alternatives. However, HQs based on single locations are not representative of the area over which receptors forage. Therefore, location-specific HQs do not

represent the population-based measurement endpoints for use in assessing overall risk to assessment endpoints.

There were three basic routes of exposure identified in the BPF and quantified in the exposure assessment: (1) ingestion from food, soil/sediment, and surface water; (2) direct contact (absorption); and (3) inhalation.

Quantification of exposure requires data on ECOPC concentrations in Site environmental media (i.e., soil, sediment, surface water, and prey items) and, for wildlife receptors, estimates of ingestion rates or contact information for each receptor and pathway. In addition, body weights, ingestion rates of food, and other factors must be known for each of the wildlife receptors. The exposure information used for each receptor is unchanged from the screening steps provided in Section 2.3 and are presented in Tables 2.3-11 (feeding habits) and 2.3-12 (exposure parameters).

The quantification of receptor-specific exposures via inhalation or dermal absorption was not evaluated because of a lack of appropriate exposure and toxicity data. The exposure of animals to contaminants in soil by dermal contact is likely to be small due to barriers of fur, feathers, and epidermis (USEPA 1989, 2005b). Inhalation of particulate forms of ECOPCs is unlikely to be as important of an exposure pathway as ingestion of contaminated materials at the Site. Thus, the exposure analysis focuses on the ingestion pathway as the primary exposure route for terrestrial vertebrates.

4.1.1 Tier 1 Exposure Assessment

Tier 1 exposure was defined in the BPF as an estimate of the upper-bound estimate of average exposure within each EU (Figure 2.4-1). Tier 1 exposure is a general estimate of exposure that the entire population of each receptor inhabiting the EU may experience. For receptors with small home ranges, such as small mammals and songbirds, the Tier 1 estimate represents an overall estimate for the part of the local population (or meta-population) that resides within the EU boundaries. For wide-ranging receptors such as the coyote, mule deer, and northern harrier, the EU may represent only a portion of the feeding range for individual animals. For these receptors, the Tier 1 estimate provides an estimate of their exposure while feeding within the EU and assuming that all of their exposure comes from the EU.

Tier 1 exposures were estimated as the 95UCL concentrations for each ECOPC for each of the exposure media. Only measured COPC concentrations in each media were used in the EPC calculations. No prey tissue EPCs were estimated in the Tier 1 exposure assessment.

Statistical summaries of each of the Tier 1 ECOPCs, including the calculated 95UCLs, are provided in Appendix A. The 95UCL EPCs used in the Tier 1 exposure assessment for upland

wildlife receptors are provided in Table 4.1-1. Soil EPCs for those ECOPCs identified for vegetation and invertebrates are provided in Table 4.1-2.

Consistent with USEPA guidance (USEPA 1992), exposure point concentrations in the SSERA were represented by the 95 percent UCL on the mean (95UCL) (i.e., $p<0.05$). Data that were reported as less than detection were included in the EPC calculations. The statistical program ProUCL 5.0 (USEPA 2013) was used to calculate the 95th UCL, including non-detected concentrations and allowing the program algorithms to estimate a UCL through bootstrapping methods. The output from ProUCL recommends a UCL (generally the 95th UCL but possibly up to the 99th UCL) and that value was used unless it was greater than the maximum concentration. In the cases where the sample count is less than 9, and the maximum concentration was greater than the calculated 95UCL, the maximum detected concentration was used in most cases, based on a review of the data. All cases where the maximum concentration was used are noted in Appendix A. For the datasets with very small sample sizes (i.e. < 5 samples), the maximum concentration (detection or detection limit) was used and provides a reasonably conservative yet uncertain assumption of exposure. The uncertainty associated with small sample sizes is discussed in more detail in the Uncertainty Analysis (Section 5).

Exposure to surface soil (0-6 inches below ground surface) was estimated for all receptors. In nearly all cases, the 0 to 2 inch depth interval was used as the surface soil EPC. A very limited number of samples (n = 9) were collected from the 0 to 6 inch depth interval and were used in the surface soil dataset. In addition, a second Tier 1 exposure calculation for burrowing receptors and terrestrial vegetation using ECOPC concentrations from 0-12 inches below ground surface was also conducted. Soil exposure was calculated using a volume weighted calculation for all depth intervals from 0 to 12 inches at a single location for calculation of a single 0-12 inch soil concentration. Details of the subsurface soil calculation are provided in Appendix C.

The receptors that primarily feed in aquatic and riparian habitats (belted kingfisher, great-blue heron, mallard, meadow vole, raccoon, red-winged blackbird, song sparrow, and mink) are discussed with the location-specific analysis in Tier 2 because of the limited number of sampling locations from riparian and aquatic habitats, and the fact that these receptors are not expected to feed in the upland EUs.

The detailed results of the Tier 1 exposure calculations are provided in Appendix D. A summary of the exposure calculated for each ECOPC/receptor pair are provided in Table 4.1-3.

4.1.2 Tier 2 Exposure Assessment

For those ECOPCs identified in Tier 1 as requiring additional risk characterization (Section 4.3-1), the Tier 2 exposure assessment provides an evaluation of ECOPC concentrations for

individual sampling locations where soil and/or other environmental media were collected. The location-specific HQ estimates are not representative of overall exposures for individuals except those with small home ranges or subpopulations, and are provided to show the relative contribution from different areas of the Site to overall exposure and risk estimates. The results are intended for use by risk managers to provide better spatial resolution and to help develop remediation alternatives. These include both upland and riparian locations for upland receptors.

The Tier 2 EPCs and exposure calculations are provided in Appendix E. Since many terrestrial receptors likely also feed in and utilize riparian habitats, exposure in riparian areas was estimated for both upland and riparian receptors. At riparian/seep areas where fish are not expected to be present, exposure to fish-eating receptors was not calculated.

4.2 Effects Assessment

The exposure of terrestrial receptors, expressed as the daily rate of intake of a chemical, was estimated for each ECOPC/receptor pair. Risk characterization was then based on the comparison of these estimated intakes to TRVs, which are exposure levels with known levels of toxicity for standard test species, and used as benchmarks to evaluate hazard or risk associated with site exposure estimates.

TRVs are generally derived from the scientific literature on toxicity of chemicals. Two types of TRVs are used for wildlife in the terrestrial risk assessment. The NOAELs are intake rates below which no adverse ecotoxicological effects are expected. NOAEL TRVs are typically used in screening-level ERAs to identify COPCs that are clearly not present at ecotoxic levels. Lowest-Observed Adverse Effects Level (LOAEL) TRVs were used in the risk characterization for wildlife. LOAELs represent the lowest exposure levels evaluated in the referenced toxicity study that were associated with adverse effects. The true threshold for possible effects is between the NOAEL and LOAEL.

TRVs for wildlife exposure were obtained from regulatory guidance and scientific literature. For ECOPCs for which EcoSSL documents are available, TRVs representing both the NOAEL identified by USEPA in the EcoSSL documents and the lowest bounded LOAEL for growth, reproduction, and mortality endpoints from the EcoSSL documents were utilized as the primary TRVs in the SSERA.

For some chemicals for which EcoSSLs were not available, TRVs were obtained from other major ecological risk databases, including Sample et al. (1996), Los Alamos National Laboratory (LANL 2008), and US Army Center for Health Promotion and Preventive Medicine (USACHPPM 2009). Tier 1 Wildlife TRVs also included NOAELs, which are the same as those identified for the screening level assessment (Table 2.3-13) and LOAELs (Table 4.2-1). Those ECOPCs for which no TRV is available were identified as ECOPCs of uncertain risk and are discussed further in the Uncertainty Analysis (Section 5).

4.3 Risk Characterization

Risk characterization represents Step 7 in the eight-step USEPA ERA process and evaluates the results of the risk analysis completed in Step 6 versus the TRVs, and provides information on interpreting the results for the assessment endpoints (USEPA 1997).

HQs were used in the risk characterization for both Tier 1 and Tier 2. As previously described, the HQ is a ratio of the estimated exposure concentration to the TRV. In general, if the HQ is less than 1 for the NOAEL TRV then no adverse effects are predicted and risks to that ECOPC/receptor pair are considered to be *de minimis*. Although the LOAEL endpoint is not explicitly based on population endpoints, for purposes of this risk assessment LOAEL HQs that are less than 1 will be used to indicate that adverse effects to receptor populations are unlikely. If the exposure exceeds the LOAEL TRV, the risk of adverse effects is more likely, but useful characterization of the risk may require more explicit evaluation including spatial extent of elevated concentrations, habitat quality, and location of elevated exposure. For instance, a high HQ that results from a small, isolated area of high concentration and/or low habitat quality may not indicate potential population/community-level effects because exposure is limited to a few individuals that must utilize other areas to maintain populations. By contrast, if the highest concentrations occur in limited areas of low habitat quality, risk of adverse effects may be small and remediation in such areas may not result in significant risk reduction. There is, however, no clear consensus from either USEPA guidance or the scientific literature concerning the significance of the level of departure from HQ greater than 1 (Menzie et al. 1992).

4.3.1 Tier 1 Risk Characterization

The Tier 1 risk characterization is intended to reflect exposures to receptors occupying the entire EU and provides the best risk estimates for large home range receptors. For upland wildlife receptors, the NOAEL HQ calculations are presented in Table 4.3-1 for all ECOPC/receptor pairs. For those ECOPCs with one or more NOAEL HQ greater than 1, the LOAEL HQs are calculated in Table 4.3-2.

Comparisons of the EU-specific soil 95UCL EPCs to the terrestrial invertebrate (0-6 inches) TRVs are provided in Table 4.3-3. Comparisons of the subsurface soil (0-12 inches, i.e. rooting zone) EPCs to the terrestrial plant TRVs are provided in Table 4.3-4.

For the ECOPCs for which the NOAEL HQs are less than 1 for all upland wildlife receptors (Table 4.3-1) in all EUs, risk of adverse effects is considered *de minimis,* and no LOAEL-based HQs were calculated. These ECOPCs are:

- Antimony
- Arsenic

- Barium
- Manganese
- Mercury

NOAEL HQs were greater than 1 in at least one EU for the following ECOPCs:

- Cadmium: deer mouse
- Chromium: American robin
- Copper: American robin
- Lead: American robin
- Molybdenum: Eastern cottontail, deer mouse, mule deer,
- Nickel: deer mouse
- Selenium: all receptors
- Vanadium: American robin, deer mouse, northern bobwhite, northern harrier
- Zinc: northern harrier

Tier 1 HQs using the lowest LOAEL TRV were calculated for the ECOPC/receptor pairs with one or more NOAEL HQ greater than 1 in any EU in Table 4.3-2. These HQs are presented graphically in Figures 4.3-1 through 4.3-18. Of these, only copper had no LOAEL HQs greater than 1 for any receptor and, therefore, is not considered further in the risk characterization. Risks from copper are considered to be low in all EUs.

Risks to upland wildlife receptors from cadmium, chromium, lead, molybdenum, nickel, selenium, vanadium, and zinc are discussed further in the Tier 2 Risk Characterization (Section 4.3.2).

For the terrestrial plant and invertebrate receptors, Tier 1 EPCs were greater than the screening benchmark (Tables 4.3-3 and 4.3-4) for the following ECOPCs:

- Antimony
- Arsenic

- Cadmium
- Chromium
- Copper
- Manganese
- Mercury
- Molybdenum
- Nickel
- Selenium
- Vanadium
- Zinc

For the ECOPCs with EPCs greater than either benchmark, the potential for adverse effects cannot be ruled out with the screening-level data available for assessment. If additional assessment for potential effects is required in order to make risk management decisions, then additional data may be required at a later date.

4.3.2 Tier 2 Risk Characterization

The Tier 2 assessment refines the risk characterization by providing HQ calculations on a location-specific basis to help identify the locations and areas of the Site that contribute most to exposure and risk. Location-specific HQs reflect the ECOPC concentration at only one location and, therefore, are not representative of exposures or risk for individuals (except small home range receptors) or subpopulations that feed over larger areas. This information is provided to support risk management decisions for wildlife receptors by identifying specific areas of the Site which may require additional assessment. Location-specific HQs were calculated in two ways: (1) sites for which collocated soil and biotic media samples are available (receptor/ECOPC pairs with Tier 1 LOAEL HQs > 1) and (2) sites for which biotic media concentrations were estimated from soil concentration (selenium only). All HQs calculated for the Tier 2 assessment are provided in Appendix E.

4.3.2.1 Upland and Riparian Receptors

HQs were calculated as described in Section 4.1.3. LOAEL HQs greater than 1 were calculated for at least one upland sampling location for the following receptor/ECOPC pairs:

- Cadmium; deer mouse
- Chromium; American robin
- Lead; American robin
- Molybdenum; deer mouse
- Nickel; deer mouse
- Selenium; all receptors
- Vanadium; American robin, deer mouse, northern bobwhite, northern harrier
- Zinc; northern harrier

The HQs for ECOPC/receptor pairs listed above are shown in Figures 4.3-19 through 4.3-35.

Both the upland and riparian receptors were assumed to utilize the riparian habitats. LOAEL HQs greater than 1 were calculated for the following ECOPCs at one or more riparian sampling locations:

- Barium; meadow vole
- Chromium; mallard
- Manganese; meadow vole
- Nickel; deer mouse
- Selenium; all receptors
- Vanadium; mallard, red-winged blackbird, American robin
- Zinc; northern harrier

All HQs calculated for riparian sampling locations are provided in Appendix E and are presented for the above receptor/ECOPC pairs in Figures 4.3-36 through 4.3-56

The following sections provide additional detail for the chemicals listed above.

Barium – LOAEL HQs for all receptors were less than 1 for all upland sampling locations, indicating *de minimis* risk from barium for upland areas of the Site.

Figure 4.3-36 shows the HQs for the meadow vole at riparian sampling locations. LOAEL HQs greater than 1 were calculated for 2 of 8 riparian sampling locations; one location on State Land Creek (HQ = 1.2 at SLC-2) and one location on North Woodall Creek (HQ = 1.2 at NWC-2). All other LOAEL HQs across the Site were less than 1.

The HQs for both locations were less than 1.2, and if rounded to the nearest unit would not exceed 1 (USEPA 2005b). Therefore, while HQs exceed 1 for isolated locations, overall risks from barium are likely *de minimis* for local populations.

Cadmium – Figure 4.3-19 shows the HQs calculated for the deer mouse. HQs greater than 1 were calculated for 3 of 17 sampling locations: two locations within the Ibex EU (HQ 1.9 at NQ-11 and 2.3 at NQ-16); and one location (HQ 1.1 for ST10-04) within the Grace Panel EU. All other LOAEL HQs across the Site were less than 1.

While risk to individual omnivorous small mammals such as deer mice from cadmium cannot be conclusively dismissed, the low magnitude of the HQs (all HQs < 2) and restricted nature of the of HQs greater than 1 indicate low risk to populations at the Site

Chromium – Figure 4.3-20 shows the HQs calculated for the American robin. HQs greater than 1 were calculated at 3 of 17 locations: one location within the Ibex EU (HQ 1.5 from Old Tailings Pond), one location within the Woodall EU (HQ 2.1 for NT5-05), and one location in the Grace Panel EU (HQ = 1.6 for ST10-04). All other LOAEL HQs calculated at upland sampling locations across the Site were less than 1.

At the riparian sampling locations, a LOAEL HQ greater than 1 was calculated only at location SWP-4 (HQ = 3.1) for the mallard (Figure 4.3-37). All other HQs at all riparian locations were less than 1.

While risk to individual omnivorous birds such as American robins and mallards from chromium cannot be conclusively dismissed, the low magnitude and restricted nature of HQs greater than 1 indicate low risk to populations at the Site.

Lead – The Tier 1 LOAEL HQs for lead were low, with only the HQ for the American robin exceeding 1 (HQ 1.1) and only for the Former Town Site EU. Figure 4.3-21 shows the HQs

calculated for the American robin. No LOAEL HQs greater than 1 were calculated at any of the 17 sampling locations, indicating no unacceptable risk to receptor populations.

Manganese – All LOAEL HQs for all receptors at all upland sampling locations were less than 1 and manganese was not carried forward to Tier 2 for the upland receptors.

For riparian receptors, an HQ greater than 1 was calculated for one location on Camp G Creek (HQ = 1.6 at CGC-1) (Figure 4.3-38). LOAEL HQs were less than or equal to 1 for all other locations. Sampling location CGC-1 is remote from source materials at the Site, and other locations closer to the source materials have HQs less than 1, suggesting that manganese exposure may not be related to mining waste at the Site.

Based on the low magnitude of HQs, and restricted nature of HQs greater than 1, risks to the ecological receptor populations from manganese exposures is low or *de minimis*.

Molybdenum – Tier 1 LOAEL HQs for molybdenum exceeded 1 for only the deer mouse in the Ibex Complex EU (HQ 1.6). Figure 4.3-22 shows the HQs calculated for the deer mouse receptor. An HQ greater than 1 was calculated at only 1 of 17 sampling locations. The HQ at location NQ-08 in the southern portion of the Woodall EU was equal to 1.2. All other LOAEL HQs across the Site were less than 1.

Based on the low magnitude of HQs, and restricted nature of HQs greater than 1, risks to ecological receptor populations from manganese exposures is low or *de minimis*.

Nickel – Tier 1 LOAEL HQs for nickel exceeded 1 for only the deer mouse in the Grace Panel EU (HQ 1.3). Figure 4.3-23 shows the HQs calculated for the deer mouse receptor. An HQ greater than 1 was calculated at 3 of 17 sampling locations at which all biotic exposure media were available. The HQs greater than 1 ranged from 1.1 at locations NT5-05 and ST10-04 in the Woodall and Grace Panel EUs to 1.3 at location NQ-16 in the Ibex EU. All other LOAEL HQs at upland and riparian sampling locations across the Site were less than 1.

Based on the low magnitude of HQs, and restricted nature of HQs greater than 1, risks to ecological receptor populations from manganese exposures is low or *de minimis*.

Selenium – Selenium was identified as an ECOPC for all receptors considered in the SSERA. In the Tier 1 risk characterization, Tier 1 LOAEL HQs greater than 1 were calculated for all upland receptors in multiple EUs.

As the first step in the Tier 2 risk characterization, location-specific LOAEL HQs were mapped for each receptor (Figures 4.3-24 through 4.3-30) at upland EU sampling locations where collocated soil and biotic media data were available.

In the riparian areas, LOAEL HQs greater than 1 were calculated for all receptors at one or more sampling locations (Figures 4.3-40 through 4.3-52).

While Tier 1 HQs were greater than 1 across the Site, there are clear spatial differences in the magnitude of the HQs across the Site where direct measure of selenium in both abiotic and biotic media was available. In order to provide a more comprehensive spatial evaluation of potential risk from selenium, the collocated data were statistically evaluated to determine if significant relationships were adequate to allow the estimation of selenium concentrations in terrestrial vegetation, invertebrates, and small mammals from concentrations in surface soil. The statistical assessment is provided in Appendix F and indicates reasonably strong correlations between soil concentrations and the various prey items used in the exposure models. The estimates for biota were then used to calculate exposures and HQs for soil sampling locations where biota data were not available. The HQs are shown in Figures 4.3-24 through 4.3-30. The locations shown on these figures where selenium concentrations in biota are estimated using the equations provided in Appendix F are designated by triangles. Those locations where measured biotic media concentrations were used in the HQ calculations are designated by circles. At these locations, selenium concentrations in tissue exposure media were not modelled and only measured concentrations were used in the risk calculations.

The location-specific HQ calculations for the deer mouse and the American robin (the most highly exposed receptors) are provided in Figures 4.3-24 and 4.3-26. Based on these data, it is clear that the Tier 1 EPCs for the two downgradient EUs were significantly influenced by a relatively small proportion of vegetation and soil sampling locations that were just downgradient of the ODAs with higher selenium concentrations. Concentrations and exposure from locations spatially distant from the former mining operations were considerably lower.

HQs are clearly higher on the ODAs within the Woodall, Ibex Complex, and Grace Panel EUs than in the downgradient EUs. In particular, HQs were highest in and around the Old Tailings Pond and in the central portion of the Ibex Complex EU as well as on the slopes of the Woodall EU. HQs within the Grace Panel were also consistently elevated relative to the samples collected from the downgradient EU adjacent to the Grace Panel. The results were similar for the remaining receptors but with lower magnitude HQs than observed for the small avian and mammalian omnivores.

Based on the Tier 1 and Tier 2 risk characterizations, selenium was identified as an ecological chemical of concern (ECOC) and risk and exposure estimates are discussed further in Section 4.4.

Vanadium – Vanadium was identified as an ECOPC for all of the upland and riparian bird receptors (except the great blue heron) and the deer mouse receptor. LOAEL HQs were greater than 1 at multiple locations for the bird receptors (Figures 4.3-31 through 4.3-33). An HQ greater than 1 was calculated at only one sampling location (Figure 4.3-34) for the deer mouse (HQ = 1.5 at NQ-18).

As shown in Table 4.3-5, where HQs were elevated, the soil ingestion pathway contributed most to exposure estimates for birds. Vanadium concentrations, and exposure associated with biotic media (i.e., food) were generally very low relative to that observed for soil.

As with selenium, the Tier 1 and Tier 2 risk characterizations indicate that vanadium HQs exceeded 1 at higher magnitude and at more sampling locations than the other ECOPCs. Since no statistically significant relationships between vanadium concentrations in soil and biotic media were present, vanadium concentrations in biotic media could not be reliably estimated from soil data (Appendix F).

Riparian HQs were similar and are provided in Figures 4.3-53 through 4.3-56 for the bird receptors.

Based on the extent and magnitude of HQs calculated under Tiers 1 and 2, vanadium was identified as an ECOC and risks are discussed further in Section 4.4.

Zinc – Figure 4.3-35 shows the HQs calculated for the northern harrier. An HQ greater than 1 was calculated at 4 of 17 sampling locations. The HQs greater than 1 ranged from 1.1 at location NT8-03 to 2.3 at location NQ-13. Two locations (NQ-13 and NQ-15) were in the Ibex EU and one location (ST9-17) was in the Former Town Site EU. The final location with a LOAEL HQ (ST9-17) was in the Background North/East EU. All other LOAEL HQs across the Site were less than 1.

Based on the low magnitude of HQs, and restricted nature of HQs greater than 1, risks to ecological receptor populations from manganese exposures is low to *de minimis* throughout most of the Site.

4.3.3 Risk Characterization for the NTCRA Area

During the summers of 2013 and 2014, Simplot performed an NTCRA at an overburden pile in the Pedro Creek Sub-Basin to reduce the release and migration of selenium and other ECOCs to the media. Full details of the NTRCA actions are provided in the 2015 Post-Removal Site Control Annual Maintenance and Monitoring Report (Formation 2016b).

To monitor effectiveness, soil and vegetation samples were collected in 2015 in accordance with the Post-Removal Site Control (PRSC) Plan (Formation 2015) and the results of those samples are discussed herein relative to the SSERA conducted across the remainder of the Site. The PRSC soil and vegetation sampling event occurred in August 2015. Soil samples, at the Agencies' request, were collected as composite samples in accordance with the Interstate Technology and Regulatory Council (ITRC) Incremental Sampling Methodology (ISM), to provide a reasonably unbiased estimate of mean COPC concentrations (ITRC 2012). The NTCRA and FSPS areas were divided into five decision units (DUs), based on soil cover and

slope aspect (Figure 4.3-57). The DU and the number of increments[13] for the composite samples were as follows:

1) The easterly facing 3:1 slope area at the NTCRA pile (40 increments, over 33 acres);

2) The northerly facing 3:1 slope area at the NTCRA pile (30 increments, over 20 acres);

3) The upslope and top area at the NTCRA pile (40 increments, over 16 acres);

4) West Pit area (30 increments over 36 acres); and

5) The non-study portions of the FSPS pile (30 increments, over 10 acres).

Vegetation community monitoring was conducted and vegetation tissue samples were collected to measure COPC levels from the same grid locations as the soil sampling locations. Small mammal samples were also collected from the NTCRA and FSPS (Formation 2016c) areas. Small mammals were captured from September 16 through 20, 2015. Terrestrial invertebrates were not collected, due to nighttime freezing weather resulting in a lack of abundancy. Terrestrial invertebrate selenium concentrations were estimated as discussed in Section 4.3.2.1 and in Appendix F. No estimations of terrestrial invertebrate data were made for the non-selenium ECOCs. For those ECOCs, the terrestrial invertebrate portion of the diet for the upland receptors that ingest terrestrial invertebrates was changed to vegetation as a surrogate.

The soil, vegetation, small mammal, and estimated terrestrial invertebrate EPCs for each of the DUs is provided in Table 4.3-6. The soil EPCs were directly reported by the laboratory using the composite samples. To evaluate sampling precision for soil and vegetation, separate “batch- type” replicate samples were collected. Considering that the soil cover of the NTCRA is derived from the same Dinwoody Formation borrow, the “batch” type replicate was used to provide an estimate of variability across the DUs (ITRC 2012). Three replicate (triplicate) samples were collected from DU5, each with different random starting locations. However, since the soil cover at DU5 consisted of top soil salvaged from areas upgradient of the FSPS pile, concentrations differed significantly from the Dinwoody-Formation soil obtained from the borrow area. Therefore, the variability of selenium in the DU soils and vegetation growing on the cover, using information from DU5 to extrapolate to the rest of the DUs, could not be adequately evaluated.

The EPCs for vegetation were calculated by taking the average concentrations of grass and forb composite samples collected within the DU. Given the relative scarcity of hyperaccumulators, those samples collected opportunistically where selenium hyperaccumulator species were encountered were not included in the EPC calculations. For small mammals, the average

[13] Increment locations are based on systematic random-start grids in each DU.

concentration of the animals collected within the DU was used as the EPC. Exposure calculations are provided in Appendix E and HQs are provided in Tables 4.3-7 and 4.3-8.

Using the lowest LOAEL TRVs, HQs greater than 1 were calculated for selenium (all receptors) and vanadium (American robin) (Table 4.3-7). The vanadium HQ for the American robin receptor was equal to 1.2 in DU5 and significantly less than 1 in all other DUs for all receptors.[14] Selenium HQs (Table 4.3-8) were higher in DU2 relative to the other DUs, which all had similar HQs. The higher HQs in DU2 were driven by higher average vegetation selenium concentrations (25 mg/kg) and one small mammal sample collected near the edge of DU2 (125 mg/kg) which greatly influenced the average concentration (65.2 mg/kg). As indicated on Table 4.3-8 the HQs calculated in the NTCRA DUs are similar or lower than those within the other EUs at Conda, and in some cases lower than those for the downgradient EUs.

4.4 Additional ECOC Risk Characterization

Based on the Tier 1 and Tier 2 risk characterizations, selenium and vanadium were identified as ECOCs posing the highest potential risk to receptors at the Site and are discussed in greater detail in this section. HQs for other ECOPCs exceeded 1, but as described in previous sections for each of those ECOPCs, HQ exceedances of 1 were either of low magnitude, limited in spatial extent, or both.

The additional risk characterization for selenium and vanadium expands the risk assessment by providing additional data to risk managers in order to more fully understand the extent of risk to terrestrial and riparian receptors by addressing several key uncertainties in the risk assessment model.

First, the use of the lowest LOAEL TRV as an effects-based measure is a conservative measure, but may not provide risk managers with the level of detail needed to make risk management decisions based on potential risks to populations of common species as required at Conda. This section provides HQ calculations using alternative TRVs available for each ECOC as discussed in the BPF. The alternative TRVs were calculated by USEPA in the EcoSSL process as potential NOAELs but for both selenium and vanadium, the geometric mean of the NOAEL TRVs for growth and reproduction were higher than the lowest LOAEL TRV available in the EcoSSL database. Based on the EcoSSL process, USEPA concluded that the geometric mean NOAEL TRVs were not adequate for the conservative screening purpose for which the EcoSSLs were derived. The geometric mean NOAELs do, however, provide a valuable comparison point for risk characterization for populations of common species because they represent an exposure rate at which no significant effects were observed in a number of studies, but above which effects were observed in others. These TRVs may then be more

[14] Although the ISM provides the best estimate of the mean concentrations within a DU, because it is a single result there is no way to estimate how far from the actual mean the ISM result might be. Consequently, for the HQs that are close to 1, decision errors are possible in both directions (i.e., concluding that there is risk when in fact concentrations are below the LOAEL TRVs, or vice versa).

predictive of effects to a wider range of species than the lowest LOAEL TRV available. By providing HQs using a range of high-quality TRVs, the risk characterization is not reliant on data from a single study and is more representative of the potential toxicity to relevant endpoints based on the body of available data.

Second, the calculation of risk at background ECOC concentrations is also provided in this section, as are the effects on the risk estimation of exposure modifying factors (e.g. relative soil bioavailability). All HQs calculated in this section are provided in Appendix G and are discussed by ECOC in the following sections.

Selenium was identified as an ECOC for all receptors considered in the SSERA, both upland and riparian.

In the Tier 1 risk characterization, HQs greater than 1 using the lowest LOAEL TRV were calculated for all upland receptors in at least one EU. The Tier 2 risk characterization similarly resulted in HQs greater than 1 for all upland receptors at one or more sampling locations, both upland and riparian.

Alternative TRVs – As an additional LOE, selenium HQs were also calculated using alternative TRVs for the American robin, deer mouse, and northern harrier receptors. These receptors are highlighted because they are modelled to have the highest exposure relative to their TRVs in each of the major feeding guilds (avian and mammalian omnivores and carnivores).

The alternative TRVs selected were the geometric mean NOAEL TRVs provided in the EcoSSL guidance document (USEPA 2007) for birds and mammals and are representative of all relevant studies with growth and reproduction endpoints evaluated by USEPA for the guidance document. The geometric mean NOAEL TRV for selenium was equal to 0.606 mg/kg BW/day for birds and 0.437 mg/kg BW/day for mammals (Table 4.4-1). Review of both of these TRVs versus the data provided in the EcoSSL document indicates that based on either differing sensitivities between test species, test methods, or measured toxic endpoints, there is considerable variability in the NOAEL and LOAEL TRVs in the studies. While the geometric mean NOAELs are higher than the lowest LOAEL TRVs in the USEPA database, they are also both lower than many NOAEL TRVs for relevant toxic endpoints.

The NOAEL TRV and the lowest LOAEL TRVs obtained from the EcoSSL database are very similar and do not provide risk managers with a good estimate of the potential range of exposure at which effects may be observed. This is especially evident for mammalian receptors that have nearly identical NOAEL (0.143 mg/kg BW/day) and lowest LOAEL (0.145 mg/kg BW/day) TRVs. While this may be indicative of a very robust toxicological dataset, nearly identical NOAEL and LOAEL TRVs provide risk managers with only a limited view of the potential for risk.

In order to provide more useful information on the range of potential risks due to selenium, the assessment also utilized the geometric mean NOAEL TRV presented in the EcoSSL document as a comparison point. These values provide an estimate of the mean exposure rate across all of the sublethal growth and reproduction endpoints in the database. This TRV may provide risk managers with a better estimate of the average exposure rate across species that have been shown to have no effects. Because the TRV is higher than the lowest LOAEL, some adverse effects are possible at or below the TRV; however, those effects should be more closely considered.

For mammals, the EcoSSL database provides 8 reproduction-based NOAEL and LOAEL TRV pairs, 44 growth TRV pairs, and 26 survival TRV pairs. The geometric mean NOAEL for reproduction and growth (0.437 mg/kg BW/day), and reproduction, growth, and survival (0.543 mg/kg BW/day) were three to four times higher than the lowest bounded LOAEL available in the EcoSSL document.

Of the available studies, 1 of 8 reproductive LOAELs and 4 of 26 survival LOAELs were lower than one or both of the geometric mean NOAELs. For the growth-related endpoints, 25 to 33 percent of the LOAELs were less than the geometric mean NOAELs. All of the growth-related LOAEL TRVs were for juvenile animals and were primarily based on effects to rats and pigs.

Exceedance of the geometric mean NOAEL TRVs for selenium may represent exposure levels related to growth, reproduction, and survival effects for sensitive individuals in a population. Based on the data from the EcoSSL compilation, the geometric mean NOAEL may be an appropriate TRV for population-level assessment endpoints, instead of the lowest bounded LOAEL. The geometric mean NOAEL TRV for selenium is still conservative, and other factors including habitat and the extent of local populations are much bigger factors in determining whether ecologically meaningful adverse impacts on a population are expected.

For birds, the EcoSSL database provides 8 reproduction-based NOAEL and LOAEL TRV pairs, 16 growth TRV pairs, and 19 survival TRV pairs. The geometric mean NOAEL for selenium for reproduction and growth (0.606 mg/kg BW/day) and reproduction, growth, and survival (0.85 mg/kg BW/day) were slightly higher than the lowest bounded LOAEL available in the EcoSSL document.

Of the available studies, 6 of 8 reproductive LOAELs and 2 of 19 survival LOAELs were lower than one or both of the geometric mean NOAELs. For the growth-related endpoints, only 2 of 16 of the LOAELs were less than the geometric mean NOAELs. As a result, the geometric mean NOAEL TRVs may be the most appropriate TRV for population-level assessment endpoints. However, because of the similarity of the lowest LOAEL TRV (0.368 mg/kg BW/day) and the geometric mean for reproduction and growth (0.606 mg/kg BW/day), it would be difficult to distinguish different levels of risk between the two TRVs.

Based on this information, the HQs calculated using the alternative selenium TRVs should be considered as a measure of potential effects to the receptors at the Site that is less conservative than using only the lowest available LOAEL TRV but likely representative of a reasonable estimate of potential risk. The HQs for the receptors using the alternative TRVs for selenium are shown by EU for the three primary receptors in Table 4.4-1.

For the American robin receptor, HQs calculated using the geometric mean NOAEL TRV ranged from 1.3 in the Former Town Site EU to 21.5 in the Woodall Mountain EU. HQs were lower for the northern harrier receptor, ranging from less than 1 in the Former Town Site, Downgradient East, Downgradient West, and Camp G and H EUs to 9 in the Grace Panel EU (Table 4.4-1).

The HQs for the deer mouse were the highest of the three receptors, ranging from 1.9 in the Former Town Site EU to 27 in the Grace Panel EU (Table 4.4-1).

As discussed in the Tier 2 risk characterization, at riparian sampling locations, selenium exposure and HQs were highest at sampling locations SWP-4, PC-5, and PC-3 but HQs greater than 1 were calculated for at least one receptor at all sampling locations. Risks to fish-eating receptors were highest at PC-5, PC-3, SLC-3 and SLC-2.

Among the riparian receptors, the mallard and meadow vole were the most highly exposed omnivorous receptors while the mink was the most highly exposed piscivorous receptor. HQs calculated using the alternative TRVs are provided in Figures 4.4-1 through 4.4-3 for these receptors. The exposure and HQ calculations are provided in Appendix G.

HQs were highest for all three receptors at location SWP-4. For the mallard, HQs ranged from 1.2 at PC-3 to 41 at SWP-4. For the meadow vole, HQs were less than 1 at all locations except PC-5 (HQ = 1.1) and SWP-4 (HQ = 4.9). HQs for the mink ranged from 2.5 at SLC-2 to 4.2 at SWP-4.

Background – Because selenium is a naturally occurring element, it is important also to consider the incremental risk above naturally occurring background concentrations as part of the risk characterization (USEPA 2002a, 2002b). Collocated biotic and abiotic exposure media were collected at two upland sampling locations (NT8-03 and ST11-02) and three riparian sampling locations (CGC-1, HHP-1, and NWC-2).

LOAEL HQs calculated for the upland background locations were less than 1 for all three upland species discussed above (Table 4.4-2).

For the riparian background, HQs based on the lowest LOAEL were greater than 1 for the mallard, mink, deer mouse, great blue heron and raccoon receptors for one or more background sampling locations (Table 4.4-2).

For the mallard, the HQ at background location HHP-1, using the geometric mean NOAEL TRV, was 2.5. HQs at study area locations PC-5 (HQ = 3.2), SLC-3 (HQ = 2.6), SLC-2 (HQ = 2.5), and PC-3 (HQ = 1.9) were all similar to the HQ calculated at HHP-1, but slightly higher than those calculated at background locations NWC-2 (HQ = 0.2) and CGC-1 (HQ = 0.2).

For the meadow vole, all HQs at background locations using the lowest LOAEL TRV were less than 1. For the mink, HQs at HHP-1 (HQ = 2.1) and CGC-1 (HQ = 1.8) were greater than 1 but still lower than HQs calculated for non-background locations (Table 4.4-2).

Based on these results, exposure and potential risk from selenium exposure is higher than literature-based TRVs and background for upland habitats in mine areas. For aquatic feeding birds like the mallard, riparian exposures in areas downgradient from the ODAs are similar to background. Other riparian receptors have exposures higher than at background locations and TRVs.

Vanadium – Vanadium was identified, based on the Tier 1 and Tier 2 risk characterizations, as an ECOC for the bird receptors at the Site.

As discussed in Section 4.1, where HQs were highest, exposure was primarily driven by the soil ingestion pathway rather than by the food ingestion pathway. As shown in Appendix F, there were no significant relationships identified between soil and plant or invertebrate vanadium concentrations using collocated samples.

Figure 4.4-4 shows the relationship between total exposure to the three upland bird species and the concentration of vanadium in surface soil at the locations where exposure was estimated. The correlation between the two measures is highly significant, highlighting the heavy influence of soil exposure on the total exposure. Coefficients of variation (r^2) for the correlation between exposure and surface soil vanadium ranged from 0.94 for the American robin to 0.99 for the northern bobwhite.

Because it has the highest HQs, the northern bobwhite receptor is the most highly exposed to vanadium, relative to the TRV, of the receptors assessed. To estimate the soil concentrations resulting in exposure equal to the lowest LOAEL and geometric mean NOAEL TRVs, the equation presented on Figure 4.4-4 was used to back-calculate the soil concentration at which exposure to the bobwhite would be equal to each of the two TRVs. At soil concentrations of approximately 64 and 229 mg/kg vanadium would be expected to result in HQs equal to 1 at the lowest LOAEL and geometric mean NOAEL TRVs respectively.

Figure 4.4-5 shows the vanadium concentrations at all surface soil sampling locations compared to those two benchmarks.

Review of the data used to calculate the EcoSSL geometric means of the NOAEL TRVs for growth and reproduction (1.19 mg/kg BW/day) and for growth, reproduction, and survival (1.9 mg/kg BW/day) indicated the following.

For birds, the EcoSSL database provides 6 reproduction-based NOAEL and LOAEL TRV pairs, 14 growth TRV pairs, and 8 survival TRV pairs. The geometric mean NOAEL for reproduction and growth (1.19 mg/kg BW/day) and reproduction, growth, and survival (1.9 mg/kg BW/day) were three to four times higher than the lowest bounded LOAEL available in the EcoSSL document.

Of the available studies, 2 of 6 reproductive LOAELs and 0 of 8 survival LOAELs were lower than one or both of the geometric mean NOAELs. For the growth-related endpoints, 3 of 14 LOAELs were less than the geometric mean NOAEL for growth and reproduction. Eight of the growth-related LOAEL TRVs that were higher than the geometric mean NOAEL were for juvenile animals and were all based on effects to chickens.

One growth study was available for a non-chicken endpoint (Japanese quail) and showed no effects to growth in juveniles (46.1 mg/kg BW/day), reproduction (39.0 mg/kg BW/day), or survival (98.7 mg/kg BW/day (Hafez and Kratzer 1976). Several studies of vanadium effects on duck mortality were also available with NOAEL TRVs equal to 12.0 and 13.4 mg/kg BW/day.

Based on the above data from the EcoSSL compilation, the geometric mean NOAEL may be an appropriate TRV for population-level assessment endpoints, instead of the lowest bounded LOAEL. The geometric mean NOAEL is still very conservative, and other factors including habitat and the extent of local populations are much bigger factors in determining whether ecologically meaningful adverse impacts on a population are expected.

Relative Bioavailability – The relative bioavailability, or the bioavailability of vanadium in Site soils versus the bioavailability of vanadium used in the toxicity tests, is unknown. It is likely, however, that the relative bioavailability in the soils is lower than tested in the studies used in the EcoSSL calculations. The Site soils have been exposed to the elements for decades causing certain geochemical changes. Toxicity tests are typically conducted using soluble forms of the metal, added to food or water which would increase the bioavailability over more natural exposure.

Soil type influences vanadium mobility where iron and aluminum hydroxides affect solubility. Additionally, vanadyl may bind with organic matter and vanadium sorption strength may be correlated with clay and oxalate-soluble iron concentrations in soil (Gabler et al. 2009). The chemical form of vanadium, a redox-sensitive metal, may affect overall solubility and bioavailability at the Site. Little is known about the bioavailability of vanadium. Vanadium prevails as the oxoanion vanadate (VO_4^{3-}) in solution, under aerobic conditions (Larsson et al. 2013). Vanadium exists in a range of oxidation states (+2 to +5) and vanadyl (vanadium IV) occurs in moderately reduced environments. Oxycation of vanadium (V) or VO_2^+ is present in

solutions below a pH of 4, while vanadate or $H_2VO_4^-$ is more prevalent above that pH. The effect of incorporating relative bioavailability estimations into the exposure model is shown in Table 4.4-3. HQs (lowest LOAEL TRV) were recalculated at the 25 upland and riparian sites where collocated biotic and abiotic media were available for the three most highly exposed bird receptors. The relative bioavailability varied from 25 percent to 75 percent and compared to the initial assumption of 100 percent for each sampling location. HQs decreased directly in relation to the relative bioavailability used, but did not typically fall below 1 if they were greater than 2 assuming 100 percent relative bioavailability. This indicates that while the relative bioavailability from soils has a significant influence on the estimated exposure, it would have little direct influence on risk management decisions at the Site.

Background – Surface soil samples collected from background sampling locations along the NT-8 transect (n = 20) ranged from 24.5 to 50.4 mg/kg and were lower than the EPCs for the exposure units and result in estimated exposures higher than the TRVs.

Collocation of Vanadium and Selenium – Elevated surface soil vanadium concentrations, relative to the benchmarks discussed above, were generally collocated with sampling locations where selenium HQs (deer mouse) were greater than 7 depending on the TRV used. As indicated in Figure 4.4-6, soil vanadium concentrations of approximately 229 mg/kg correspond to an HQ of 1 for the deer mouse (based on geometric mean NOAEL TRV). Vanadium exceeds 229 mg/kg at only two surface soil sampling locations with deer mouse selenium HQs less than 7 and at no locations with selenium HQs less than 5. These results indicate that risk-based actions taken to address selenium concentrations at the Site would also likely address potential risks from vanadium.

4.5 Risk Characterization Summary

The LOAEL HQs calculated for terrestrial and riparian receptors are summarized in Tables 4.5-1 and 4.5-2 for any ECOPCs that had an HQ greater than 1 in each EU or at the riparian sampling locations. These HQs represent the Tier 1 HQs calculated for the upland EUs (Table 4.5-1) and the Tier 2 HQs calculated for the riparian sampling locations (Table 4.5-2).

As discussed in Sections 4.2 and 4.3, risks to all of the ECOPCs with the exception of selenium and vanadium are relatively low within all of the EUs and riparian sampling locations. Section 4.4 provides several alternative LOEs for selenium and vanadium; however, these two ECOCs are present in clearly elevated concentrations relative to background and alternative TRVs. Potential risks from both selenium and vanadium appear to be collocated across most of the Site and are primarily related to the EUs encompassing the ODAs and the riparian areas closest to those EUs.

5.0 UNCERTAINTY ANALYSIS

Uncertainty is inherent in every step of the risk assessment process. The general approach in this SSERA has been to err on the side of conservatism. Therefore, the risks in this SSERA are likely to be overestimated rather than underestimated. However, a complete understanding of the uncertainties associated with the risk estimates is crucial to placing the estimated risks into the proper perspective.

Ecological risk assessments require assumptions and extrapolations in each step of the assessment that lead to uncertainty in risk prediction and affect projections of true exposure and risk at any site. Accordingly, the key assumptions and uncertainties discussed in the following sections that have the greatest influence on ecological risk assessments include:

- Sampling uncertainty;
- Assumptions regarding exposure probability;
- Sampling uncertainty (uncertainty about spatial distribution of contamination as a consequence of limitations in sampling a site);
- Uncertainty in the selection of ECOPCs;
- Uncertainty in the natural (including seasonal or annual) variability in the species, populations, communities, and ecosystems in question, as well as uncertainty about individual sensitivity to COPCs;
- Uncertainty in risk characterization using laboratory-based toxicity values and the HQ approach;
- Uncertainty in models and parameters used to estimate risk potentials; and
- Uncertainty in assessing background ECOPC concentrations that may relate to calculated risk potentials (incremental risk).

The following sections present the uncertainty analysis identifying sources of uncertainty specific to this SSERA.

5.1 Sampling Uncertainty

Sampling was conducted according to agency-approved sampling plans and met objectives developed by Simplot and the Agencies for the RI and risk assessments. In general, sampling was focused on areas of suspected contamination. As a result, more data are available for areas of higher ECOPC concentrations than areas and habitats of the Site that have lower ECOPC concentrations. Unless receptors or receptor subpopulations are restricted to the areas of contamination, this factor tends to overestimate exposure to ECOPCs.

For the terrestrial assessment, small sample sizes were generally only associated with prey tissue media. Woodall, Ibex Complex, Former Town Site, and Downgradient East and West EUs generally had more than 9 soil samples. Camp G and H, Grace Panel, and North Trail EUs had fewer than 9 soil samples. Only the Ibex Complex EU had 9 tissue samples available for use. Grace Panel EU and North Trail EU had only 1 tissue sample. In the Downgradient West EU, riparian tissue samples collected at HHP-1 were used to represent the EU in all Tier 1 calculations. In the Downgradient East EU, riparian tissue samples from Camp G Creek, State Land Creek, and Pedro Creek riparian locations were used to represent the EU. Using riparian samples in the Downgradient East EU, where samples from riparian areas receiving runoff from the mined areas of the Site may provide higher than expected exposures, may overestimate risks, particularly within the upland areas of the EU that are not expected to have significant exposure from mine related materials. Using the data from location HHP-1 in the Downgradient West EU calculations is not expected to overestimate risk, but may underestimate risk to an unknown degree; however, given the lack of large-scale transport mechanisms to the upland areas of the EU, risks are not expected to be significantly underestimated.

5.2 Assumptions of Exposure Probability

The tiered assessment approach used in the SSERA includes several assumptions about exposure to ECOPCs that are conservative for certain sampled conditions and less conservative for others. Examples of these assumptions follow:

- Ponds and detention basins that were developed as mine storm water management features were not considered to provide viable aquatic habitat, therefore, surface water and sediments from these features were considered separately in the SSERA from aquatic habitats. These areas were considered as complete exposure pathways for non-piscivorous receptors.

- Aquatic features of the on-site and off-site areas varied and were categorized accordingly. Areas generally believed to primarily consist of lotic habitats (streams and creeks) comprised one group, while ponds were considered as a separate group. The third grouping was for wetlands, which included springs and seeps that created aquatic habitat.

5.3 Uncertainties Associated with ECOPC Selection

Comparing Site COPC concentrations to conservative TRVs in the screening-level approach identified ECOPCs for surface soil, sediment, surface water, terrestrial biota, and aquatic biota. This tiered screening effort minimizes the chance that chemicals that are at potentially ecotoxic concentrations will be omitted as ECOPCs. Therefore, the uncertainty associated with the misidentification of ECOPCs in the SSERA is low, as is the potential for not identifying ECOPCs that may be present at ecologically significant concentrations.

For those ECOPCs identified as ECOPCs of uncertain risk in Section 2 because they lack suitable toxicity data, risks are unknown. Risks to these ECOPCs cannot be accurately characterized because there is insufficient data available related to their potential toxicity. The ECOPCs of uncertain risk are listed below by exposure media:

<u>Aquatic Receptors</u>

- Surface Water
    - None
- Sediment
    - Beryllium
    - Vanadium
- Fish Tissue
    - Barium
    - Manganese

<u>Terrestrial Receptors</u>

- Plants and Invertebrates
    - Iron
- Terrestrial and Riparian Vertebrates
    - Antimony - Birds only
    - Beryllium - Birds only
    - Iron - Birds and Mammals

5.4 Uncertainties Due to Assessment of Multiple ECOPCs

Particular ECOPCs, such as some metals, may have potential additive, synergistic, antagonistic, and/or neutral influences on the toxicity of other constituents (Calabrese 1991). The extent to which these COPCs interact and influence overall toxicity to receptors depends not only on the specific composition of constituents, but on relative concentrations as well. Data required to evaluate the extent to which risk may be attributable to multiple COPC interactions and mixtures is lacking. As such, HQs for ECOPCs may be biased high or low depending on the extent to which additive and/or synergistic mechanisms are involved.

5.5 Receptor-Specific Uncertainties

Species, life histories, and behavioral differences can also affect sensitivities to ECOPCs. Exposure was quantified for several indicator species that are intended to be representative of the various groups of species or feeding guilds potentially inhabiting the mine area. Uncertainties are present in the selection of the receptors that could utilize the Site to some degree. The receptors were selected based on several criteria, including their potential to utilize habitats present within the Site, their potential to contact environmental media with elevated concentrations of ECOPCs within those habitats, their potential sensitivities to ECOPCs, and the amount of life history and behavioral information available. These criteria help to decrease the uncertainty associated with selecting the receptors rather than analyzing all of the dominant species present at the Site. In addition, the selection of species for this SSERA focused on those likely to come in contact with contaminated media and, in terms of bioaccumulative chemicals, those media that would be expected to have accumulated the chemical at the highest concentration.

Exposure was also quantified using life history and behavioral parameters for each receptor to estimate the amount of contact a receptor may have with contaminated media by various exposure routes. The following parameters were used in the exposure models in the SLERA:

- Ingestion rates of food, soil/sediment, and surface water;
- Body weight;
- Dietary proportions of each prey type;
- Feeding habits; and
- Proportion of food obtained from the Site.

Exposure parameters were obtained from guidance published by USEPA (e.g., *Wildlife Exposure Factors Handbook* [USEPA 1993]) or other state and federal agencies, or from well-

established literature (e.g., food ingestion rates from Nagy [2001]). The receptors and corresponding exposure parameters were approved by USFS, IDEQ, and USEPA. The use of certain of these exposure parameters derived from studies conducted in habitats and climates different from the landscape of the Site adds uncertainty to the SSERA because the exposure parameter may not reflect actual Site conditions. For example, ingestion rates cited in the Nagy (2001) food ingestion rate database are based on allometric equations that use receptor body weight and the typical relationships between body weight and food ingestion across a range of feeding strategies. It is unknown to what degree a wild setting such as that present at the Site, where the receptors would not have access to an *ad libitum* food supply, versus what would be experienced in a lab setting would have on ingestion rates. This could result in a lower actual ingestion rate than cited in Nagy (2001). In this case, use of the published values would tend to bias the SSERA toward an overestimation of risk but underestimation is also possible.

While the exposure models used in the SSERA represent the most up-to-date information available for each receptor, the models are essentially simplistic approximations of the overall feeding behaviors of the receptors based on allometric equations used to estimate food intake and professional judgment used to estimate sediment intake. As a result, there is uncertainty inherent in the use of simplistic models to describe the complex interactions that occur in a natural system. Therefore, there is uncertainty involved with estimating exposure to ECOPCs.

5.6 Risk Characterization Uncertainties

There are several and varying levels of uncertainty associated with the process of risk characterization. This section identifies the major risk characterization components as well as uncertainties that apply, regardless of the habitat component for which the risks are being evaluated.

Exposure Point Concentrations

Uncertainty associated with the EPCs comes from the underlying data used to represent or calculate the EPC, and the method used in the calculation. Upland soil, animal, and plant samples were collected in accordance with agency-approved sampling plans primarily to characterize the nature and extent of contamination, and were focused on areas of suspected contamination. Data were not collected to represent an unbiased average concentration across the exposure areas. This approach generally results in an overestimate of EPCs. Data on aquatic organisms was sampled across diverse conditions and habitats and may be more representative of ECOPC concentrations in the Site and downstream areas.

When calculating EPCs from sampling data, ProUCLs advanced algorithms for dealing with non-detected samples were used. While this represents a robust method for left-censored data, any approach dealing with non-detect values is associated with some uncertainty, because chemicals that were not detected at the specified detection limit may be absent from the

medium or may be present at any concentration below the detection limit. The uncertainty of the EPC will increase as the number of non-detects in a data set increases, but this uncertainty may not be important if the non-detect concentration is less than the pertinent screening level. Additionally, the EPC is based on either the 95th UCL or the maximum detected concentration. The use of these statistical parameters, which are upper bound estimates, likely overestimates risk. Furthermore, ProUCL may default to the maximum detected concentration in cases with low sample size, which may overestimate risk.

Uncertainties applicable to all chemical measurement data are related to the measurement of representative field concentrations of a chemical. This, in turn, depends upon several factors, including the media in which the chemical is being measured, the form or phase of the chemical being measured, and the concentrations of other chemicals in the media being measured that affect the measurement of the chemical of interest. Uncertainties due to these factors are addressed to the extent possible through good analytical laboratory procedures, and development and implementation of sampling and analysis plans. Despite the sound application of such procedures and plans, these factors do introduce uncertainty into the estimation of ecological risks. For example, in nearly all cases the 0–2 inch depth interval was used as the surface soil EPC for surface soil exposures. A very limited number of samples (n = 9) were collected from the 0–6 inch depth interval and were used in the surface soil dataset for EPCs. The effect of this limited number of samples on the exposure estimate is unknown. While no known gradient of ECOPC concentrations is known to occur at depth, should one be present in the areas where 0–6 inch depth interval samples were used, risks could be over-estimated or underestimated to an unknown extent in those areas. In addition, although the selenium concentrations in the NTCRA Dinwoody Formation soil cover are low in all DUs, the fact that triplicate salvaged Dinwoody soil samples from DU5 at the FSPS pile were significantly different from the borrow area soils, variability in soils from DU 1 through 4 could not be assessed. The effect of this lack of variability information on the exposure estimate is insignificant, since the Dinwoody Formation soil from the Agency-approved borrow is known to have very low selenium concentrations.

Bioavailability

The bioavailability of an ECOPC creates uncertainty in the risk characterization process. This uncertainty can affect the potential exposure conditions used to estimate bioavailable forms (such as dissolved metals in solution) as well as the toxicity endpoints used to derive risk assessment benchmarks. Bioavailability and ecotoxicity of chemicals are linked to their concentrations and the forms they take (USEPA 1999). The toxicity of a contaminant is controlled by the following factors:

- Its environmental concentration;
- Site-specific chemistry (especially through ionic solubility and speciation, if a metal or metalloid);

- The physical matrix in which the contaminant is found; and
- The uptake pathways into a target organism from the physical matrix.

All of these factors help to determine the exposure matrix for organisms in the field. Assessment of ecological risks and the potential adverse effects of a contaminant require an understanding of the exposure matrix that may lead to actual uptake by a receptor species.

For terrestrial and riparian receptors, the relative bioavailability, or the bioavailability of an ECOPC versus the bioavailability of the ECOPC used in the toxicity tests, is unknown. In most cases, the relative bioavailability of an ECOPC is lower than the bioavailability used in the TRV studies because toxicity tests are typically conducted using soluble forms of the metal, added to food or water which would increase the bioavailability over more natural exposure.

Except as explicitly discussed in the risk characterization, all ECOPCs were assumed to be 100 percent bioavailable as a conservative measure. As a result, the exposure estimations for all terrestrial and riparian receptors are expected to be overestimated to an unknown degree.

Toxicity and TRVs

In general, risk assessments draw from information gained from laboratory and other carefully controlled experimental exposures, which is then used to extrapolate conditions likely to exist in the natural environment. The laboratory information often does not provide complete linkages for these extrapolations. Consequently, assessment factors are often used to compensate for the many uncertainties inherent in the extrapolation from laboratory effects data to effects in natural ecosystems (Warren-Hicks and Moore 1998). As described in Calabrese and Baldwin (1993), uncertainties arise when extrapolations are made from the following:

- Acute to chronic endpoints;
- One life stage to an entire life cycle;
- Individual effects to effects at the population level or higher;
- One species to many species;
- Laboratory to field conditions;
- One to all exposure routes;
- Direct to indirect effects;

- One ecosystem to all ecosystems; and/or
- One location or time to others.

The net effect of these uncertainties may result in either an overestimate or underestimate of risk, depending on site-specific conditions, the types of receptors included in the evaluation, and the ECOPCs. To limit this uncertainty to the extent possible, chronic toxicity endpoints indicative of reproductive, growth, or mortality effects were used. In addition, for wildlife receptors a range of TRVs was discussed where appropriate.

Care has been taken in the gathering of toxicity values for the ECOPCs at the Site to minimize the points of uncertainty presented in the list above by using well established TRVs that are based on high quality investigations. However, no procedures for the identification of toxicity data can eliminate all, or even most, of the uncertainty inherent in the process of toxicity assessment.

Selenium in the aquatic system is a particularly important aspect of the SSERA. The USEPA's recent re-evaluation of selenium aquatic toxicity for the Final National Selenium Criterion (USEPA 2016) has reduced uncertainty and established the following:

- Chronic selenium effects are manifested through dietary uptake of the maternal parent, not aqueous or sediment exposures, and the effects endpoints are either malformations in young developing organisms or survival.
- Egg/ovary tissue concentrations of selenium provide the best relationship to effects in young.
- There is a difference in organism responses based on their environment (e.g., lentic versus lotic).
- The EC10 is a sensitive measure of effects.
- Fish are an appropriately sensitive organism to assess effects in aquatic systems.
- Some fish species are more sensitive than other fish species.
- Egg/ovary effects thresholds can be translated to whole body tissue concentrations.

The primary uncertainty for a selenium TRV based on fish tissues is the translation or modeling of effects thresholds from one species to another species.

Acute toxicity of selenium is predicted due to EPC concentrations at Pedro Creek, State Land Creek, and Westside Ponds EUs, and mine features. The primary exposure mechanism for

selenium is uptake via the diet which occurs over longer exposure periods. High surface water concentrations may translate to acute effects, but there are several factors affecting the acute toxicity of selenium which increase the uncertainty in the SSERA of predicting acute effects using the current acute State Standard value of 20 µg/l for selenium.

- Where sulfate concentrations are elevated, selenium will primarily be in the form of selenate, reducing its bioavailability and toxicity. Pedro Creek wetland sulfate ranged from 110 to over 1900 mg/L. In the mine features, sulfate ranged from 52 to 2500 mg/L with the highest sulfate occurring in the NE Seep Pond.

- Selenium bioavailability is affected by the form of selenium present with selenite being the more bioavailable and thus toxic form of selenium.

- The current State of Idaho standard for acute selenium exposure is 20 µg/L. In 2004, USEPA released a revised Draft selenium criterion that was 257.5 µg/L, more than 12 times higher than the current State standard. While only a Draft value, the 2004 criterion value accounted for the effects of sulfate and included additional studies not available in 1987. Comparisons of the Site EPCs to the current State standard may result in an over prediction of potential acute risks and thus the acute risk HQs are uncertain.

Given this range of variability for one sensitive genus, the influence of sulfate on acute and chronic toxicity of selenium, and the unknowns about selenium speciation, it is uncertain, based on the acute HQs whether or not acute toxicity is occurring at all the locations where selenium in surface waters exceed the acute TRV. It is certain that concentrations are sufficiently high in these areas to pose a chronic risk, concentrations may pose an acute risk, and the definitive analysis of risks from these areas should be based on tissue residues from aquatic receptors when at all practical.

Uncertainty in the sediment TRVs for selenium arise because the existing TRVs used are based on sediment concentrations of selenium that may pose potential effects on higher order organisms that may ingest those benthic organisms. With the Conley studies (2009, 2011, 2013) dietary intake information for a benthic species is now available to estimate via the benthic tissue pathway, if benthic invertebrates are at risk due to selenium concentrations they may consume as part of their diet. The sediment TRVs (as opposed to the benthic tissue TRVs) used to assess potential benthic invertebrate risks due to selenium more often than not, overestimate risks through the HQ process.

<u>TRVs – Surface Water</u>

The benchmarks or TRVs for a single environmental medium may be derived differently and reflect varying levels of conservatism. For surface water, Idaho State Standards or NAWQC were the primary TRVs utilized. When neither was available, Michigan Rule 57 Tier 2 values were utilized. Tier 2 values are typically more conservative because they have added safety

factors due to use of fewer studies to derive the criterion value. This hierarchy was used for surface water TRVs for the initial screening level assessment in order to provide a conservative platform for identifying surface water ECOPCs.

In subsequent tiers of the ERA, new and or different thresholds were introduced. For example, the NAWQC for aluminum has not been updated since 1988 at the National level. For this SSERA, a Region 6 approved aluminum criteria set (acute and chronic equations) was used that included a hardness-based derivation that more accurately reflected toxicity of aluminum in surface waters in the pH range from 6 to 9. The range of pH values observed at different areas of the Site is provided in Table 3.1-1. For two metals, manganese and uranium, CDPHE standards developed for the Arkansas River basin were used to assess effects due to these parameters. Both are hardness-based criteria developed using the USEPA approved methods for criteria derivation. Overall, nearly all of the surface water criteria were derived using a similar process, prescribed by USEPA, to arrive at a chronic value. While the process allows for different levels of conservatism (i.e., standards and AWQC versus Tier 2 criteria), it is a methodical derivation process.

However, very limited data were available for iron. While USEPA (1986) is cited, the iron value has its origins back in the USEPA Red Book circa 1976. A single field effect study was used as the basis for the 1 mg/L value, and there has been little corroborating evidence since. For this reason, EPRI (2004) undertook the task to develop a scientifically defensible iron criterion; however, they found that the availability of usable laboratory studies was limited. Instead they used an extensive bioassessment dataset from West Virginia to derive a value consistent with the CWA 101(a) goal (i.e., maintain the chemical, physical, and biological integrity of the Nation's waters). The result of their analysis was that a value of 1.74 mg/L would be protective of those aquatic biological communities. While it is not intended that this value is applicable to the Site, the research from that document and compilation of studies reviewed indicates that a number of factors govern iron toxicity, which is likely site-specific due to these compounding factors. Therefore, the surface water TRV for iron may have significant uncertainty and is likely biased low for this Site.

TRVs – Sediments

Some sediment benchmarks will use a 15th percentile value for a low or no effect benchmark and an 85th percentile for high effects. Others will be even more conservative and only consider a concentration to be protective if at a 95 percent confidence level, (i.e., individual level protection versus population level protection). These threshold levels are expressed as effects range-low (ER-L), AET, or upper effects thresholds (UET), to name a few. Collectively, these values and others like them are often referred to as SQGs. Because SQGs do not exist as national regulatory thresholds and for the most part are still in a state of development on regional or state levels, there may be varying levels of effect threshold values for a single parameter.

MacDonald et al. (2000) indicate that the numerical SQGs for any particular substance can differ by several orders of magnitude, depending on the derivation procedure and intended use. Despite the wide range of benchmark values, derivations procedures, endpoints, etc., there has been an ongoing effort to develop SQGs that are consensus-based values. The apparent goal of such efforts is to integrate the various studies conducted to date to develop a two-tiered benchmark that is backed by real data from many field and laboratory studies which results in benchmarks that are broad-based, more accurate as to the level of toxicity, and correlated to effects. For these reasons, the TEC and PEC values from MacDonald et al. (2000, 2009) were used to assess potential risks. Essentially, these are the best available thresholds based on the most rigorous evaluation of matching concentrations in sediments to toxic/not toxic endpoints. When TEC/PEC values were not available, ER-L, effects range-medium (ER-M), or AET, UET type thresholds were used, if available. The primary uncertainty associated with the consensus based TRVs is that they are derived based on a range of effects thresholds for mixtures of COCs in sediments much more so than on individual species and chemical toxicity testing. The mixture of COPCs, organic carbon content, sediment grain size, and redox conditions, among other factors can affect both individual and multiple chemical toxicity in sediments, therefore creating uncertainty.

Despite the availability of SQGs for some parameters, not all have had these types of values developed. For example, no SQGs were found for beryllium, boron, molybdenum, or thallium. For barium, the screening value used has no basis in aquatic toxicity, but rather a dredging guideline for sediments. The selenium TRV for sediments is also not rooted in toxic effects to benthic organisms, but is a proposed effect threshold for higher level trophic organisms via dietary consumption.

For all of the sediment TRVs, there is inherent uncertainty about whether the TRVs over predict or under predict the actual risk.

TRVs – Fish Tissues and Amphibians

A variety of different fish tissue thresholds from varying studies reported in the literature were utilized. Uncertainty in the use of these tissue thresholds arises from several sources, many of which have been discussed above, including bioavailability of the contaminant, exposure route, test duration, species used for testing, and/or the endpoints measured, among others. Of the ECOPCs assessed in this SSERA, all ECOPCs have toxicity thresholds established due to exposure to surface water concentrations. For most of these ECOPCs, water exposure would be the primary medium by which risk would be predicted. While representative and conservative tissue TRVs were compiled for trout and other species of fish, the first LOE for risk prediction should be considered the surface water concentrations.

Bioaccumulation data for aluminum in fish and associated toxicity data is very limited. It is likely that the scarcity of data is because of its toxicity to many aquatic organisms, including fish, thus aluminum does not bioconcentrate in aquatic organisms to any significant degree (Rosseland et

al. 1990). The single study utilized for the aluminum TRV in this SSERA was a No Observed Effects Concentration (NOEC) for rainbow trout. One other study in the ERED database had a whole body brook trout NOEC for growth of 48 mg/kg dw. Sparling et al. (1997) notes that in fish and other aquatic organisms it is difficult to distinguish between the toxic effects of aluminum and acidity because of the strong relationship between aluminum solubility and pH. This observation undoubtedly is founded on the predominance of aluminum studies at low pH found in the literature. Due to the lack of actual bioaccumulation toxicity data and likelihood that effects due to aluminum are likely manifested well before accumulation occurs, the use of an aluminum TRV for fish tissues should carry minimal weight as compared to the surface water effects thresholds when assessing risks of aluminum to fish.

Selenium has undergone a fundamental change in the basis of how toxic effects are assessed due to a better understanding of how selenium affects fish. For this SSERA, whole body fish tissue data were used where available to compare to effects thresholds for (1) a nationally developed selenium criterion (8.5 mg/kg dw) and (2) a species within the same family (cyprinid threshold equal to 17 mg/kg dw). Varying sensitivities of different species exist as documented in USEPA's 2016 AWQC, but the magnitude of those differences for all fish species is unknown.

Until July 2016, the selenium criterion has been fluid, and has changed several times. The final National Criterion document recommends a value of 8.5 mg/kg dw for whole body fish tissues as a protective level. The new selenium criterion is useful to conservatively screen whole body fish tissues collected from the site. This value was derived as the 5th percentile of a species rank distribution for eight EC10 values from different species. The lowest value in that distribution was for white sturgeon (EC10 whole body = 9.2 mg/kg dw). White sturgeon and the next most sensitive species, bluegill sunfish, do not exist in Southeastern Idaho; therefore, application of this National AQWC in this SSERA is inherently conservative.

To assess baseline risks using fish tissue data from the Site, a less conservative effects threshold was used that reflects species assemblages at the Site. Initially, the fathead minnow threshold value was used as a representative cyprinid, given that cyprinids were the predominant family captured in the three primary streams that flow off-site. USEPA (2016) noted that in their opinion, sufficient uncertainty existed with the fathead minnow study that they declined to use it for 2016 criterion derivation; however, USEPA goes on to state that the data from the study support the range of reproductive effect levels determined in other fish studies, and notes the following for most cyprinids:

"The available studies with native cyprinids indicate that a variety of native cyprinid genera (e.g. chubs, shiners, dace) have stable, diverse populations and are reproducing successfully (based on length frequency data) in selenium impacted waters at whole body concentrations far exceeding our proposed whole body criterion element of 8.5 mg/kg dw. Taken together, the available studies (Hamilton et al. (1998), NAMC (2008), Presser (2013), USGS (2012)) indicate that native cyprinids as a family are not expected to be overly sensitive to selenium when compared with other families of freshwater fish."

Assessing potential risks using a criterion derived based in large part on white sturgeon for southeast Idaho is an overly conservative assessment strategy, while incorporation of a family specific threshold value provides for an appropriately conservative strategy for assessing risks. Incorporating both effects values will allow for an effective approach to reduce uncertainties associated with each threshold and allow risk managers to evaluate the risk range present.

The Agencies previously commented that sculpins were a sensitive species; however, a current unpublished study (Lo et al. 2014), as well as field data from the Smoky Canyon Mine indicate that sculpin, like cyprinids are not particularly sensitive to selenium. The Lo et al. (2014) study used field collected sculpins that were reared in the laboratory and fed lumbriculous dosed with selenium for 7 months. Exposures and rearing of young occurred in the laboratory. The no effect concentration from the Lo et al. (2014) study was greater than 22 mg/kg dw egg selenium with the highest whole body sculpin tissue measured being 11 mg/kg dw. High populations of sculpin, with multiple age classes present, where high levels of selenium are found near the Smoky Canyon Mine only support the findings of the laboratory based exposures. Sculpins were rarely found in Pedro, Camp G, and State Land Creeks because favorable sculpin habitat is not present in these streams. Quist et al. (2004) found that Paiute sculpins have an affinity for fast water habitats, particularly riffles with large substrate whereas mottled sculpins were more commonly found in lower gradient, lower elevation streams with deep pool habitat that were spring fed. Both typically had low summer water temperatures. Due to lack of water during most times of the year, these types of habitats simply are not present in Site streams. The information presented indicates that neither cyprinids nor cottids are particularly sensitive to selenium effects.

To put these data into context, considerations must be given to the brown trout data utilized in USEPA (2016). Brown trout are sensitive and are found in the Blackfoot River, which all three Site streams ultimately discharge to. The brown trout EC10 for whole body fish tissues is 13.2 mg/kg dw. More importantly, the brown trout data utilized in the national criterion were derived from fish from southeast Idaho in the Crow Creek drainage. While no salmonids were captured in Camp G, Pedro, or State Land Creeks, the brown trout effects threshold represents a sensitive species found in the assemblage of species for the Blackfoot River drainage. For assessing risks in the UBR downstream of the Conda Mine and other mines in southeast Idaho where salmonids are present, the Agencies recommend using the 13 µg/g dry weight selenium in whole body for the selenium fish tissue TRV.

Risk to amphibians was assessed through evaluation of fish tissue which was considered to be a suitable surrogate for amphibian tissue relative to amphibian TRVs. As discussed in Section 3.2.3, data were available to develop TRVs for amphibians. Because amphibian data from the site were generally not available, fish tissue data were used as a suitable surrogate. A literature search was conducted to determine whether information is available to indicate that amphibians are either more sensitive to RI COPCs than fish (i.e., experience toxicity at lower exposure levels), or are likely to accumulate higher RI COPC concentrations. Reviews of scientific literature suggest that amphibians are less sensitive to the effects of selenium than are fish

(Hopkins et al. 2006; Masse et al. 2014) based on the TRVs developed. Unrine et al. (2007) indicated that anuran amphibians will not bioaccumulate substantially higher selenium concentrations than fish at the site based on observations from the Savannah River coal ash study.

Therefore, the tissue data for fish species included in the evaluation are considered sufficient surrogates for assessing potential risks for amphibians using the TRVs developed for amphibians which should reduce the uncertainty in this approach.

5.7 Radium-226 Risk

Ra-228 was identified in the SLERA as having a potential maximum activity level that was unable to be eliminated from further consideration for riparian receptors using the conservative screening approach. The potential for risk was based on the assumption of Ra-226 activity equal to the maximum Uranium-238 activity detected on-site (7.52 pCi/L). Only four samples of measured Ra-226 activity were available and activity levels ranged from non-detect (0.09 pCi/L) to 0.85 pCi/L with samples collected from water in the New Tailings Pond, French Drain, and from the Hoorah Hollow Pond which is unaffected by mining operations. The maximum activity detected was from a background area (Hoorah Hollow Pond).

When that activity is evaluated using the RESRAD BIOTA Level I BCG model used in Section 2.3.2, the TIR ratio is equal to 0.21 versus the 1.8 used in the screening assessment. Since the TIR ratio calculated using the maximum detected Ra-226 activity was considerably less than 1, it is assumed that no significant risk to riparian receptors from Ra-226 is expected. There is some uncertainty in that conclusion, however, based on the small number of samples available. But given the relatively small exceedance of 1 (TIR = 1.8 in the SLERA), it is unlikely that the widespread effects from Ra-226 exposure to riparian receptors is occurring.

6.0 SUMMARY AND CONCLUSIONS

A tiered assessment approach was used to estimate risks of ECOPC concentrations to aquatic and terrestrial receptors within different potential habitats and exposure scales at the Site. The Assessment Endpoints identified in BPF for risk management decisions are based on potential adverse effects on populations of aquatic and terrestrial receptors. The Tier 1 assessment is based on EUs that are entirely contained in the Site and represent subpopulations of receptors in the Conda Mine area. EU delineation was based on functional characteristics including anthropogenic factors such as former mining operations or town sites, and natural factors such as drainage basins contributing to streams draining the Site to the east and west. Therefore, while the Tier 1 assessment is focused on the subpopulations within EUs, the biological populations are likely much larger than a given EU or the Site.

The Tier 2 assessment is intended to identify the parts of the Site that contribute most to overall exposure and risk estimates. The Tier 2 results were intended to further support risk management decisions for the ECOCs identified by Tier 1. The location-specific HQs in Tier 2 are shown as indicators of relative exposure, but do not represent independent estimates of risk for Assessment Endpoints (i.e. populations) because they do not reflect ecologically meaningful areal scales. They do, however, show areas where risks within an EU may be higher or lower than predicted by the 95UCL EPC exposure calculations and should be considered as part of the risk management phase for the Site.

Selenium was identified as an ECOC and is the primary risk driver for both aquatic and terrestrial habitats. While exposure to other ECOPCs exceeded risk benchmarks in some areas, the elevated concentrations coincided with elevated selenium exposures in most cases. In the terrestrial assessment, vanadium was also identified as an ECOC. In the aquatic assessment, depending upon the media being evaluated ECOCs varied by EU along with selenium. The most common additional ECOC was cadmium.

Potentially unacceptable risks to ecological receptors have been identified through the risk assessment process described in this SSERA based on expected exposure scenarios. Results will be used to support the development of remedial alternatives and provide a basis for comparing potential ecological impacts of the alternatives in the forthcoming FS for the Conda Mine. The conclusions of this SSERA will be available for the support of risk management decisions regarding which remedy is most appropriate for the Site. Additional studies to further define ecological risk may be conducted as part of the FS process to provide risk managers with additional data for use in risk management decision making.

6.1 Aquatic Ecological Resources

Conclusions for aquatic receptors are presented separately for surface water, sediment, and biotic tissues to reflect the risk analysis organization and regulatory framework for aquatic environments. Figure 6.1-1, using selenium as the ECOPC, summarizes the concentrations that receptors can be exposed to in surface water and sediment at individual sampling locations throughout the site. Tables 6.1-1 to 6.1-4 compile the selenium and cadmium HQs across all media so as to view where the highest predicted risks are for these two ECOPCs, as well as where HQs are consistently low.

Surface Water

Based on the Tier 1 and Tier 2 risk characterization steps, selenium was found to be the primary ECOC of the four ECOPCs considered (e.g., aluminum, iron, cadmium, selenium). Cadmium also shows high exposure risks, however only in waters associated with mine features (Table 6.1-4).

Selenium exposure within the aquatic habitat EUs illustrated a consistent pattern of higher exposure near source areas and lower exposure as distance from source areas increased. Pedro Creek and State Land Creek EU wetlands and the Westside Ponds EU wetland habitats showed the highest exposure and risk with chronic HQs as high as 425, 33 and 10, respectively, and acute HQs of 106, 8 and 2, respectively. Farther downstream in the Pedro Creek EU, the selenium chronic HQ decreased to 19 and acute HQ to 5, while in State Land Creek, the chronic HQ decreased to 18 and acute HQ to 5. The uncertainties of the acute selenium TRV were previously discussed.

Moderate to low selenium exposure and risk were found in Camp G Creek EU stream and pond habitats with HQs of 2 and 4, respectively. Additional analyses of locations through time revealed that selenium concentrations in habitats tended to be greatest during high flow event or precipitation periods where runoff was transporting selenium in surface waters from source areas. Base flow data indicates selenium concentrations were low with HQs being less than 1. Aquatic receptors in surface water locations near source areas such as headwaters of State Land Creek, Camp G Creek, and Pedro Creek are at the highest risk due to selenium exposure, particularly during high flow events. These risks decrease the farther they are downstream and away from the source areas.

Selenium in surface waters of the primary mine features was high, resulting in chronic HQs in the Pit Lake, French Drain, Sedimentation Basin, and NE Seep Pond of 50, 66, 127, and 1474, respectively. Selenium concentrations for these same features resulted in acute HQs of 12, 17, 32, and 369, respectively. The Tailings Pond selenium concentrations in surface waters resulted in a HQ of less than 1. Cadmium in mine waterbody features was present in sufficiently high concentrations to be acutely toxic in the NE Seep Pond (HQ_{acute} = 5). Concentrations of dissolved cadmium in other mine features approached the acute toxicity threshold, but did not

exceed it (e.g., HQs < 1). Cadmium in the Tailings Pond resulted in an $HQ_{chronic}$ of less than 1, while cadmium in the French Drain and Sediment Basin resulted in HQs that ranged from greater than 1 to five or less. Cadmium in the Pit Lake and mine area ponds had an $HQ_{chronic}$ greater than 5.

Sediment

The ECOCs for sediment varied based on the EU, habitat, or mine feature where measured. Selenium is the primary ECOC for sediment, but the surface water, fish tissue, and terrestrial assessments are better indicators of selenium risks from sediments than are the sediment TRVs used to characterize risk. As previously described, sediment TRVs for selenium are based on potential effects to consumers in higher trophic levels, not to benthic invertebrates. Thus decisions about risks from selenium in sediments should be based primarily on Site-specific data on bioaccumulation potential.

For several ECOPCs, background concentrations exceeded the different habitat EPCs, TRV_{low} and/or the TRV_{high}, including: barium, cadmium, manganese, nickel, and zinc. Conclusions regarding these ECOPCs as ECOCs are as follows:

- The only location where barium significantly exceeded local background was the French Drain. At all other EU habitat and mine features, barium in background sediments exceeded Site sediment concentrations. Barium is not known to be particularly toxic, but the high concentration may contribute to physical effects for benthic invertebrates.

- Local background cadmium concentrations in sediments exceeded Site concentrations and the TRV_{high} at some locations. The EU EPCs that exceeded the TRV_{high} by a higher magnitude than local background concentrations (i.e., IRQ of 0.5 or greater) include Pedro Creek and State Land Creek streams and wetlands, Trail Canyon Creek stream, Westside Ponds wetlands, Pit Lake, Tailings Pond, French Drain, and Sedimentation Basin. Cadmium may pose risks to benthic invertebrates in these areas due to Site-related activities.

- Chromium in sediments exceeded the TRV_{high} at Pedro Creek stream and wetlands, Westside Ponds wetlands, Pit Lake, and French Drain. Chromium in Site background was not particularly high and does not have a large influence on observed concentrations of chromium at the various locations. Chromium concentrations in sediments from these areas may pose a risk to benthic macroinvertebrates.

- Manganese local background concentrations were significantly higher than the EU habitat and mine feature EPCs and the $TRV_{high.}$ But EPCs from the different EUs were generally lower than the TRV_{high} resulting in $HQ_{high} \leq 1$. Manganese was only identified in one mine feature in Tier 2 (French Drain), and the HQ_{high} was ≤1.

- Mercury was carried forward as an ECOPC in the Pedro Creek and Westside Ponds EUs, and Pit Lake, Tailings Pond, French Drain, and Sedimentation Basin mine features. All mercury EPCs from these areas resulted in HQ_{high} values of ≤1. Mercury risks to benthic invertebrates in these areas are likely negligible.

- Nickel in Pedro Creek streams and wetlands and State Land Creek streams resulted in HQ_{high} values greater than 1. At the Westside Ponds wetlands, nickel in sediments resulted in an HQ_{high} greater than 1. For the Pit Lake and French Drain, nickel HQ_{high} values exceeded 1 with HQ_{high} values of 3 and 5, respectively.

- Zinc in sediments exceeded the TRV_{high} in Westside Ponds EU wetlands (HQ = 2), Pit Lake (HQ = 2, and French Drain (HQ = 3). Risks to benthic invertebrates due to Site-related activities likely occur in these areas.

No sediment TRVs were available for beryllium and vanadium in sediments. Background concentrations of beryllium were only marginally exceeded in Pit Lake and French Drain. Beryllium risks to benthic invertebrates are therefore uncertain, but likely negligible due to Site-related activities. Vanadium exceeded local background in all stream and wetlands of the Pedro Creek EU, Westside Ponds EU, Pit Lake, French Drain, and Sedimentation Basin. Vanadium may pose a risk in these areas but the magnitude is uncertain due to the lack of applicable sediment toxicity data for vanadium.

Biotic Tissues

In fish tissues, aluminum, iron, selenium and zinc were the ECOPCs considered in the risk characterization. HQs for aluminum and iron in fish tissues were all greater than 1. Both these ECOPCs were identified as having background concentrations in surface waters and sediments that likely influenced elevated Site concentrations. Tissue concentration may reflect background concentrations from these media. Zinc tissue HQs were 2 for each tissue group from Camp G Creek, State Land Creek and Pedro Creek. Iron and zinc are essential micronutrients required for normal physiological functions, thus Site tissue data reflecting higher concentrations than the TRV values utilized may indicate species-specific uncertainties or other Site-related influences.

Selenium in fish tissues from locations on State Land Creek and Pedro Creek had HQs greater than 1 when compared to the 2016 AQWC TRV for whole body tissue residue (8.5 mg/kg dw). Comparing Site tissue data to the cyprinid TRV (17 mg/kg dw), reveals that Pedro Creek and State Land Creek fish tissues suggest potential risk due to selenium accumulation (HQs of 3 and 2, respectively).

Using fish tissues as a comparative tissue for amphibians against an amphibian selenium TRV showed that all LOEC HQs were less than 1 and only at Pedro Creek (PC-1) and State Land Creek (SLC-1) did tissue EPCs exceed the NOEC TRV.

Benthic invertebrate tissue data compared to benthic invertebrate TRVs for selenium found that Camp G Creek (high in the headwaters), French Drain, and Pit Lake had invertebrate tissue concentrations greater than the LOEC TRV. Those same locations with the addition of Pedro Creek at PC1 exceeded the NOEC TRV.

Collectively, the tissue data suggests unacceptable risks for receptors in Pedro Creek, and to a lesser extent potentially State Land Creek. Camp G Creek risks due to selenium appear to be isolated to wetlands in the headwaters downstream of the old waste rock dumps.

Summary

Overall, potentially unacceptable risks to aquatic receptors are due primarily to selenium in surface waters and sediments that enters the food chain via bioaccumulation. Where fish tissue data are available they confirm the observations found in the surface water and sediments (Tables 6.1-1 to 6.1-2). The highest potential risks across all media for selenium occur in Pedro Creek, some portions of State Land Creek, and Westside Ponds. All other EU habitats had HQs of 5 or less. Mine features pose unacceptable risks due to a number of ECOCs but the most prevalent are selenium and cadmium (Tables 6.1-3 to 6.1-4). The highest unacceptable risks occur in the Pit Lake, French Drain, and Sedimentation Basin for selenium and cadmium. Other prevalent ECOCs for the mine features include chromium, nickel, and zinc.

Together the surface water data and fish tissue data reflect a consistent trend for potential selenium risks to aquatic biota. In both fish tissues and surface water data, risks are highest in Pedro Creek, followed by State Land Creek, and diminished in Camp G Creek. Transport from the source areas into these drainages appears to occur during precipitation or runoff events as indicated by high flow data with elevated selenium concentrations.

Site-related contributions to the Blackfoot River and Trail Creek are indeterminate due to wide temporal and spatial variability in a limited dataset.

6.2 Terrestrial Resources

The terrestrial risk analysis included plants, invertebrates, mammals and birds. The screening-level and Tier 1 assessment revealed that the deer mouse (representing small omnivorous mammals) and American robin (representing omnivorous songbirds) were predicted to be the most exposed wildlife receptors because of their small home ranges. As a result, much of the risk characterization focused on these receptors.

For the terrestrial plant and invertebrate receptors, EPCs were greater than the screening benchmarks for antimony, arsenic, cadmium, chromium, copper, manganese, mercury, molybdenum, nickel, selenium, vanadium, and zinc. For these ECOPCs, the potential for adverse effects for terrestrial plant and invertebrate receptors cannot be ruled out. However,

the clear presence of a robust vegetation cover, terrestrial invertebrates, and abundant small mammal population (including herbivorous, insectivorous, and omnivorous species) at the Site suggest that a functioning ecosystem has developed within the areas with elevated soil selenium concentrations.

Selenium and vanadium are the primary ECOCs driving risk estimates and potential for risk management decisions for wildlife receptors at the Site. Other ECOPCs were identified as a result of Tier 1 and Tier 2 analyses including cadmium, chromium, lead, molybdenum, and zinc for both the upland and riparian receptors. Barium and manganese were identified as ECOPCs for the riparian receptors only. For all of these ECOPCs, LOAEL HQs were either less than 1 or about 2 for a very limited spatial extent. Based on the low magnitude of the HQs and the limited spatial extent of HQs greater than 1, risk of significant effects from these ECOCs are unlikely.

The HQs for selenium and vanadium were higher, and exceeded 1 over larger areas. Both chemicals are evaluated further, as summarized below. Figure 6.2-1 summarizes the Tier 2 (i.e., location-specific) HQs, using selenium as the primary ECOC and the deer mouse and American robin as indicator receptors for the terrestrial and avian receptor groups.

Selenium Exposure within the Upland EUs

Selenium HQs are summarized by receptor and EU in Table 6.2-1. While HQs were greater than 1 in all upland EUs for at least one receptor, HQs were consistently highest for the EUs located primarily within the ODAs. The Woodall, Ibex Complex, North Trail, and Grace Panel EUs consistently had that the highest HQs regardless of the receptor. The Camp G and H, Former Town Site, and Downgradient EUs have no substantial ODA materials and had consistently lower HQs than the ODA-based EUs.

For the small omnivorous receptors, HQs in the Downgradient West EU were generally higher than in the Downgradient East EU, but the HQs for the carnivorous receptors were generally very low. Given the large size of these EUs, the Tier 2 location-by-location assessment of selenium risks represents an important LOE for risk management. In both EUs, risks to the smaller omnivorous receptors in the downgradient EUs were heavily driven by one or two samples associated with another EU. In the Downgradient West EU, several samples adjacent to the Grace Panel EU heavily influenced the Tier 1 HQ. Similarly in the Downgradient East EU, several samples within the Pedro Creek drainage have a large influence on the EU-wide HQ. HQs for more downgradient areas are generally less than 1. Overall this suggests limited downgradient transport of ODA materials, and/or partial exposure of mobile species of invertebrates and small mammals between the ODA and unaffected areas. As discussed in Sections 4.2 and 4.3, this is best shown by Tier 2 estimates for the smallest receptors with diets that include high proportions of terrestrial invertebrates.

HQs for most receptors are clearly elevated on the ODAs within the Woodall, Ibex Complex, and Grace Panel EUs relative to the downgradient EUs. Tier 2 data show that HQs were

highest in and around the Old Tailings Pond and in the central portion of the Ibex Complex EU as well as on the slopes of the Woodall EU. However, the Tier 2 analysis also highlights uncertainty in the risk characterization process. Prey tissue data were limited in most EUs, but were used exclusively in estimating food-based exposure in Tier 1. In Tier 2, for selenium, location-specific risks were calculated at all locations where surface soil samples were available by estimating food tissue concentrations. In some cases, the two tiers show different results. This is clearly illustrated in the Former Town Site EU. The Tier 1 risk characterization resulted in low HQs for most receptors (Table 6.2-1) due to low tissue selenium concentration. However, Figure 6.2-1 shows high HQs at 4 sampling locations within the EU. Selenium concentrations in surface soil ranged from 22 to 27 mg/kg in those locations which resulted in much higher fatty tissue concentration estimates in those locations relative to the measured prey tissue concentrations from the samples collected within the EU. These results suggest that either the bioaccumulation models over-predict selenium concentrations or that the biota sampling location (surface soil concentration = 3 mg/kg) under-predicts exposure and risk in the EU. This example highlights the importance of considering both Tier 1 and Tier 2 risk characterization results in making risk management decisions at the Site. Tier 1 and Tier 2 exposures exceed the LOAEL TRV for selenium by a substantial degree in some cases in several areas of the Site. This result could indicate potentially significant adverse effects on subpopulations inhabiting the areas with selenium within those areas. However, there is substantial uncertainty associated with all exposure estimates and application of TRVs in the traditional exposure-based risk assessment model. Exposure and risk estimates can be over- or under-predicted by several orders of magnitude based on the combination of uncertainty in the exposure parameters, considerations of Site use, bioaccumulation estimates, variability in actual tissue concentration, and uncertainties related to the toxicity data available.

The clear presence of a robust vegetation cover and abundant small mammal population at the Site suggest that an apparently functioning ecosystem has developed within many of the areas of the Site with elevated soil selenium concentrations. While exposure estimates indicate a substantial risk of toxicity and potential effects on the population in the revegetated ODAs and other areas, these areas may also exhibit functioning ecosystem. Additional, more detailed surveys of small mammal populations are ongoing on some ODAs. This approach is consistent with USEPA ERA guidance (USEPA 1997, 1998) which indicates that the ERA process should be iterative and incorporate multiple LOEs. The information generated from the surveys may be useful in risk management decisions and formulating remedial alternatives to be considered in the FS.

Selenium Exposure in the NTCRA Area

Using the lowest LOAEL TRVs, HQs greater than 1 were calculated for selenium (all receptors). The HQs calculated for selenium are shown graphically on Figure 4.3-58 and show the relative differences between the DUs. Selenium HQs were higher in DU2 relative to the other DUs which all had similar HQs.

The higher HQs in DU2 were driven by higher average vegetation selenium concentrations (25 mg/kg) and one small mammal sample collected near the edge of DU2 (125 mg/kg) which greatly influenced the average concentration (65.2 mg/kg). It is unknown whether that deer mouse shown to have a high selenium concentration was exposed outside of the DU or whether the elevated tissue concentration was due to exposure entirely within the DU, however, the remaining small mammals collected within DU2 all had considerably lower selenium concentrations.

The HQs calculated in the PRSC DUs are similar or lower than those within the other EUs at Conda, and in some cases lower than those for the downgradient EUs. For the non-carnivorous receptors (i.e. deer mouse, American robin, eastern cottontail, and northern bobwhite) HQs within the DUs were most similar to those calculated in the Camp G and H EU and were lower than those calculated in the Downgradient East and West EUs. The carnivorous receptors had HQs most similar to the North Trail EU and were somewhat higher than the Downgradient EUs, particularly DU2.

Only one DU had any other LOAEL-based HQ greater than 1. The vanadium HQ for the American robin receptor was equal to 1.2 in DU5 and was less than 1 in all other DUs for all receptors. Risks in the PRSC DUs are generally lower than the primary mining-related EUs. HQs were greater than 1 in all DUs but they were consistently lower than those observed in Woodall, Ibex Complex, Grace Panel, and North Trail EUs indicating a reduction in the risk to subpopulations inhabiting the DU areas prior to remediation. Additional data may be required in subsequent years to further track the reduction in risk as the remediated systems mature.

Selenium Exposure and Riparian Habitats

As with the terrestrial receptors, elevated selenium is the primary risk driver for the riparian areas of the Site. Relative to the upland habitats at the Site, collocated soil and biota data were available from a smaller number of sampling locations that were generally located in the upgradient reaches of the drainages. As a result, the data represent the potential worst-case risk scenario for the riparian areas within the Site drainages. The selenium HQs calculated for each location are summarized in Table 6.2-2.

HQs for most riparian receptors were highest at sampling location SWP-4 and in the most upgradient sample on Pedro Creek (PC-5). HQs greater than 5 were also calculated for the American robin and deer mouse receptor at the downstream location on Pedro Creek (PC-3). Evaluation of the exposure estimates reveal that elevated HQs in these locations were highest for those receptors ingesting terrestrial invertebrates and lower for those with a higher proportion of vegetation and/or small mammals in their diet.

The mink had the most widely distributed elevated HQs (Figure 4.3-47). The HQ at SWP-4 was equal to 12. In Pedro Creek, HQs were equal to 9 and 8 at PC-5 and PC-3, respectively, and in State Land Creek HQs were equal to 7 at both sampling locations. The HQ calculated at CGC-

1 (HQ = 1.8) was lower than the HQ calculated in the background location at Hoorah Hollow Pond (HQ =2) but not at the background location in North Woodall Creek (HQ = 0.1). The elevated HQs in SWP-4, Pedro Creek, and State Land Creek were primarily driven by selenium concentrations in fish tissues.

Risk to riparian receptor populations and potential exposure of individual receptors is elevated compared to the surrounding upland areas. This is possibly due to greater downstream transport of selenium in water and subsequent exposure of prey and forage items in species farther downgradient. However, the areas represented by the samples collected in the upgradient reaches of Pedro Creek and at SWP-4 are relatively small. It is unknown whether any effects are occurring to the receptor meta-populations inhabiting those areas. No data are currently available to address the actual presence or absence of population-level effects from selenium.

Vanadium

As discussed in Sections 4.2 and 4.3, exposure to vanadium present in surface soils on the ODAs may pose a risk to receptors inhabiting those areas. While there appears to be no significant relationship between vanadium concentrations in soils and vanadium concentrations in prey items, the elevated concentrations in surface soils resulted in HQs greater than 1 for the bird receptors primarily within the upland habitats at the Site due mostly to the soil ingestion pathway.

Within the upland habitats, elevated surface soil vanadium concentrations were generally collocated with sampling locations where measured or estimated selenium HQs were greater than 7 (selenium HQs calculated for the deer mouse receptor) depending on the TRV used. Risk-based actions taken to address selenium concentrations at the Site would also likely address potential risks from vanadium.

Other ECOPCs

Concentrations of the following ECOPCs correspond to exposures that exceed LOAELs at some locations:

- Barium
- Cadmium
- Chromium
- Lead
- Manganese

- Molybdenum
- Nickel
- Zinc

Exposure in excess of the LOAELs for these ECOPCs is restricted in magnitude, scale, or both. Therefore, while individual receptors may experience exposures exceeding LOAELs, overall effects from these chemicals on populations is low. Risk management decisions for wildlife should, therefore, be based on the potential risk from selenium exposure.

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TABLES

FIGURES

APPENDICES

PROVIDED ELECTRONICALLY ON CD

Table 2.1-1
Potential Terrestrial and Riparian/Aquatic Species
Present at Conda Mine (Not All Inclusive)

Common Name	Scientific Name
Mammals	
Grazers	
Elk	*Cervus elaphus*
Browsers	
Moose	*Alces alces*
Mule deer	*Odocoileus hemionus*
Omnivores	
Raccoon	*Procyon lotor*
Red fox	*Vulpes vulpes*
Striped skunk	*Mephitis mephitis*
Black bear	*Ursus americanus*
Carnivores	
Mink	*Mustela vison*
Coyote	*Canis latrans*
Grey Wolf	*Canis lupus*
Bobcat	*Lynx rufus*
Badger	*Taxidea taxus*
Mountain lion	*Felis concolor*
American marten	*Martes americana*
Long-tailed weasel	*Mustela frenata*
Ermine	*Mustela erminea*
Small Herbivores & Rodents	
Deer mouse	*Peromyscus maniculatus*
Long-tailed vole	*Microtus longicaudus*
Meadow vole	*Microtus pennsylvanicus*
Montane vole	*Microtus montanus*
Southern red-backed vole	*Clethrionomys gapperi*
Beaver	*Castor canadensis*
Muskrat	*Ondatra zibethicus*
Porcupine	*Erithizon dorsatum*
Least chipmunk	*Eutamias minimus*
Yellow pine chipmunk	*Eutamias amoenus*
Yellow-bellied marmot	*Marmota flaviventris*
Pine squirrel	*Tamiasciurus hudsonicus*
Northern flying squirrel	*Glaucomys abrinus*
Uinta ground squirrel	*Spermophilus armatus*
Nuttall's cottontail	*Sylvilagus nuttalli*
Black-tailed jackrabbit	*Lepus californicus*
Snowshoe hare	*Lepus americanus*
Bats	
Big brown bat	*Eptesicus fuscus*
Little brown bat	*Myotis lucifugus*
Long-legged myotis	*Myotis volans*
Silver-haired bat	*Lasionycteris noctivagans*
Western long-eared myotis	*Myotis evotis*
Reptiles	
Rubber boa	*Charina bottae*
Western terrestrial garter	*Thamnophis elegans*
Amphibians	
Tiger salamander	*Ambystoma tigrinum*
Boreal chorus frog	*Pseudacris maculata*
Northern leopard frog	*Rana pipiens*
Fish	
Yellowstone cutthroat trout	*Oncorhynchus clarki bouvieri*
Rainbow trout	*Oncorhynchus mykiss*
Brown trout	*Salmo trutta*
Brook trout	*Salvelinus fontinalis*
Mountain whitefish	*Prosopium williamsoni*
Utah chub	*Gila atraria*
Longnose dace	*Rhinichthys cataractae*
Speckled dace	*Rhinichthys osculus*
Redside shiner	*Richardsonius balteatus*
Utah sucker	*Catostomus ardens*
Mountain sucker	*Catostomus platyrhynchus*
Bluehead sucker	*Catostomus discobolus*
Mottled sculpin	*Cottus bairdi*
Paiute sculpin	*Cottus beldingi*
Black bullhead	*Ictalurus melas*
Fathead minnow	*Pimephales promelas*
Carp	*Cyprinus carpio*
Northern leatherside chub	*Lepidomeda copei*

Note: This list includes species known, suspected, or possible to occur in the region (e.g., Blackfoot River subbasin) including the project area, based on regional documents. These species, or their habitats, may not definitively occur at Conda, nor is this list all inclusive.

(*) Indicates species protected by the Migratory Bird Treaty Act (MBTA)

Common Name	Scientific Name
Birds	
Herbivores	
Chipping sparrow*	*Spizella passerina**
Song sparrow*	*Melospiza melodia**
Cassin's finch*	*Carpodacus cassinii**
Dark-eyed junco*	*Junco hyemalis**
Vesper sparrow*	*Pooecetes gramineus**
Pine siskin*	*Carduelis pinus**
Red crossbill*	*Loxia curvirostra**
White-crowned sparrow*	*Zonotrichia leucophrys**
Omnivores	
American robin*	*Turdus migratorius**
Yellow-headed blackbird*	*Xanthocephalus*
Red-winged blackbird*	*Agelaius phoeniceus**
Brewer's blackbird*	*Euphagus cyanocephalus**
Brown-headed cowbird*	*Molothrus ater**
Black-billed magpie*	*Pica hudsonia**
Three-toed woodpecker	*Picoides tridactylus*
Common raven*	*Corvus corax**
Gray jay*	*Perisoreus canadensis**
Green-tailed towhee*	*Pipilo chlorurus**
Hairy woodpecker*	*Picoides villosus**
Red-naped sapsucker*	*Sphyrapicus nuchalis**
Williamson's sapsucker*	*Sphyrapicus thyroideus**
Sandhill crane*	*Grus canadensis**
Swainson's thrush*	*Catharus ustulatus**
Townsend's solitaire*	*Myadestes townsendi**
Western meadowlark*	*Sturnella neglecta**
Western tanager*	*Piranga ludoviciana**
Western wood-pewee*	*Contopus sordidulus**
Belted kingfisher*	*Megaceryle alcyon**
Insectivores	
Bank swallow*	*Riparia riparia**
Tree swallow*	*Tachycineta bicolor**
Black-capped chickadee*	*Poecile atricapillus**
Mountain chickadee*	*Poecile gambeli**
Common nighthawk*	*Chordeiles minor**
MacGillivray's warbler*	*Oporornis tolmiei**
Mountain bluebird*	*Sialia currucoides**
Northern flicker*	*Colaptes auratus**
Red-breasted nuthatch*	*Sitta carolinensis**
White-breasted nuthatch*	*Sitta carolinensis**
Yellow warbler*	*Dendroica petechia**
Yellow-rumped warbler*	*Dendroica coronata**
House wren*	*Troglodytes aedon**
Raptors	
Northern harrier*	*Circus cyaneus**
Bald eagle*	*Haliaeetus leucocephalus**
Northern goshawk*	*Accipiter gentilis**
Golden eagle*	*Aquila chrysaetos**
Red-tailed hawk*	*Buteo jamaicensis**
Swainson's hawk *	*Buteo swainsoni**
Northern goshawk*	*Accipiter gentilis**
Cooper's hawk*	*Accipiter cooperii**
American kestral*	*Falco sparverius**
Game Birds	
Ruffed grouse	*Bonasa umbellus*
Blue grouse	*Dendragapus obscurus*
Mourning dove*	*Zenaida macroura**
Hungarian partridge	*Perdix perdix*
Chukar partridge	*Alectoris chukar*
Greater sage grouse	*Centrocercus urophasianus*
Aquatic	
Great blue heron*	*Ardea heroidas**
Mallard*	*Anas platyrhynchos**
American widgeon*	*Anas americana**
Canada goose*	*Branta canadensis**
American coot*	*Fulica americana**
Franklin's gull*	*Larus pipixcan**
Gadwall*	*Anas strepera**
Lesser scaup*	*Aythya affinis**
Eared grebe*	*Podiceps nigricolli**
Western grebe*	*Aechmophorus occidentalis**
Pied-billed grebe*	*Podilymbus podiceps**
Redhead*	*Aythya americana**
Green-winged teal*	*Anas crecca**
Cinnamon teal*	*Anas cyanoptera**
Common goldeneye*	*Bucephala clangula**
American white pelican*	*Pelecanus erythrorhynchos**
Owls	
Boreal owl*	*Aegolius funereus**
Flammulated owl*	*Otus flammeolus**
Great gray owl*	*Strix nebulosa**
Great-horned owl*	*Bubo virginianus**
Shore Birds	
Common snipe*	*Gallinago gallinago**
American avocet*	*Recurvirostra americana**
Long-billed curlew*	*Numenius americanus**
Spotted sandpiper*	*Actitis macularius**
Killdeer*	*Charadrius vociferus**
Scavangers	
Turkey vulture*	*Cathartes aura**

Table 2.1-2
Summary of Fish Caught On-Site

Waterbody	Station ID	Species	Count	Average Length (mm)	Length Range (mm)	Average Weight (g)	Weight Range (g)
Camp G Creek	CGC-0	Mountain sucker	1	106.0	-	12.1	-
		Paiute sculpin	1	68.0	-	4.0	-
		Redside shiner	3	76.3	68 - 84	4.8	3.4 - 6.0
		Speckled dace	40	55.2	27 - 76	1.8	0.1 - 4.7
Pedro Creek	PC-1	Speckled dace	9	55.8	20 - 70	2.5	1.3 - 3.8
State Land Creek	SLC-0	Redside shiner	18	38.2	30 - 50	0.6	0.1 - 1.3
		Speckled dace	11	41.9	34 - 48	0.7	0.2 - 1.2
	SLC-1	Redside shiner	3	82.7	75 - 93	5.8	4.3 - 7.0
		Speckled dace	10	54.8	38 - 65	1.9	0.4 - 3.9
	SLC-2	Speckled dace	3	72.3	59 - 81	4.3	3.8 - 5.2
		Utah sucker	1	145.0	-	30.6	-
Trail Creek	TC-1	Redside shiner	13	63.7	32 - 92	3.0	0.3 - 6.4
		Speckled dace	42	52.3	32 - 74	1.6	0.3 - 4.7
		Utah sucker	2	67.0	67	2.1	1.4 - 2.8

Notes:
mm - millimeter
g - gram

Table 2.1-3
Summary of Special Status Species Information

Common Name[1]	Scientific Name[1]	USFWS - correspondence July 2009 [2]	USFWS (Caribou County) August 2011 [3]	IDAPA 2009 [4]	IDAPA 2011 [5]	IDFG-IFWIS May 2010 [6, 7]	USFS - correspondence 2009/2010 [8, 9]	USFS (Caribou NF) July 2011 [10]	BLM correspondence (Pocatello Field Office) 2009 [11]	BLM FEIS (Pocatello Field Office) 2010 [12]
Birds										
American white pelican	*Pelecanus erythrorhynchos*								Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Bald eagle	*Haliaeetus leucocephalus*			Threatened [a]	Protected Non Game	G5; S3B,S4N	No suitable habitat/no known occurrence	Sensitive	Threatened	
Boreal owl	*Aegolius funereus*						No suitable habitat/no known occurrence	Sensitive		
Black tern	*Chlidonias niger*								Regional/State Imperiled Species	Regional/State Imperiled Species
Brewer's sparrow	*Spizella breweri*								Regional/State Imperiled Species	Regional/State Imperiled Species
Calliope hummingbird	*Stellula calliope*								Regional/State Imperiled Species	Regional/State Imperiled Species
Columbian sharp-tailed grouse	*Tympanchus phasianellus columbianus*						Sensitive and Manangement Indicator Species	Sensitive	Regional/State Imperiled Species	Regional/State Imperiled Species
Flammulated owl	*Otus flammeolus*						Sensitive and Manangement Indicator Species	Sensitive	Regional/State Imperiled Species	Regional/State Imperiled Species
Ferruginous hawk	*Buteo regalis*								Regional/State Imperiled Species	Regional/State Imperiled Species
Greater sage-grouse	*Centrocercus urophasianus*		Candidate			G3G4; S2	Sensitive and Manangement Indicator Species	Sensitive	Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Great gray owl	*Strix nebulosa*						Sensitive and Manangement Indicator Species	Sensitive		
Hammond's flycatcher	*Empidonax hammondii*								Regional/State Imperiled Species	Regional/State Imperiled Species
Harlequin duck	*Histrionicus histrionicus*						No suitable habitat/no known occurrence	Sensitive		
Lewis' woodpecker	*Melanerpes lewis*								Regional/State Imperiled Species	Regional/State Imperiled Species
Loggerhead shrike	*Lanius ludovicianus*								Regional/State Imperiled Species	Regional/State Imperiled Species
Northern goshawk	*Accipiter gentilis*						Sensitive and Manangement Indicator Species	Sensitive	Regional/State Imperiled Species	Regional/State Imperiled Species
Olive-sided flycatcher	*Contopus borealis*								Regional/State Imperiled Species	Regional/State Imperiled Species
Peregrine falcon	*Falco peregrinus anatum*			Threatened	Protected Non Game		No suitable habitat/no known occurrence	Sensitive	Regional/State Imperiled Species	Regional/State Imperiled Species
Prairie falcon	*F. mexicanus*								Regional/State Imperiled Species	Regional/State Imperiled Species
Sage sparrow	*Amphispiza belli*								Regional/State Imperiled Species	Regional/State Imperiled Species
Three-toed woodpecker	*Picoides tridactylus*						Sensitive and Manangement Indicator Species	Sensitive		
Trumpeter swan	*Cygnus buccinator*					G4; S1B, S2N	No suitable habitat/no known occurrence	Sensitive	Regional/State Imperiled Species	Regional/State Imperiled Species
White-faced ibis	*Plegadis chihi*								Peripheral Species	Peripheral Species
Williamson's sapsucker	*Sphyrapicus throideus*								Regional/State Imperiled Species	Regional/State Imperiled Species
Willow flycatcher	*Empidonax trailii*								Regional/State Imperiled Species	Regional/State Imperiled Species
Yellow-billed cuckoo	*Coccyzus americanus*								Candidate	
Long-billed curlew	*Numenius americanus*					G5; S2B			Candidate	
Virginia's warbler	*Vermivora virginae*								Peripheral Species	Peripheral Species
Merlin	*Falco columbarius*					G5; S2B, S2N			Candidate	
Mammals										
Gray wolf (Rocky mountain DPS)	*Canis lupus*						Threatened, Endangered, Proposed, and Candidate species - not currently listed [c]	Sensitive	Experimental Population	
Rock squirrel	*Spermophilus variegatus*			Protected Non Game	Protected Non Game					
North american wolverine	*Gulo gulo luscus*		Candidate	Protected Non Game	Protected Non Game		Sensitive and Manangement Indicator Species	Sensitive		
Pygmy rabbit	*Brachylagus idahoensis*						No suitable habitat/no known occurrence	Sensitive	Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species

Table 2.1-3
Summary of Special Status Species Information

Common Name[1]	Scientific Name[1]	USFWS - correspondence July 2009 [2]	USFWS (Caribou County) August 2011 [3]	IDAPA 2009 [4]	IDAPA 2011 [5]	IDFG-IFWIS May 2010 [6, 7]	USFS - correspondence 2009/2010 [8, 9]	USFS (Caribou NF) July 2011 [10]	BLM correspondence (Pocatello Field Office) 2009 [11]	BLM FEIS (Pocatello Field Office) 2010 [12]
Woodland caribou (Selkirk mountain caribou)	*Rangifer tarandus caribou.*			Endangered	Endangered					
Canadian lynx	*Lynx canadensis*	Threatened	Threatened (no designated Critical Habitat in Caribou County)	Threatened	Threatened	G5; S1	Threatened, Endangered, Proposed, and Candidate species	Threatened		
Grizzly bear	*Ursus arctos horribilis*			Threatened	Threatened			Threatened		
Northern Idaho ground squirrel	*Spermophilus brunneus brunneus*			Threatened	Threatened					
American pika	*Ochotona princeps*			Protected Non Game	Protected Non Game					
Bats	all species			Protected Non Game	Protected Non Game		No suitable habitat/no known occurrence (spotted bat: *Euderma maculatum* , Townsend's western big-eared bat: *Corynorhinus townsendii townsendii*)	Sensitive (spotted bat: *Euderma maculatum,* townsend's Western Big-Eared Bat: *Corynorhinus townsendii townsendii)*	Regional/State Imperiled Species (Townsend's big-eared bat *Corynorhinus townsendii*)	Regional/State Imperiled Species (Townsend's big-eared bat *Corynorhinus townsendii*)
Chipmunks	*Neotamias spp*			Protected Non Game	Protected Non Game				Peripheral Species (Cliff chipmunk, Tamias dorsalis, Uinta chipmunk, Tamias umbrinus)	Peripheral Species (Cliff chipmunk, *Tamias dorsalis* , Uinta chipmunk, *Tamias umbrinus*)
Columbia Plateau (Merriam's) ground squirrel	*Spermophilus canus vigilis*			Protected Non Game	Protected Non Game					
Golden-mantled ground squirrel	*Spermophilus lateralis*			Protected Non Game	Protected Non Game					
Great Basin (piute) ground squirrel	*Spermophilus canus vigilis*			Protected Non Game	Protected Non Game					
Kit fox	*Vulpes macrotis*			Protected Non Game	Protected Non Game				Peripheral Species	Peripheral Species
Northern Flying Squirrel	*Glaucomys sabrinus*			Protected Non Game	Protected Non Game					
Red squirrel	*Tamiasciurus hudsonicus.*			Protected Non Game	Protected Non Game					
Southern Idaho ground squirrel	*Spermophilus brunneus endemicus.*			Protected Non Game	Protected Non Game					
Wyoming ground squirrel	*Spermophilus elegans nevadensis*			Protected Non Game	Protected Non Game					
Fish										
Bear lake cutthroat trout	*Oncorhynchus clarki pop 3*								Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Bear lake sculpin	*Cottus extensus*			Protected Non Game	Protected Non Game				Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Bear lake whitefish	*Prosopium abyssicola*								Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Bonneville cisco	*Prosopium gemmifer*								Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Bonneville whitefish	*Prosopium spilonotus*								Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Bonneville cutthroat trout	*Oncorhynchus clarki utah*								Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Burbot, ling	*Lota lota.*			Endangered	Endangered					
Bull trout	*Salvelinus confluentus*			Threatened	Threatened					
Chinook salmon (spring, summer, and fall)	*Oncorhynchus tshawytscha*			Threatened	Threatened					
Leatherside chub	*Gila copei*			Protected Non Game	Protected Non Game				Regional/State Imperiled Species	Regional/State Imperiled Species
Northern leatherside chub	*Lepidomeda copei*						Sensitive and Manangement Indicator Species [b]	Sensitive		
Pacific lamprey	*Lampetra tridentata*			Endangered	Endangered					
Sand roller	*Percopsis transmontana*			Protected Non Game	Protected Non Game					
Shoshone sculpin	*Cottus greenei*			Protected Non Game	Protected Non Game					
Sockeye salmon	*Oncorhynchus nerka*			Endangered	Endangered					
Yellowstone cutthroat trout	*Oncorhynchus clarki bouvieri*						Sensitive and Manangement Indicator Species [b]	Sensitive [d]	Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Steelhead trout (Snake River summer)	*Oncorhynchus mykiss gairdneri*			Threatened	Threatened					
White sturgeon (Kootenai River population)	*Acipenser transmontanus*			Endangered	Endangered					

Table 2.1-3
Summary of Special Status Species Information

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Wood River sculpin	*Cottus leiopomus*			Protected Non Game	Protected Non Game					
Amphibians										
Boreal toad	*Bufo boreas boreas*							Sensitive	Rangewide/Globally Imperiled Species (Southeast Idaho population only)	Rangewide/Globally Imperiled Species
Columbia spotted frog (Great Basin population)	*Rana luteiventris*						No suitable habitat/no known occurrence	Sensitive		
Common garter snake	*Thamnophis sirtalis*								Regional/State Imperiled Species	Regional/State Imperiled Species
Western toad	*Bufo boreas*								Regional/State Imperiled Species (Northern Rocky Mountain Group only)	
Northern leopard frog	*Rana pipiens*								Rangewide/Globally Imperiled Species	Rangewide/Globally Imperiled Species
Invertebrates										
Utah valvata snail	*Valvata utahensis*								Endangered	
Bliss Rapids snail	*Taylorconcha serpenticola*								Threatened	
Bear Lake springsnail	*Pyrgulopsis pilsbryana*					G2; S1				
Plants										
Whitebark pine	*Pinus albicaulis*		Candidate							
Alderleaf mountain mahogany	*Cercocarpus montanus*									Rangewide/Globally Imperiled Species-Moderate Endangerment
Cooper's hymenoxys	*Hymenoxys cooperi* var.*canescens*									Species of Concern
Iodinebush	*Alenrolfea occidentalis*									Rangewide/Globally Imperiled Species-Moderate Endangerment
Red glasswort	*Salicornia rubra*									Species of Concern
Silky cryptantha	*Cryptantha sericea*									Rangewide/Globally Imperiled Species-Moderate Endangerment
Idaho sedge	*Carex idahoa*									Rangewide/Globally Imperiled Species-High Endangerment
Ute ladies' tresses orchid	*Spiranthes diluvialis*							Threatened - ? (suspected/potential habitat)		
Meadow milkvetch	*Astragalus diversifolius A. Gray*									Regional/Imperiled Species
Starveling milkvetch	*Astragalus jejunus* var. *jejunus*						No suitable habitat/no known occurrence	Sensitive		Rangewide/Globally Imperiled Species-High Endangerment
Payson bladderpod	*Lesquerella paysonii*						No suitable habitat/no known occurrence	Sensitive		
Cache beardtongue	*Penstemon compactus*						No suitable habitat/no known occurrence	Sensitive		
Hoary willow	*Salix candida*					G5; S2				Species of Concern

Table 2.1-3
Summary of Special Status Species Information

Common Name[1]	Scientific Name[1]	USFWS - correspondence July 2009 [2]	USFWS (Caribou County) August 2011 [3]	IDAPA 2009 [4]	IDAPA 2011 [5]	IDFG-IFWIS May 2010 [6, 7]	USFS - correspondence 2009/2010 [8, 9]	USFS (Caribou NF) July 2011 [10]	BLM correspondence (Pocatello Field Office) 2009 [11]	BLM FEIS (Pocatello Field Office) 2010 [12]

Notes:
1 - Not all species in the table definitely occur at the Site.

U.S. Fish and Wildlife Service (USFWS)
2 - A letter was sent to USFWS on June 16, 2009 seeking feedback on which federally-listed T/E species they expect could occur at the Site and should be specifically included in the SSERA. Table reflects response letter, dated July 21, 2009.

3 - U.S. Fish and Wildlife Service (USFWS). 2011. U.S Fish and Wildlife Service – Idaho Fish and Wildlife Office, Endangered, Threatened, Proposed, and Candidate Species (With Associated Proposed and Critical Habitats), updated 8/17/2011. USFWS, Idaho Fish and Wildlife Office, Boise, ID. Includes species identified for Caribou County only.

Idaho Administrative Procedures Act (IDAPA)
4 - Idaho Administrative Procedures Act (IDAPA). 2009. 13.01.06 – Rules Governing Classification and Protection of Wildlife. Idaho Department of Fish and Game.

5 - Idaho Administrative Procedures Act (IDAPA). 2011. 13.01.06 – Rules Governing Classification and Protection of Wildlife. Idaho Department of Fish and Game. Available at http://adminrules.idaho.gov/rules/2011/13/0106.pdf

a - Although the bald eagle is listed as threatened in IDAPA (2009), it was recommended by IDFG biologists for delisting from T/E species to non-game wildlife species; recommendations were reportedly to be made to their commission on July 23, 2009 (pers. comm., R. Sallabanks at IDFG, July 21, 2009). IDAPA 2011 reflects the updated status.
Definitions from IDAPA (2011) for Threatened/Endangered species:
Endangered: Any native species in danger of extinction throughout all or a significant portion of its Idaho range.
Threatened Species: Any native species likely to be classified as Endangered within the foreseeable future throughout all or a significant portion of its Idaho range.

Idaho Department of Fish and Game (IDFG)-Idaho Fish and Wildlife Information System (IFWIS)
6 - Idaho Department of Fish and Game (IDFG). 2010a. Request for List of Special-Status Species Occurrences in the Vicinity of the J.R. Simplot Company's Conda/Woodall Mountain Mine to Support Baseline Ecological Risk Assessment was sent to Jim Mende of the Department of Fish and Game; October 21, 2009. Verbal response in May 2010 indicated that the Idaho Fish and Wildlife Information System (IFWIS) staff should be contacted.

7 - Idaho Department of Fish and Game (IDFG). 2010b. E-mail communication containing Geographic Information System (GIS) shapefiles of at-risk species locations within 2 miles of the project area, received from George Stephens, Idaho Fish and Wildlife Information System (IFWIS), IDFG, Boise, ID. May 5, 2010. Refer to Figure 2-9 for more information.
Definitions from IDFG & IFWIS (Nature Serve Explorer 2010)
G2: Nature Serve Global Conservation Status Rank, Imperiled
G3: Nature Serve Global Conservation Status Rank,Vulnerable
G4: Nature Serve Global Conservation Status Rank, Apparently Secure
G5: Nature Serve Global Conservation Status Rank, Secure
S1: Nature Serve Subnational Conservation Status Rank, Critically Imperiled
S2: Nature Serve Subnational Conservation Status Rank, Imperiled
S3: Nature Serve Subnational Conservation Status Rank, Vulnerable
S4: Nature Serve Subnational Conservation Status Rank, Apparently Secure
B: Breeding- Conservation status refers to the breeding population of the species in the nation or state/province
N: Nonbreeding- Conservation status refers to the non-breeding population of the species in the nation or state/province

U.S. Forest Service (USFS)

8 - A letter was sent to USFS on October 21, 2009 seeking feedback on which federally-listed T/E species they expect could occur on USFS lands at the Site (southeastern corner of Non-Mine Area) and should be specifically included in the SSERA. Table reflects response letter, dated October 30, 2009.
Information was provided in USFS (2009) as to whether "Suitable habitat for species or prey occurs in the project or analysis area" and "Occurrence is known, expected, probable, or possible in the project or analysis area determined by the amount, distribution, and quality of suitable habitat in and around the project area; reviewing file information of suitable habitat, sightings; survey data; site visits; and/or personal knowledge of species and habitat." Only species with either suitable habitat or possible occurrence in USFS lands at the Conda site are listed on this table. (exception: if the species is on the list as a result of cross-listing with another source, then information regarding lack of suitable habitat/lack of occurrence is provided.)

9 - U.S. Forest Service (USFS). 2010. Telephone communication from James Capurso (USFS fisheries biologist) to Formation Environmental; regarding species of concern listed on USFS's 10/30/2009 list from A. Keysor. May 5, 2010.

b - Caribou NF Fish Biologist Jim Capurso (USFS 2010) indicated that Snake River fine-spotted and Bonneville cutthroat trout can be lumped and referred to as Yellowstone cutthroat trout. He also verified that the northern leatherside chub is a sensitive species.
c - USFS (2009) indicated that the wolf may be relisted and should be considered as a listed species.

Definitions and information from USFS (2009):
Threatened, Endangered, Proposed, and Candidate species identified by U.S. Fish and Wildlife Services on the 180-Day Species List Number (or update) and date of transmittal letter: Species List # 14420 2009-SL-0358 – 6-01-09
Sensitive species identified by the Regional Forester are known or suspected to occur on the Caribou NF (USDA 2009). Population viability is a concern for these species as evidenced by current or expected downward trends in population numbers and/or habitat.
Management Indicator Species – Caribou National Forest FEIS (USDA 2003a D-40) and Revised Forest Plan (USDA 2003b 3-25)

10 - U.S. Forest Service (USFS). 2011. Intermountain Region (R4) Threatened, Endangered, Proposed, and Sensitive Species, July 27, 2011 update, Known/Suspected Distribution by Forest. Table presents information for Caribou National Forest (NF) only. Available at http://www.fs.fed.us/r4/resources/tes/r4_tes_lst.pdf. July 27, 2011.

d - Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*) and Bonneville cutthroat trout (*Oncorhynchus clarki utah*) are lumped together (per footnote 9/b).

Bureau of Land Management (BLM)
11 - Bureau of Land Management (BLM). 2009b. E-mail from Jason Sturm (BLM) to Robbert-Paul Smit (Formation Environmental) on November 3, 2009 with an attachment titled "Idaho BLM Special Status Animal Species For Districts and Field Offices" (no date). Table reflects wildlife listings for Type 1, Type 2, Type 3, and Type 4 species for the Pocatello Field Office only. The email did not indicate which species were expected to occur specifically on BLM lands within the Conda Study Area.

12 - Bureau of Land Management (BLM). 2010. Proposed Resource Management Plan and Final Environmental Impact Statement (FEIS). Volume I - Executive Summary, Chapters 1, 2, and 3. U.S. Department of Interior, Bureau of Land Management, Pocatello Field Office/Idaho Falls District. April 2010.

Definitions in BLM (2009b):
Rangewide / Globally Imperiled Species: Includes species that are experiencing significant declines throughout their range with a high liklihood of being listed under the Endangered Species Act in the forseeable future due to their rarity and/or significant endangerment factors.
Regional / State Imperiled Species: Includes species that are experiencing declines in population or habitat and are in danger of regional or local extinctions in Idaho in the foreseeable future.
Peripheral Species in Idaho: Includes species that are generally rare in Idaho with the majority of their breeding range outside the state.
Watch List Species: Includes species that are not considered Idaho BLM sensitive species but current population or habitat information suggests that species may warrant sensitive species status in the future. (Not included on this table).

Table 2.2-1
Potentially Exposed Receptor Groups and Representative Receptors

Receptor Groups (Trophic Level / Feeding Guild)	Potential Representative Receptors	Ecosystem Type
Terrestrial Ecosystems		
1° Consumers – Terrestrial Herbivorous Birds	Chipping sparrow (*Spizella passerina)* [Surrogate = Northern bobwhite (*Colinus virginianus*)]	Terrestrial
1° Consumers – Terrestrial Herbivorous Mammals	Black-tailed jackrabbit (*Lepus californicus)* [Surrogate = Eastern cottontail (*Sylvilagus floridanus*)]	Terrestrial
	Mule deer (*Odocoileus hemionus*)	Terrestrial
2° Consumers – Terrestrial Omnivorous Birds	American robin (*Turdus migratorius)*	Terrestrial
2° Consumers – Terrestrial Omnivorous Mammals	Deer mouse (*Peromyscus maniculatus)*	Terrestrial
2° Consumers – Terrestrial Reptiles	Western garter snake (*Thamnophis elegans*)	Terrestrial
3° Consumers – Terrestrial Carnivorous Mammals	Coyote (*Canis latrans)*	Terrestrial
3° Consumers – Terrestrial Raptors	Northern harrier (*Circus cyaneus*)	Terrestrial
Aquatic and Riparian Ecosystems		
1° Producers and Consumers – Non-fish Aquatic Life	Benthic invertebrates	Aquatic
1° Consumers – Fish	Sculpin (*Cottus sp.*) [Surrogate = Common carp (*Cyprinus carpio*)]	Aquatic
2° and 3° Consumers – Fish	Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri)* [Surrogate = Rainbow trout (*Oncorhynchus mykiss*)]	Aquatic
1° Consumers – Aquatic and Riparian Herbivorous Birds	Song sparrow *(Melospiza melodia)*	Aquatic/ Riparian
1° Consumers – Aquatic and Riparian Herbivorous Mammals	Long-tailed vole (*Microtus longicaudus)* [Surrogate = Meadow vole *(Microtus pennsylvanicus*)]	Aquatic/ Riparian
2° Consumers – Aquatic and Riparian Omnivorous Birds	Red-winged blackbird (*Agelaius phoeniceus)*	Aquatic/ Riparian
2° Consumers – Aquatic and Riparian Piscivorous Birds	Great blue heron *(Ardea herodias)*	Aquatic/ Riparian
2° Consumers – Aquatic and Riparian Benthic-feeding Birds	Mallard (*Anas platyrhynchas)*	Aquatic/ Riparian
2° Consumers – Aquatic and Riparian Omnivorous Mammals	Raccoon (*Procyon lotor)*	Aquatic/ Riparian
2° Consumers – Aquatic and Riparian Carnivorous Mammals	Mink (*Mustela vison)*	Aquatic/ Riparian

Notes:

1° - primary trophic level

2° - secondary trophic level

3° - tertiary trophic level

Table 2.3-1
Surface Water Screening Values for Aquatic Receptors

COPC			USEPA National Recommended Water Quality Criteria[1]		IDAPA Criteria[2]		Lower of IDAPA and EPA Surface Water Screening Benchmark	Alternative Chronic Value			Surface Water Screening Benchmark for Aquatic Life
			Freshwater CCC (Chronic) Criteria		Aquatic Life CCC (Chronic) Criteria						
CASNo	Analyte	Units	Value	Notes	Value	Notes		Value	Notes	Source	Value
7429-90-5	Aluminum	mg/L	---		---		---	0.087		[3]USEPA 1988	0.087
7440-36-0	Antimony	mg/L	---		---		---	1.60		[4]USEPA 1986	1.60
7440-38-2	Arsenic, Dissolved	mg/L	0.15		0.15	a	0.15	---		---	0.15
7440-39-3	Barium	mg/L	---		---		---	0.44	j	[5]MDEQ 2015 - FCV	0.44
7440-41-7	Beryllium	mg/L	---		---		---	0.0067	j	[5]MDEQ 2015 - FCV	0.007
7440-42-8	Boron	mg/L	---		---		---	7.20		[5]MDEQ 2015 - FCV	7.20
7440-43-9	Cadmium, Dissolved	mg/L	0.00025	d	0.0006	c	0.00025	---		---	0.00025
7440-47-3	Chromium, Dissolved	mg/L	0.074	d, e	0.074	c, e	0.074	---		---	0.074
7440-48-4	Cobalt	mg/L	---		---		---	0.10		[5]MDEQ 2015 - FCV	0.10
7440-50-8	Copper, Dissolved	mg/L	BLM	h	0.011	c		---		---	0.011
7782-41-4	Fluoride	mg/L	---		---			2.25	j	[5]MDEQ 2015 - FCV	2.25
7439-89-6	Iron	mg/L	---		---		---	1		[3]USEPA 1986	1
7439-92-1	Lead, Dissolved	mg/L	0.0025	d	0.0025	c	0.0025	---		---	0.0025
7439-96-5	Manganese, Dissolved	mg/L	---		---		---	1.65	j, m	[6]CDPHE 2009	1.65
7439-97-6	Mercury, Dissolved	mg/L	0.00077		- -		0.00077	---		---	0.00077
7439-98-7	Molybdenum	mg/L	---		---		---	3.20		[5]MDEQ 2015 - FCV	3.20
7440-02-0	Nickel, Dissolved	mg/L	0.052	d	0.052	c	0.052	---		---	0.052
7782-49-2	Selenium	mg/L	0.005	g	0.005	f	0.005	---		---	0.005
7440-22-4	Silver, Dissolved	mg/L	0.0032	d, b	---		0.0032	---		---	0.0032
7440-28-0	Thallium	mg/L	---		---		---	0.0072		[5]MDEQ 2015 - FCV	0.0072
7440-61-1	Uranium, Dissolved	mg/L	---		---		---	1.50	j, m	[6]CDPHE 2009	1.50
7440-62-2	Vanadium	mg/L	---		---		---	0.027		[5]MDEQ 2015 - FCV	0.027
7440-66-6	Zinc, Dissolved	mg/L	0.12	d	0.12	c	0.12	---		---	0.12

Notes:
---: No applicable screening benchmark
COPC - Chemical of Potential Concern
CCC - Criterion Continuous Concentration (i.e., chronic)
[a] Criteria for these metals are expressed as a function of the water effect ratio (WER), as defined in Subsection 210.03.c.iii of IDAPA 58.01.02.
[b] Silver criteria is acute value, chronic value not available
[c] Aquatic life criteria for these metals are expressed as a function of total hardness (mg/L as calcium carbonate), the pollutant's water effect ratio (WER) as defined in Subsection 210.03.c.iii of IDAPA 58.01.02 and multiplied by an appropriate dissolved conversion factor as defined in Subsection 210.02. For comparative purposes only, the values displayed in this table are shown as dissolved metal and correspond to a total hardness of one hundred (100) mg/L and a water effect ratio of one
[d] The freshwater criterion for this metal is expressed as a function of hardness (mg/L) in the water column. The value given here corresponds to a hardness of 100 mg/L. Criteria values for other hardness may be calculated from the following: CCC (dissolved) = exp {mC[ln(hardness)]+bC} (CF).
[e] Value is for chromium III.
[f] Criterion is expressed as total recoverable (unfiltered) concentration.
[g] This recommended water quality criterion for selenium is expressed in terms of total recoverable metal in the water column. It is scientifically acceptable to use the conversion factor (0.996- CMC or 0.922-CCC) that was used in the GLI (60FR15393-15399, March 23, 1995; 40CFR132 Appendix A) to convert this to a value that is expressed in terms of dissolved metal.
[h] USEPA's most recent National Ambient Water Quality Criteria table recommends the use of the Biotic Ligan Model (BLM).
[j] hardness-based value calculated using 100 mg/L CaCO3.
[m] Metals are stated as dissolved unless otherwise specified.

Criteria Sources:

[1]U.S. Environmental Protection Agency (EPA). 2015. National Recommended Water Quality Criteria (NRWQC) for Priority Pollutants. EPA Office of Water, Office of Science and Technology (4304T). Available at http://http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm#altable.

[2]Idaho Administrative Procedures Act (IDAPA) 58.01.02 water quality standards - IDAPA Numeric Criteria For Toxic Substances For Waters Designated For Aquatic Life, Recreation, Or Domestic Water Supply Use (IDAPA 2010).

[3]U.S. Environmental Protection Agency (EPA). 1988. Quality Criteria for Aluminum 1988. EPA 440/5-86-008. August, 1988.

[4]U.S. Environmental Protection Agency (EPA). 1986. Quality Criteria for Water 1986 ("The Gold Book"). EPA 440/5-86-001. May 1, 1986.

[5]Michigan Department of Environmental Quality (MDEQ). 2015. Freshwater Chronic Values (FCV) from Rule 57 Water Quality Values based on Rule 323.1057 (Toxic Substances) of the Part 4. Water Quality Standards gives procedures for calculating water quality values to protect humans, wildlife and aquatic life. http://www.michigan.gov/documents/deq/wrd-swas-rule57_372470_7.pdf. Updated April 1, 2015.

[6]Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Commission (WQCC). 2007. Reg. Number 32. Classifications and Numeric Standards for the Arkansas River System, updated February 2009. Available at http://www.cdphe.state.co.us/regulations/wqccregs/100232arkansasriverbasinnew.pdf.

Table 2.3-2
Sediment Screening Values for Aquatic Receptors

RI COPCs			SQAGS[1]		NOAA SQuiRTs[2]				Literature Derived Benchmarks		
CASNo	Analyte	Units	TEC	PEC	LELs	SELs	UETs	ARCS	Value	Type	Reference
7429-90-5	Aluminum	mg/kg	---	---	---	---	---	25,500	---	---	
7440-36-0	Antimony	mg/kg	---	---	---	---	3	---	---	---	
7440-38-2	Arsenic	mg/kg	9.8	33	6	33	17	---	---	---	
7440-39-3	Barium	mg/kg	20	60	---	---	---	---	---	---	
7440-41-7	Beryllium	mg/kg	---	---	---	---	---	---	---	---	
7440-42-8	Boron	mg/kg	---	---	---	---	---	---	235.5 - 310.6	IC25 - L. Variegatus and L. siliquoidea	3
7440-43-9	Cadmium	mg/kg	1	4.98	0.6	10	3	---	---	---	
7440-47-3	Chromium	mg/kg	43	111	26	110	95	---	---	---	
7440-48-4	Cobalt	mg/kg	50	---	---	---	---	---	80	PRG Blackbird Mine Idaho	4
7440-50-8	Copper	mg/kg	32	149	16	110	86	---	---	---	
7439-89-6	Iron	mg/kg	---	---	20,000	40,000	40,000	---	---	---	
7439-92-1	Lead	mg/kg	36	128	31	250	127	---	---	---	
7439-96-5	Manganese	mg/kg	---	---	460	1,100	1,100	---	1800	Apparent Effect Threshold H. azteca	5
7439-97-6	Mercury	mg/kg	0.18	1.06	0.2	2	0.56	---	---	---	
7439-98-7	Molybdenum	mg/kg	---	---	---	---	---	---	3742	NOEC 10 day survival and growth H. azteca	6
7440-02-0	Nickel	mg/kg	23	48.6	16	75	43	---	---	---	
7782-49-2	Selenium	mg/kg	---	---	---	---	---	---	2 - 4	Effects to higher trophic levels	7 and 8
7440-22-4	Silver	mg/kg	1	2.2	0.5	---	4.5	---	4.5	Apparent Effect Threshold H. azteca	5
7440-28-0	Thallium	mg/kg	---	---	---	---	---	---	0.858	Threshold is sediment concentration resulting in 2% of the Lethal Body concentration (25) for 4 week Hyallela bioaccumulation test	9
7440-61-1	Uranium	mg/kg	---	---	---	---	---	---	100	PNEC	3
7440-62-2	Vanadium	mg/kg	---	---	---	---	---	---	---	---	
7440-66-6	Zinc	mg/kg	121	459	120	820	520	---	---	---	

Notes:

COPC - Chemical of Potential Concern
LELs- Lowest Effect Levels
NA: No applicable screening benchmark
PNEC - Predicted No-Effect Concentration
ARCS - Assessment and Remediation of Contaminated Sediments
SELs - Severe Effect Levels
SQuiRTs - screening quick reference tables
TEC - Threshold Effect Concentration
PEC - Probable Effects Concentration
SQAGS - sediment quality assessment guidelines
UETs - Upper Effect Levels
RI - Remedial Investigation
mg/kg - Milligrams per kilograms

Criteria Sources:

[1] MacDonald, D.D., C.G. Ingersoll, D.E. Smorong, R.A. Lindskoog, G. Sloane, and T. Biernacki. 2003. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines (SQAGs) for Florida Inland Waters. Florida Department of Environmental Protection, Tallahassee, FL.

[2] U.S. National Oceanic and Atmospheric Association (NOAA). 2008. Screening Quick Reference Tables (SQuiRTs). NOAA Office of Response and Restoration Division, NOAA OR&R Report 08-1, Seattle, WA. Available at http://response.restoration.noaa.gov/book_shelf/122_NEW-SQuiRTs.pdf.

[3] Sheppard, S.C., M.I. Sheppard, M.O. Gallerand, B. Sanipelli. 2005. Derivation of ecotoxicity thresholds for uranium. Journal of Environmental Radioactivity 79(1):55-83.

[4] Lemley, A.D. 2002. Selenium assessment in aquatic ecosystems. U.S. Forest Service, Blacksburg, VA. as cited in U.S. Environmental Protection Agency (USEPA). 2012. Freshwater sediment screening benchmarks. Mid-Atlantic Risk Assessment. Available at http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fwsed/screenbench.htm. Last updated March 20, 2012.

[5] Cubbage, J., D. Batts, and S. Breidenbach. 1997. Creation and Analysis of Freshwater Sediment Quality Values in Washington State. Washington State Department of Ecology. Olympia,

[6] Liber K, Doig LE, White-Sobey SL. 2011. Toxicity of uranium, molybdenum, nickel, and arsenic to Hyalella azteca and Chironomus dilutus in water-only and spiked sediment toxicity tests. Ecotoxicology and Environmental Safety, 74(5), 1171-1179

[7] Lemley, A.D. 2002. Selenium assessment in aquatic ecosystems. A guide for Hazard Evaluation and Water Quality Criteria. Springer-Verlag, New York, NY.

[8] Vanderveer, W.D., and S.P. Canton. 1997. Selenium Sediment Toxicity Thresholds and Derivation of a Water Quality Criteria for Freshwater Biota of Western Streams. Environmental Toxicology and Chemistry. Vol 16, No. 6. 1260-1268.

[9] Borgmann, U., V. Cheam, W.P. Norwood, and J.Lechner. 1998. Toxicity and bioaccumulation of thallium in Hyallela azteca, with comparison to other metals and prediction of environmental impact. Env Pollution 99: 105-114.

TABLE 2.3-3
Fish Tissue TRVs for Screening and Tier 1 and Tier 2 Risk Characterization

ECOPC		Fish Tissue (mg/kg dw)					
CAS No.	**Analyte**	**Trout**	**Source**	**Notes**	**Other Fish Species**	**Source**	**Notes**
7429-90-5	Aluminum	33.00	a	Rainbow trout, NOEC concentration 8.53 mg/kg ww	--	--	
7440-36-0	Antimony	19.23	b	Rainbow trout, NOEC survival, 5.0 mg/kg ww	4.23	d	
7440-38-2	Arsenic	3.85	c	Sodium arsenate - NOEC survival 2.0 mg/kg ww, growth NOEC at 1.0 mg/kg ww - rainbow trout whole body, 77 day exposure	6.92	e	Survival and growth - No effect Bluegill
7440-39-3	Barium	--	--	No data	--	--	
7440-41-7	Beryllium	--	--		19.73	f	Bluegill mortality NOEC 5.13 mg/kg ww
7440-42-8	Boron	--	--		4.00	g	Suggest that boron in fish tissue is usually less than 4 mg/kg
7440-43-9	Cadmium	2.08	h	NOEC growth 0.54 - Rainbow trout whole body, 210 day exposure	1.35	I	NOEC survival and growth, bluegill, 180 days
7440-47-3	Chromium	8.85	j	Chromium VI, rainbow trout 2.3 mg/kg ww - NOEC mortality	169.60	k	Killifish ED15, larval fish, growth
7440-48-4	Cobalt	--		Dietary info listed indicates it's an essential element - lower doses increase growth	0.2 - 0.3	dd	Gill, liver, muscle tissue range (day 20) in 15 day bioaccumulation study, levels found in control fish, no exposure.
7440-50-8	Copper	6.70	l	Rainbow trout fry growth IC_{10} (6.7 mg/kg dw)	19.54	m	Common Carp larvae NOEC mort (5.08 mg/kg ww)
7439-89-6	Iron	34.62	n	brown trout mortality NOEC egg life stage (9 mg/kg ww)	--	--	
7439-92-1	Lead	15.38	o	Survival NOEC - lead nitrate 4.0 mg/kg ww in carcass (224 day exposure)- rainbow trout	3.46	p	Tilapia lowest value NOEC (0.9 mg/kg ww) growth (muscle tissue)
7439-96-5	Manganese	--	--	No data	--	--	
7439-97-6	Mercury	1.81	q	Mortality no effect, juvenile rainbow trout	3.08	r	Fathead minnow, growth, NOEC, 60 days
7439-98-7	Molybdenum	2.77	s	Growth corrected NOEC for rainbow trout (0.72 mg/kg ww)	--	--	
7440-02-0	Nickel	7.69	t	RBT adult NOEC (2 mg/kg ww) biochemical endpoint for plasma	1.54	u	FHM NOEC (0.4 mg/kg ww)
7782-49-2	Selenium	13.2 - 14.14	v	USEPA's and Simplot's derived whole body brown trout effects concentrations translated from the EC10 egg values	8.5 - 17	--	Fifth percentile criterion value for whole body (8.5 mg/kg dw); fathead minnow whole body value (23.85 mg/kg dw) LOEC reproductive effects values translated from egg/ovary tissues (see Section 3.2.3 for derivation)
7440-22-4	Silver	0.78	w	RBT whole body NOEC (0.78 mg/kg dw) mortality & sublethal endpoints	1.46	x	No effect survival and growth FHM (1.46 mg/kg dw)
7440-28-0	Thallium	--	--		0.19	u	FHM NOEC (0.05 mg/kg ww) embryo time to hatch
7440-61-1	Uranium	67.69	y	Brook trout NOEC hatch, survival, growth (17.6 mg/kg ww derived from BCF (1.94) and NOEC for water (9.08 mg/l)	--	--	
7440-62-2	Vanadium	1.58	z	LOED in carcass for growth and morphology immature RBT (0.41 mg/kg dw)	2.62	aa	American Flagfish NOEC (0.68 mg/kg ww) growth, whole body
7440-66-6	Zinc	22.50	bb	Zinc sulfate, survival and growth NOEC whole body (newly hatched larvae) 4.5 mg/kg ww for brook trout. 84 day exposure	130.77	cc	Flagfish growth, no effect, 100 days,larvae to adult

Notes:
ECOPC = Ecological Chemical of Potential Concern, NOEC = No Observed Effect Concentrations, RBT = Rainbow Trout, LOEL = Lowest Observed Adverse Effects Level, FHM = Fathead Minnow
Wet Weight (ww) concentrations converted to dry weight (dw) using an assumed mositure content of 0.74%, TRV = Toxicity Reference Value, BCF = Bioconcentration factor, IC = Inhibition concentration
Whole body tissue concentrations used whenever available.

TABLE 2.3-3
Fish Tissue TRVs for Screening and Tier 1 and Tier 2 Risk Characterization

ECOPC		Fish Tissue (mg/kg dw)					
CAS No.	Analyte	Trout	Source	Notes	Other Fish Species	Source	Notes

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Table 2.3-4
Radionuclide Screening Levels for Terrestrial/Riparian/Aquatic Receptors

Soil/ Sediment	TERRESTRIAL RECEPTORS (Soil)		RIPARIAN RECEPTORS (Sediment)	
	Terrestrial Animal - Soil	Terrestrial Plant - Soil	Riparian Animal - Sediment	Aquatic Animal - Sediment
U-238 decay string	RESRAD-BIOTA	RESRAD-BIOTA	RESRAD-BIOTA	RESRAD-BIOTA
	Level I BCG (pCi/g)	Level I BCG (pCi/g)	Level I BCG (pCi/g)	Level I BCG (pCi/g)
U-238	1.58E+03	1.57E+04	2.49E+03	4.28E+04
Ra-226	5.06E+01	2.88E+02	1.01E+02	1.45E+04
Rn-222	----	----	----	----
Pb-210	1.39E+03	1.29E+04	1.73E+03	9.18E+04
Po-210	4.33E+03	1.83E+05	4.36E+03	4.59E+09

Water	TERRESTRIAL RECEPTORS		RIPARIAN RECEPTORS	
	Terrestrial Animal - Water	Terrestrial Plant -	Riparian Animal - Water	Aquatic Animal - Water
U-238 decay string	RESRAD-BIOTA	RESRAD-BIOTA	RESRAD-BIOTA	RESRAD-BIOTA
	Level I BCG (pCi/L)	Level I BCG (pCi/L)	Level I BCG (pCi/L)	Level I BCG (pCi/L)
U-238	4.06E+05	4.28E+07	7.56E+02	2.23E+02
Ra-226	8.11E+03	1.45E+07	4.08E+00	1.02E+01
Rn-222	----	----	----	----
Pb-210	2.9E+05	9.18E+07	9.26E+02	6.01E+02
Po-210	6.2E+05	4.59E+12	1.14E+03	3.65E+02

Notes:
BCG - Biota Concentration Guide
pCi/L - Picocuries per liter
pCi/g - Picocuries per gram
Sources:
Level I BCGS from U.S. Department of Energy (USDOE). 2009. RESRAD-Biota software, Version 1.5. Developed by USDOE's Biota Dose Assessment Committee (BDAC). Available at http://web.ead.anl.gov/resrad/home2/biota.cfm. Updated November 18, 2009.

Table 2.3-5
Surface Water Screening-Level Analysis
Aquatic Habitats, Site-Wide Maximum Concentration

COPC		Samples		Detected Concentrations		Overall Minimum	Overall Maximum	Frequency Detection Analysis	Surface Water Screening Benchmark for Aquatic Life	ECOPC?
Analyte	Units	Number of Samples	Detection Frequency	Min	Max				Based on 95LCL hardness[1]	
Aluminum, Total	mg/L	108	76%	0.0146	7.92	0.014	7.92	>5%D	0.087	**YES**
Antimony, Total	mg/L	108	5%	0.0001	0.0018	0.0001	0.0018	**<5%D**	1.6	NO, <5% detection
Arsenic, Dissolved	mg/L	313	44%	0.000062	0.109	0.000062	0.109	>5%D	0.150	NO, Does not exceed criteria
Barium, Total	mg/L	108	100%	0.0032	0.241	0.0032	0.241	>5%D	0.827	NO, Does not exceed criteria
Beryllium, Total	mg/L	108	1%	0.0007	0.00073	0.00016	0.00073	**<5%D**	0.018	NO, <5% detection
Boron,Total	mg/L	104	98%	0.0107	0.0729	0.0107	0.0729	>5%D	7.200	NO, Does not exceed criteria
Cadmium, Dissolved	mg/L	336	20%	0.00002	0.0035	0.00002	0.0035	>5%D	0.0004	**YES**
Chromium, Dissolved	mg/L	336	24%	0.0001	0.023	0.0001	0.023	>5%D	0.121	NO, Does not exceed criteria
Cobalt,Total	mg/L	108	14%	0.0007	0.0022	0.00061	0.0022	>5%D	0.100	NO, Does not exceed criteria
Copper, Dissolved	mg/L	331	24%	0.0003	0.0092	0.0002	0.0092	>5%D	0.019	NO, Does not exceed criteria
Fluoride	mg/L	399	92%	0.022	0.94	0.022	0.94	>5%D	2.505	NO, Does not exceed criteria
Iron, Total	mg/L	108	83%	0.0217	5.68	0.018	5.68	>5%D	1.0	**YES**
Lead, Dissolved	mg/L	254	6%	0.00004	0.007	0.00003	0.007	>5%D	0.005	**YES**
Manganese, Dissolved	mg/L	308	83%	0.0013	1.87	0.0001	1.87	>5%D	2.014	NO, Does not exceed criteria
Mercury, Dissolved	mg/L	261	10%	0.00001	0.0002	0.00001	0.0002	>5%D	0.0008	NO, Does not exceed criteria
Molybdenum, Total	mg/L	108	69%	0.0015	0.0216	0.001	0.0216	>5%D	3.200	NO, Does not exceed criteria
Nickel, Dissolved	mg/L	331	33%	0.0003	0.04	0.00019	0.04	>5%D	0.086	NO, Does not exceed criteria
Selenium, Total	mg/L	462	83%	0.0003	4.08	0.0001	4.08	>5%D	0.005	**YES**
Silver, Dissolved	mg/L	254	3%	0.00005	0.0018	0.00001	0.0018	**<5%D**	0.009	NO, <5% detection
Thallium	mg/L	108	6%	0.00002	0.0049	0.000018	0.0049	>5%D	0.007	NO, Does not exceed criteria
Uranium, Dissolved	mg/L	196	35%	0.00002	0.03	0.00002	0.03	>5%D	2.903	NO, Does not exceed criteria
Vanadium	mg/L	113	88%	0.0005	0.014	0.00044	0.014	>5%D	0.027	NO, Does not exceed criteria
Zinc, Dissolved	mg/L	336	29%	0.0004	0.26	0.0002	0.26	>5%D	0.196	**YES**

Notes:

[1]Hardness based on 95LCL of available data among stream, wetland, and pond habitats. A conservative hardness value of 182 mg/L as $CaCO_3$ was used.

COPC - Chemical of Potential Concern
< 5%D = less than 5% detection frequency (bold)
ECOPC - Ecological Chemical of Potential Concern (bold if the COPC is an ECOPC)

Table 2.3-6
Surface Water Screening-Level Analysis
Aquatic Mine Features, Site-Wide Maximum Concentration

COPC		Samples		Detected Concentrations		Overall Minimum	Overall Maximum	Frequency Detection Analysis	Surface Water Screening Benchmark for Aquatic Life	ECOPC?
Analyte	Units	Number of Samples	Detection Frequency	Min	Max				Based on 95LCL hardness[1]	
Aluminum, Total	mg/L	33	73%	0.0199	4.37	0.014	4.37	>5%D	0.087	**YES**
Antimony, Total	mg/L	33	52%	0.000174	0.0013	0.0001	0.002	>5%D	1.6	NO, Does not exceed criteria
Arsenic, Dissolved	mg/L	43	95%	0.00098	0.045	0.00098	0.045	>5%D	0.15	NO, Does not exceed criteria
Barium, Total	mg/L	33	100%	0.0024	0.0998	0.0024	0.0998	>5%D	0.74	NO, Does not exceed criteria
Beryllium, Total	mg/L	33	0%			0.00016	0.00065	**ND**	0.0153	NO, <5% detection
Boron,Total	mg/L	33	100%	0.0085	0.0841	0.0085	0.0841	>5%D	7.20	NO, Does not exceed criteria
Cadmium, Dissolved	mg/L	49	55%	0.00002	0.018	0.00002	0.018	>5%D	0.00035	**YES**
Chromium, Dissolved	mg/L	49	41%	0.0003	0.0096	0.0002	0.0096	>5%D	0.111	NO, Does not exceed criteria
Cobalt,Total	mg/L	33	15%	0.00073	0.0029	0.00061	0.0029	>5%D	0.10	NO, Does not exceed criteria
Copper, Dissolved	mg/L	49	20%	0.0025	0.008	0.0002	0.008	>5%D	0.0173	NO, Does not exceed criteria
Fluoride	mg/L	63	90%	0.13	3.79	0.1	3.79	>5%D	2.4588	**YES**
Iron, Total	mg/L	33	85%	0.0256	3.8	0.018	3.8	>5%D	1	**YES**
Lead, Dissolved	mg/L	43	2%	0.00046	0.00046	0.00003	0.0039	**<5%D**	0.0043	NO, <5% detection
Manganese, Dissolved	mg/L	43	81%	0.0016	0.552	0.0013	0.552	>5%D	1.95	NO, Does not exceed criteria
Mercury, Dissolved	mg/L	35	0%			0.00006	0.0001	**ND**	0.00077	NO, <5% detection
Molybdenum, Total	mg/L	33	97%	0.0055	0.0668	0.0055	0.0668	>5%D	3.20	NO, Does not exceed criteria
Nickel, Dissolved	mg/L	49	90%	0.0034	0.577	0.0019	0.577	>5%D	0.0790	**YES**
Selenium, Total	mg/L	83	100%	0.00073	8.55	0.00073	8.55	>5%D	0.005	**YES**
Silver, Dissolved	mg/L	43	5%	0.002	0.0037	0.00001	0.0037	**<5%D**	0.0075	NO, <5% detection
Thallium	mg/L	33	42%	0.000056	0.00048	0.000021	0.0049	>5%D	0.0072	NO, Does not exceed criteria
Uranium, Dissolved	mg/L	34	100%	0.00102	0.02	0.00102	0.02	>5%D	2.59	NO, Does not exceed criteria
Vanadium	mg/L	33	97%	0.0016	0.11	0.0016	0.11	>5%D	0.027	**YES**
Zinc, Dissolved	mg/L	49	82%	0.0014	1.65	0.0014	1.65	>5%D	0.18	**YES**

Notes:

[1]Hardness based on 95LCL of available data for the different mine features. A conservative value of 164 mg/L as CaCO3 was used.

COPC - Chemical of Potential Concern
< 5%D = less than 5% detection frequency (bold)
ECOPC - Ecological Chemical of Potential Concern (bold if the COPC is an ECOPC)

Table 2.3-7
Aquatic Sediment Screening-Level Analysis
Aquatic Habitats Site-Wide

COPC			Samples		Detected Concentrations		Overall Minimum	Overall Maximum	Frequency Detection Analysis	Sediment Screening Benchmark for Aquatic Life	ECOPC?
CAS No.	Analyte	Units	Number of Samples	Detection Frequency	Min	Max				Site-wide	
7429-90-5	**Aluminum**	mg/kg dw	62	100%	280	27,300	280	27,300	>5%D	25,500	**YES**
7440-36-0	**Antimony**	mg/kg dw	62	74%	0.07	3	0.05	3	>5%D	3	**YES**
7440-38-2	**Arsenic**	mg/kg dw	65	95%	0.81	29.7	0.07	29.7	>5%D	9.8	**YES**
7440-39-3	**Barium**	mg/kg dw	62	100%	61.3	250	61.3	250	>5%D	20	**YES**
7440-41-7	Beryllium	mg/kg dw	62	98%	0.097	1.4	0.025	1.4	>5%D	NA	No Criteria
7440-42-8	Boron	mg/kg dw	62	97%	0.97	28.2	0.63	28.2	>5%D	NA	No Criteria
7440-43-9	**Cadmium**	mg/kg dw	65	98%	0.082	29	0.053	29	>5%D	1	**YES**
7440-47-3	**Chromium**	mg/kg dw	65	100%	4.8	356	4.8	356	>5%D	43	**YES**
7440-48-4	Cobalt	mg/kg dw	62	94%	0.19	14.4	0.066	14.4	>5%D	50	NO, Does not exceed criteria
7440-50-8	**Copper**	mg/kg dw	62	100%	1.7	121	1.7	121	>5%D	32	**YES**
7439-89-6	**Iron**	mg/kg dw	62	100%	351	32,200	351	32,200	>5%D	20,000	**YES**
7439-92-1	Lead	mg/kg dw	62	95%	0.87	20	0.23	20	>5%D	36	NO, Does not exceed criteria
7439-96-5	**Manganese**	mg/kg dw	62	100%	9.6	2260	9.6	2260	>5%D	460	**YES**
7439-97-6	**Mercury**	mg/kg dw	62	100%	0.02	0.9	0.02	0.9	>5%D	0.18	**YES**
7439-98-7	Molybdenum	mg/kg dw	62	87%	0.56	18.4	0.17	18.4	>5%D	NA	No Criteria
7440-02-0	**Nickel**	mg/kg dw	62	100%	0.34	253	0.34	253	>5%D	23	**YES**
7782-49-2	**Selenium**	mg/kg dw	65	100%	0.21	1430	0.21	1430	>5%D	2	**YES**
7440-22-4	**Silver**	mg/kg dw	62	52%	0.083	3.5	0.048	3.5	>5%D	1	**YES**
7440-28-0	Thallium	mg/kg dw	62	32%	0.09	1.2	0.09	1.2	>5%D	NA	No Criteria
7440-61-1	Uranium	mg/kg dw	62	100%	0.5673	25	0.5673	25	>5%D	100	NO, Does not exceed criteria
7440-62-2	Vanadium	mg/kg dw	65	100%	2.4	179	2.4	179	>5%D	NA	No Criteria
7440-66-6	**Zinc**	mg/kg dw	65	100%	10.1	890	10.1	890	>5%D	120	**YES**

Notes:
mg/kg dw - milligram per kilogram on dry weight basis
COPC - Chemical of Potential Concern
NA: No applicable screening benchmark value
> 5%D = greater than 5% detection frequency
< 5%D = less than 5% detection frequency (bold)
ECOPC - Ecological Chemical of Potential Concern (bold if the COPC is an ECOPC)
COPCs identified as having no criteria for the screening level analysis did not have TEC or similar values available.

Table 2.3-8
Aquatic Sediment Screening-Level Analysis
Aquatic Mine Features Site-Wide

Chemicals of Interest (COI)			Samples		Detected Concentrations		Overall Minimum	Overall Maximum	Frequency Detection Analysis	Sediment Screening Benchmark for Aquatic Life	ECOPC?
CAS No.	Analyte	Units	Number of Samples	Detection Frequency	Min	Max				Site-wide	
7429-90-5	**Aluminum**	mg/kg dw	8	100%	2,820	27,200	280	27,200	>5%D	25,500	**YES**
7440-36-0	**Antimony**	mg/kg dw	8	100%	0.32	4.8	0.05	4.8	>5%D	3	**YES**
7440-38-2	**Arsenic**	mg/kg dw	9	100%	3.1	29.5	0.07	29.5	>5%D	9.8	**YES**
7440-39-3	**Barium**	mg/kg dw	8	100%	55.3	1050	61.3	1050	>5%D	20	**YES**
7440-41-7	Beryllium	mg/kg dw	8	100%	0.54	1.8	0.025	1.8	>5%D	NA	No Criteria
7440-42-8	Boron	mg/kg dw	8	100%	3.6	29.6	0.63	29.6	>5%D	NA	No Criteria
7440-43-9	**Cadmium**	mg/kg dw	9	100%	1.7	108	0.053	108	>5%D	1	**YES**
7440-47-3	**Chromium**	mg/kg dw	9	100%	20	581	4.8	581	>5%D	43	**YES**
7440-48-4	Cobalt	mg/kg dw	8	100%	1.3	7.6	0.066	7.6	>5%D	50	NO, Does not exceed criteria
7440-50-8	**Copper**	mg/kg dw	8	100%	10.4	146	1.7	146	>5%D	32	**YES**
7439-89-6	Iron	mg/kg dw	8	100%	5,520	14,000	351	14,000	>5%D	20,000	NO, Does not exceed criteria
7439-92-1	Lead	mg/kg dw	8	100%	3.6	27.2	0.23	27.2	>5%D	36	NO, Does not exceed criteria
7439-96-5	**Manganese**	mg/kg dw	8	100%	68	1310	9.6	1310	>5%D	460	**YES**
7439-97-6	**Mercury**	mg/kg dw	8	100%	0.055	0.58	0.02	0.58	>5%D	0.18	**YES**
7439-98-7	Molybdenum	mg/kg dw	8	100%	2.3	17.8	0.17	17.8	>5%D	NA	No Criteria
7440-02-0	**Nickel**	mg/kg dw	8	100%	19.4	211	0.34	211	>5%D	23	**YES**
7782-49-2	**Selenium**	mg/kg dw	9	100%	0.41	624	0.21	624	>5%D	2	**YES**
7440-22-4	**Silver**	mg/kg dw	8	100%	0.18	9.2	0.051	9.2	>5%D	1	**YES**
7440-28-0	Thallium	mg/kg dw	8	100%	0.29	2	0.62	2	>5%D	NA	No Criteria
7440-61-1	Uranium	mg/kg dw	8	100%	2.20765	61.6	0.5673	61.6	>5%D	100	NO, Does not exceed criteria
7440-62-2	Vanadium	mg/kg dw	9	100%	28.1	942	2.4	942	>5%D	NA	No Criteria
7440-66-6	**Zinc**	mg/kg dw	9	100%	62.4	1220	10.1	1220	>5%D	120	**YES**

Notes:
mg/kg dw - milligram per kilogram on dry weight basis
COPC - Chemical of Potential Concern
NA: No applicable screening benchmark value
> 5%D = greater than 5% detection frequency
< 5%D = less than 5% detection frequency (bold)
ECOPC - Ecological Chemical of Potential Concern (bold if the COI is an ECOPC)
COPCs identified as having no criteria for the screening level analysis did not have TEC or similar values available.

Table 2.3-9
Screening Level Evaluation for Fish Tissue Data

COPC			Detection Frequency	Maximum Tissue Concentratons[1]			Frequency Detection Analysis	Lowest Fish Tissue TRV	ECOPC?
CAS No.	Analyte	Units		All Fish	Cyprinids	Amphibian			
7429-90-5	**Aluminum**	mg/kd dw	100%	1600	503	296	>5%D	33	**Yes**
7440-36-0	Antimony	mg/kd dw	3%	0.13	0.13	0.02	**<5%D**	4.23	No
7440-38-2	Arsenic	mg/kd dw	100%	0.98	0.98	0.67	>5%D	3.85	No
7440-39-3	Barium	mg/kd dw	100%	44.3	33.6	26	>5%D	ND	Uncertain
7440-41-7	Beryllium	mg/kd dw	61%	0.041	0.022	0.01	>5%D	19.73	No
7440-42-8	**Boron**	mg/kd dw	97%	13	13	0.5	>5%D	4	**Yes**
7440-43-9	Cadmium	mg/kd dw	100%	0.55	0.55	0.276	>5%D	1.35	No
7440-47-3	Chromium	mg/kd dw	73%	2.85	1	1.68	>5%D	8.85	No
7440-48-4	**Cobalt**	mg/kd dw	100%	0.316	0.264	0.316	>5%D	0.25	**Yes**
7440-50-8	**Copper**	mg/kd dw	100%	9.47	9.47	4.81	>5%D	6.7	**Yes**
7439-89-6	**Iron**	mg/kd dw	100%	1280	391	219	>5%D	34.62	**Yes**
7439-92-1	Lead	mg/kd dw	100%	0.59	0.228	0.139	>5%D	3.46	No
7439-96-5	Manganese	mg/kd dw	100%	447	99.3	16.5	>5%D	ND	Uncertain
7439-97-6	Mercury	mg/kd dw	100%	0.312	0.312	0.031	>5%D	1.81	No
7439-98-7	Molybdenum	mg/kd dw	88%	0.15	0.15	0.14	>5%D	2.77	No
7440-02-0	**Nickel**	mg/kd dw	100%	2.15	1.46	1.59	>5%D	1.54	**Yes**
7782-49-2	**Selenium**	mg/kd dw	100%	36.4	36.4	6.18	>5%D	8.5	**Yes**
7440-22-4	Silver	mg/kd dw	64%	0.07	0.07	0.03	>5%D	0.78	No
7440-28-0	Thallium	mg/kd dw	100%	0.044	0.044	0.012	>5%D	0.19	No
7440-61-1	Uranium	mg/kd dw	100%	0.054	0.031	0.048	>5%D	67.69	No
7440-62-2	**Vanadium**	mg/kd dw	100%	2.91	1.19	1.16	>5%D	1.58	**Yes**
7440-66-6	Zinc	mg/kd dw	100%	378	378	108	>5%D	22.7	No

Notes:
mg/kg dw - milligram per kilogram on dry weight basis
COPC - Chemical of Potential Concern
TRV - Toxicity Reference Value
Maximum tissue concentration used to screen against lowest fish tissue TRV
ND: Non-detect
> 5%D = greater than 5% detection frequency
< 5%D = less than 5% detection frequency (bold)
ECOPC - Ecological Chemical of Potential Concern (bold if the COPC is an ECOPC)
[1] Fish tissue residue concentrations obtained from whole body fish.

Table 2.3-10
Soil and Dry Sediment Screening-Level Analysis - Terrestrial Plants and Invertebrates

COPC				Samples	Detected Concentrations		Overall Minimum	Overall Maximum	Frequency Detection Analysis	Soil Screening Benchmark - Plants	Soil Screening Benchmark - Inverts	Most Conservative Soil Screening Benchmark	Site-Wide ECOPC?	Risk Ratio
CAS No.	Analyte	COPC? *	Units	Detection Frequency	Min	Max								
Metals and Metalloids														
7429-90-5	Aluminum	Y	mg/kg	100%	251	23,700	251	23,700	>5%D	**Not a COPC if soil pH > 5.5			No	
7440-36-0	**Antimony**	Y	mg/kg	88%	0.06	12.9	0.05	12.9	>5%D	5	78	5	**YES**	2.58
7440-38-2	**Arsenic**	Y	mg/kg	100%	1.7	57.9	1.7	57.9	>5%D	18	60	18	**YES**	3.22
7440-39-3	**Barium**	Y	mg/kg	100%	14.9	1,340	14.9	1,340	>5%D	500	330	330	**YES**	4.06
7440-41-7	Beryllium	Y	mg/kg	100%	0.027	2	0.027	2	>5%D	10	40	10	NO, Does not exceed criteria	
7440-42-8	**Boron**	Y	mg/kg	100%	0.76	137	0.76	137	>5%D	0.5	NA	0.5	**YES**	274
7440-43-9	**Cadmium**	Y	mg/kg	98%	0.097	124	0.054	124	>5%D	32	140	32	**YES**	3.88
7440-47-3	**Chromium**	Y	mg/kg	100%	4.5	1,680	4.5	1,680	>5%D	1	0.4	0.4	**YES**	4200
7440-48-4	**Cobalt**	Y	mg/kg	100%	0.26	22.5	0.26	22.5	>5%D	13	NA	13	**YES**	1.73
7440-50-8	**Copper**	Y	mg/kg	100%	1.6	204	1.6	204	>5%D	70	80	70	**YES**	2.91
7439-89-6	Iron	Y	mg/kg	100%	1,380	36,700	1,380	36,700	>5%D	NA	NA	NA	No Criteria	
7439-92-1	**Lead**	Y	mg/kg	100%	1.3	1,000	1.3	1,000	>5%D	120	1,700	120	**YES**	8.33
7439-96-5	**Manganese**	Y	mg/kg	100%	20.4	4,840	20.4	4,840	>5%D	220	450	220	**YES**	22
7439-97-6	**Mercury**	Y	mg/kg	97%	0.007	3.6	0.003	3.6	>5%D	0.3	0.1	0.1	**YES**	36
7439-98-7	**Molybdenum**	Y	mg/kg	100%	0.44	95	0.44	95	>5%D	2	NA	2	**YES**	47.5
7440-02-0	**Nickel**	Y	mg/kg	100%	7.1	528	7.1	528	>5%D	38	280	38	**YES**	13.89
7782-49-2	**Selenium**	Y	mg/kg	100%	0.084	2,800	0.084	2,800	>5%D	0.52	4.1	0.52	**YES**	5384.62
7440-22-4	Silver	Y	mg/kg	71%	0.066	12.1	0.051	12.1	>5%D	560	NA	560	NO, Does not exceed criteria	
7440-28-0	**Thallium**	Y	mg/kg	82%	0.09	6.8	0.09	6.8	>5%D	1	NA	1	**YES**	6.8
7440-61-1	**Uranium**	Y	mg/kg	100%	0.363	112	0.0024	112	>5%D	5	NA	5	**YES**	22.4
7440-62-2	**Vanadium**	Y	mg/kg	100%	5.9	2,610	5.9	2,610	>5%D	2	NA	2	**YES**	1305
7440-66-6	**Zinc**	Y	mg/kg	100%	5.5	2,930	5.5	2,930	>5%D	160	120	120	**YES**	24.42
Organics*														
630-20-6	1,1,1,2-Tetrachloroethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
71-55-6	1,1,1-Trichloroethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
79-34-5	1,1,2,2-Tetrachloroethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
79-00-5	1,1,2-Trichloroethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
75-34-3	1,1-Dichloroethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
75-35-4	1,1-Dichloroethene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
563-58-6	1,1-Dichloropropene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
87-61-6	1,2,3-Trichlorobenzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	20	20	NO, <5% D	
96-18-4	1,2,3-Trichloropropane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
120-82-1	1,2,4-Trichlorobenzene	Y	mg/kg	0%			0.002	0.02	**ND**	NA	20	20	NO, <5% D	
95-63-6	1,2,4-Trimethylbenzene	Y	mg/kg	32%	0.0197	0.0579	0.002	0.0579	>5%D	NA	NA	NA	No Criteria	
96-12-8	1,2-Dibromo-3-	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
106-93-4	1,2-Dibromoethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
95-50-1	1,2-Dichlorobenzene	Y	mg/kg	0%			0.002	0.02	**ND**	NA	NA	NA	NO, <5% D	
107-06-2	1,2-Dichloroethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
78-87-5	1,2-Dichloropropane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	700	700	NO, <5% D	
122-66-7	1,2-Diphenyl hydrazine	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
108-67-8	1,3,5-Trimethylbenzene	Y	mg/kg	20%	0.0168	0.0527	0.002	0.0527	>5%D	NA	NA	NA	No Criteria	
541-73-1	1,3-Dichlorobenzene	Y	mg/kg	0%			0.002	0.02	**ND**	NA	NA	NA	NO, <5% D	
142-28-9	1,3-Dichloropropane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
106-46-7	1,4-Dichlorobenzene	Y	mg/kg	0%			0.002	0.02	**ND**	NA	20	20	NO, <5% D	
90-12-0	1-Methylnaphthalene	Y	mg/kg	32%	0.05	0.1	0.02	0.1	>5%D	NA	NA	NA	No Criteria	
78-87-5	2,2-Dichloropropane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
58-90-2	2,3,4,6-Tetrachlorophenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
88-06-2	2,3,5,6-Tetrachlorophenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
95-95-4	2,4,5-Trichlorophenol	Y	mg/kg	0%			0.02	0.02	**ND**	4	9	4	NO, <5% D	
88-06-2	2,4,6-Trichlorophenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	10	10	NO, <5% D	
120-83-2	2,4-Dichlorophenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
105-67-9	2,4-Dimethylphenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
51-28-5	2,4-Dinitrophenol	Y	mg/kg	0%			0.02	0.02	**ND**	20	NA	20	NO, <5% D	
121-14-2	2,4-Dinitrotoluene	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
606-20-2	2,6-Dinitrotoluene	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
91-58-7	2-Chloronaphthalene	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
95-57-8	2-Chlorophenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
95-49-8	2-Chlorotoluene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
591-78-6	2-hexanone	Y	mg/kg	0%			0.01	0.01	**ND**	NA	NA	NA	NO, <5% D	
91-57-6	2-Methylnaphthalene	Y	mg/kg	44%	0.05	0.13	0.02	0.13	>5%D	NA	NA	NA	No Criteria	
95-48-7	2-Methylphenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
88-74-4	2-Nitroaniline	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	

Table 2.3-10
Soil and Dry Sediment Screening-Level Analysis - Terrestrial Plants and Invertebrates

COPC				Samples	Detected Concentrations		Overall Minimum	Overall Maximum	Frequency Detection Analysis	Soil Screening Benchmark - Plants	Soil Screening Benchmark - Inverts	Most Conservative Soil Screening Benchmark	Site-Wide ECOPC?	Risk Ratio
CAS No.	Analyte	COPC? *	Units	Detection Frequency	Min	Max								
88-75-5	2-Nitrophenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
91-94-1	3,3'-Dichlorobenzidine	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
m+p-	3+4-Methylphenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
99-09-2	3-Nitroaniline	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
534-52-1	4,6-Dinitro-2-	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
101-55-3	4-Bromophenyl-	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
59-50-7	4-Chloro-3-methylphenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
106-47-8	4-Chloroaniline	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
7005-72-3	4-Chlorophenyl-	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
106-43-4	4-Chlorotoluene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
100-01-6	4-Nitroaniline	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
100-02-7	4-Nitrophenol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	7	7	NO, <5% D	
83-32-9	Acenaphthene	Y	mg/kg	0%			0.02	0.02	**ND**	20	NA	20	NO, <5% D	
208-96-8	Acenaphthylene	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
67-64-1	Acetone	Y	mg/kg	0%			0.01	0.01	**ND**	NA	NA	NA	NO, <5% D	
107-13-1	Acrylonitrile	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
62-53-3	Aniline	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
120-12-7	Anthracene	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
71-43-2	Benzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
92-87-5	Benzidine	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
191-24-2	Benzo(ghi)perylene	Y	mg/kg	20%	0.05	0.13	0.02	0.13	>5%D	NA	NA	NA	No Criteria	
56-55-3	Benzo[a]anthracene	Y	mg/kg	24%	0.05	0.14	0.02	0.14	>5%D	NA	NA	NA	No Criteria	
50-32-8	Benzo[a]pyrene	Y	mg/kg	24%	0.05	0.16	0.02	0.16	>5%D	NA	NA	NA	No Criteria	
205-99-2	Benzo[b]fluoranthene	Y	mg/kg	32%	0.05	0.27	0.02	0.27	>5%D	NA	NA	NA	No Criteria	
207-08-9	Benzo[k]fluoranthene	Y	mg/kg	16%	0.07	0.18	0.02	0.18	>5%D	NA	NA	NA	No Criteria	
100-51-6	Benzyl alcohol	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
111-91-1	bis(2-	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
111-44-4	bis(2-Chloroethyl)ether	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
108-60-1	bis(2-	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
117-81-7	bis(2-Ethylhexyl)phthalate	Y	mg/kg	16%	0.1	0.16	0.02	0.16	>5%D	NA	NA	NA	No Criteria	
108-86-1	Bromobenzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
74-97-5	Bromochloromethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
75-27-4	Bromodichloromethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
75-25-2	Bromoform	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
74-83-9	Bromomethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
85-68-7	Butylbenzylphthalate	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
86-74-8	Carbazole	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
75-15-0	Carbon disulfide	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
56-23-5	Carbon Tetrachloride	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
108-90-7	Chlorobenzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	40	40	NO, <5% D	
75-00-3	Chloroethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
67-66-3	Chloroform	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
74-87-3	Chloromethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
218-01-9	Chrysene	Y	mg/kg	52%	0.05	0.17	0.02	0.17	>5%D	NA	NA	NA	No Criteria	
156-59-2	cis-1,2-dichloroethene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
10061-01-	cis-1,3-Dichloropropene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
53-70-3	Dibenz[a,h]anthracene	Y	mg/kg	4%	0.1	0.1	0.02	0.1	**<5%D**	NA	NA	NA	NO, <5% D	
132-64-9	Dibenzofuran	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
75-27-4	Dibromochloromethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
74-95-3	Dibromomethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
75-71-8	Dichlorodifluoromethane	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
84-66-2	Diethylphthalate	Y	mg/kg	0%			0.02	0.02	**ND**	100	NA	100	NO, <5% D	
131-11-3	Dimethylphthalate	Y	mg/kg	0%			0.02	0.02	**ND**	NA	200	200	NO, <5% D	
84-74-2	Di-n-butylphthalate	Y	mg/kg	0%			0.02	0.02	**ND**	200	NA	200	NO, <5% D	
117-84-0	Di-n-octylphthalate	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
100-41-4	Ethylbenzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
206-44-0	Fluoranthene	Y	mg/kg	40%	0.05	0.29	0.02	0.29	>5%D	NA	29	29	NO, Does not exceed criteria	
86-73-7	Fluorene	Y	mg/kg	0%			0.02	0.02	**ND**	NA	30	30	NO, <5% D	
118-74-1	Hexachlorobenzene	Y	mg/kg	0%			0.02	0.02	**ND**	NA	1000	1000	NO, <5% D	
87-68-3	Hexachlorobutadiene	Y	mg/kg	0%			0.002	0.02	**ND**	NA	NA	NA	NO, <5% D	
77-47-4	Hexachlorocyclopentadie	Y	mg/kg	0%			0.02	0.02	**ND**	10	NA	10	NO, <5% D	
67-72-1	Hexachloroethane	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
193-39-5	Indeno[1,2,3-cd]pyrene	Y	mg/kg	12%	0.09	0.14	0.02	0.14	>5%D	NA	NA	NA	No Criteria	

Table 2.3-10
Soil and Dry Sediment Screening-Level Analysis - Terrestrial Plants and Invertebrates

COPC				Samples	Detected Concentrations		Overall Minimum	Overall Maximum	Frequency Detection Analysis	Soil Screening Benchmark - Plants	Soil Screening Benchmark - Inverts	Most Conservative Soil Screening Benchmark	Site-Wide ECOPC?	Risk Ratio
CAS No.	Analyte	COPC? *	Units	Detection Frequency	Min	Max								
78-59-1	Isophorone	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
98-82-8	Isopropylbenzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
m+p-	m+p-Xylene	Y	mg/kg	12%	0.0481	0.0668	0.002	0.0668	>5%D	NA	NA	NA	No Criteria	
78-93-3	Methyl ethyl ketone	Y	mg/kg	8%	0.0807	0.0903	0.01	0.0903	>5%D	NA	NA	NA	No Criteria	
108-10-1	Methyl isobutyl ketone	Y	mg/kg	0%			0.01	0.01	**ND**	NA	NA	NA	NO, <5% D	
75-09-2	Methylene chloride	Y	mg/kg	0%			0.01	0.01	**ND**	NA	NA	NA	NO, <5% D	
1634-04-4	methyl-t-butyl ether	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
91-20-3	Naphthalene	Y	mg/kg	20%	0.0227	0.09	0.002	0.09	>5%D	NA	NA	NA	No Criteria	
104-51-8	n-Butylbenzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
98-95-3	Nitrobenzene	Y	mg/kg	0%			0.02	0.02	**ND**	NA	40	40	NO, <5% D	
62-75-9	Nitrosodimethylamine	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
621-64-7	n-Nitroso-di-n-	Y	mg/kg	0%			0.02	0.02	**ND**	NA	20	20	NO, <5% D	
86-30-6	n-Nitrosodiphenylamine	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
103-65-1	n-Propylbenzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
95-47-6	o-Xylene	Y	mg/kg	8%	0.0222	0.0286	0.002	0.0286	>5%D	NA	NA	NA	No Criteria	
87-86-5	Pentachlorophenol	Y	mg/kg	0%			0.02	0.02	**ND**	5	31	5	NO, <5% D	
85-01-8	Phenanthrene	Y	mg/kg	60%	0.05	0.24	0.02	0.24	>5%D	NA	29	29	NO, Does not exceed criteria	
108-95-2	Phenol	Y	mg/kg	0%			0.02	0.02	**ND**	70	30	30	NO, <5% D	
99-87-6	p-isopropyltoluene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
129-00-0	Pyrene	Y	mg/kg	40%	0.05	0.18	0.02	0.18	>5%D	NA	18	18	NO, Does not exceed criteria	
110-86-1	Pyridine	Y	mg/kg	0%			0.02	0.02	**ND**	NA	NA	NA	NO, <5% D	
135-98-8	sec-Butylbenzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
100-42-5	Styrene	Y	mg/kg	0%			0.002	0.002	**ND**	300	NA	300	NO, <5% D	
98-06-6	tert-Butylbenzene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
127-18-4	Tetrachloroethene	Y	mg/kg	16%	0.0186	0.0257	0.002	0.0257	>5%D	NA	NA	NA	No Criteria	
108-88-3	Toluene	Y	mg/kg	24%	0.0269	0.075	0.002	0.075	>5%D	200	NA	200	NO, Does not exceed criteria	
156-59-2	trans-1,2-Dichloroethene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
10061-02-	trans-1,3-	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
79-01-6	Trichloroethene	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	
75-69-4	Trichloroflouromethane	Y	mg/kg	8%	0.011	0.0755	0.002	0.0755	>5%D	NA	NA	NA	No Criteria	
75-01-4	Vinyl Chloride	Y	mg/kg	0%			0.002	0.002	**ND**	NA	NA	NA	NO, <5% D	

Notes:
Sediment sampling locations were separated into “dry sediment” locations and “wet sediment” locations to distinguish between locations that are perennially dry (and thus function ecologically like soil) and those locations that have water permanently or ephemerally through the year - dry sediment and soils data are combined in this analysis.
Includes concentration data from samples of all available depths, from both terrestrial and riparian areas.
mg/kg dw - milligram per kilogram on dry weight basis
COPC - Chemical of Potential Concern
* Organics are COPCs for the Former Conda Townsite only.
** Aluminum was not identified as a COPC because soil pH at the site is generally greater than 5.5.
NA: No applicable screening benchmark value
ND: non-detect (bold)
> 5%D = greater than 5% detection frequency
< 5%D = less than 5% detection frequency (bold)
ECOPC - Ecological Chemical of Potential Concern (bold if the COPC is an ECOPC)

Table 2.3-11
Dietary Inputs to Wildlife Exposure Assessment Model

Receptor Groups (Trophic Level / Guild)	Potential Representative Receptors	Percent of Dietary Intake Estimated for Prey Item Data Source[1]													Notes
		Surface Water	Terrestrial Soil	Riparian Soil	Sediment	Terrestrial Plants	Riparian Plants	Aquatic Plants	Terrestrial Insects	Riparian Insects	Aquatic Invertebrates	Fish	Terrestrial Small Mammals	Riparian Small Mammals	
Terrestrial Ecosystems															
1° Consumers – Terrestrial Herbivorous Birds	Chipping sparrow (*Spizella passerina)* [Surrogate = Northern bobwhite (*Colinus virginianus*)]		**SIR**			**85.6%**			**14.4%**						Drinking water from food source
1° Consumers – Terrestrial Herbivorous Mammals	Black-tailed jackrabbit (*Lepus californicus)* [Surrogate = Eastern cottontail (*Sylvilagus floridanus*)]		**SIR**			**100%**									Drinking water from food source
	Mule deer (*Odocoileus hemionus*)	**WIR**	**SIR**			**100%**									
2° Consumers – Terrestrial Omnivorous Birds	American robin (*Turdus migratorius)*		**SIR**			**50%**			**50%**						Drinking water from food source
2° Consumers – Terrestrial Omnivorous Mammals	Deer mouse (*Peromyscus maniculatus)*		**SIR**			**64.5%**			**45.5%**						Drinking water from food source
3° Consumers – Terrestrial Carnivorous Mammals	Coyote (*Canis latrans)*	**WIR**	**SIR**			**4.0%**			**6.0%**				**90.0%**		
3° Consumers – Raptors	Northern harrier (*Circus cyaneus*)		**SIR**						**2.5%**				**97.5%**		Drinking water from food source
Aquatic and Riparian Ecosystems															
1° Consumers – Aquatic and Riparian Herbivorous Birds	Song sparrow *(Melospiza melodia)*			**SIR**			**100%**								Drinking water from food source
1° Consumers – Aquatic and Riparian Herbivorous Mammals	Long-tailed vole (*Microtus longicaudus)* [Surrogate = Meadow vole *(Microtus pennsylvanicus*)]			**SIR**			**98%**			**2%**					Drinking water from food source
2° Consumers – Aquatic and Riparian Omnivorous Birds	Red-winged blackbird (*Agelaius phoeniceus)*			**SIR**			**78.5%**			**21.5%**					Drinking water from food source
2° Consumers – Aquatic and Riparian Piscivorous Birds	Great blue heron *(Ardea herodias)*	**WIR**			**SIR**							**100.0%**			
2° Consumers – Aquatic and Riparian Benthic-feeding Birds	Mallard (*Anas platyrhynchas)*	**WIR**			**SIR**			**24.5%**			**75.5%**				
2° Consumers – Aquatic and Riparian Omnivorous Mammals	Raccoon (*Procyon lotor)*	**WIR**		**SIR**	**SIR**		**27.0%**	**27.0%**			**35.1%**	**1.8%**		**9.1%**	
2° Consumers – Aquatic and Riparian Carnivorous Mammals	Mink (*Mustela vison)*	**WIR**		**SIR**	**SIR**		**3.86%**	**3.86%**			**6.4%**	**81.2%**		**4.7%**	

Notes:

1° - primary trophic level
2° - secondary trophic level
3° - tertiary trophic level

WIR - water ingestion rate
SIR - soil/sediment ingestion rate

[1]This table identifies how site-specific abiotic and biotic data will be used in exposure assessment intake models. "IR" indicates that an ingestion rate will be used to esimate intake from abiotic media and the the percentages indicate dietary percentages for dietary sources.

Table 2.3-12
Summary of Exposure Parameters for Representative Wildlife Receptors

Representative Receptor	Exposure Parameter	Units	Conservative Value	Reference and Basis of Value
Body Weight				
Northern bobwhite	Body weight	kilograms (kg)	0.191	Robel (1969, as cited in USEPA 1993) based on average body weight of both sexes for three seasons from Kansas
Eastern cottontail	Body weight	kilograms (kg)	1.231	Lord (1963, as cited in USEPA 1993) based on mean for both sexes from Illinois
American robin	Body weight	kilograms (kg)	0.077	Based on the mean body weight of an adult robin from Pennsylvania (Clench and Leberman 1978, as cited in USEPA 1993)
Deer mouse	Body weight	kilograms (kg)	0.021	Millar (1989, as cited in USEPA 1993) based on body weights for both males and females from North America
Mule deer	Body weight	kilograms (kg)	58.99	Average of both sexes (Mackie et al. 1982 as cited in Sample et al. 1997)
Song sparrow	Body weight	kilograms (kg)	0.0235	Smith and Arcese (1988)
Meadow vole	Body weight	kilograms (kg)	0.037	Myers and Krebs (1971, as cited in USEPA 1993) based on average body weights of males and females from collections made all year from south Indiana
Red-winged blackbird	Body weight	kilograms (kg)	0.043	Beletsky (1996)
Great blue heron	Body weight	kilograms (kg)	2.09	Body weight (Butler 1992)
Mallard duck	Body weight	kilograms (kg)	1.134	Nelson and Martin (1953, as cited in USEPA 1993) based on average of mean body weights for both males and females from throughout the U.S.
Raccoon	Body weight	kilograms (kg)	6.7	Sanderson (1984, as cited in USEPA 1993) based on mean body weights of wild caught males and females from Illinois
Mink	Body weight	kilograms (kg)	0.852	Mitchell (1961, as cited in USEPA 1993) based on the average of mean body weights for both males and females for summer and fall from Montana
Coyote	Body weight	kilograms (kg)	10.5	Based on females from Minnesota (Windberg and others 1997; Berg and Chesness 1978)
Northern harrier	Body weight	kilograms (kg)	0.513	Bildstein (1988, as cited in MacWhirter and Bildstein 1996)
Dietary Composition - Refer to Table 2.11-9 for actual percentages to be used in the generalized Exposure Assessment Model				
Northern bobwhite	Dietary composition	percent (%)	85.6% Vegetation; 14.4% invertebrates	Handley (1931, as cited in USEPA 1993), based on average percentage from birds in the southeastern United States
Eastern cottontail	Dietary composition	percent (%)	100% Vegetation	USEPA (1993)
American robin	Dietary composition	percent (%)	50% Vegetation and 50% invertebrates	USEPA (1993)
Deer mouse	Dietary composition	percent (%)	54.5% Vegetation and 45.5% invertebrates	Flake (1973, as cited in USEPA 1993), based on average of four seasons diet for mice from Colorado short grass prairie
Mule Deer	Dietary composition	percent (%)	100% Vegetation	Sample et al. 1997
Song sparrow	Dietary composition	percent (%)	Primarily herbivorous and granivorous; may consume insects and other invertebrates during yolk formation	University of Michigan (2000)
Meadow vole	Dietary composition	percent (%)	98% Vegetation and 2% invertebrates	Lindroth and Batzli (1984, as cited in USEPA 1993), based on average of two studies during four seasons in Illinois
Red-winged blackbird	Dietary composition	percent (%)	90% Plant material, seeds, and grains in fall and winter, 70% insects and 17% grain during the breeding season	Diet during fall and winter taken from Bent (1985), Martin and others (1961), and Crase and DeHaven (1978), all as cited in Zeiner and others (1990). Diet of males and females during breeding season in agricultural and nonagricultural land in Ontario, Canada
Great blue heron	Dietary composition	percent (%)	72% Fish, 17% invertebrates, and 11% miscellaneous	Prey ingestion percentages (Zeiner and others 1990)
Mallard duck	Dietary composition	percent (%)	25.3% Vegetation and 74.7% invertebrates	Swanson and others (1985, as cited in USEPA 1993), based on spring breeding season in south- central North Dakota prairie pothole area
Raccoon	Dietary composition	percent (%)	48.48% Vegetation, 31.78% invertebrates, 9.28% mammals, 6.33% reptiles/amphibians, 1.75% fish, 1.5% birds, and 0.91% other not identified	Tabatabai and Kennedy (1988) and Hamilton (1951), all as cited in USEPA (1993), based on average of percent wet volume of digestive tract or stomach contents of raccoons from Tennessee (four seasons) and New York (summer only)
Mink	Dietary composition	percent (%)	54% Trout, 19% other fish, 7.5% invertebrates. 2.5% amphibians, 5.5% birds and mammals, 9% vegetation, and 2.5% unidentified	Alexander (1977, as cited in USEPA 1993), based on stomach contents for four seasons from Michigan streams and rivers.
Coyote	Dietary composition	percent (%)	90% Mice, rats, rabbits, squirrels, and carrion. Some deer and ground nesting birds. Various fruits, berries, seeds, and grasses consumed when available	Omnivorous based on http://www.ukans.edu/~mammals/canis -latr.html
Northern harrier	Dietary composition	percent (%)	80% Mammals, 15% birds, 3% reptiles and amphibians, and 2% invertebrates	Bildstein (1987), based on pellet content in the northern part of the harrier range and another study by Brown and Amadon (1968)

Table 2.3-12
Summary of Exposure Parameters for Representative Wildlife Receptors

Representative Receptor	Exposure Parameter	Units	Conservative Value	Reference and Basis of Value
Food Ingestion Rate (dry weight)				
Northern bobwhite	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.095	Calculated using the ingestion rate equation for omnivorous birds from Nagy 2001 (FIR = (0.67*BW^0.627)/BW)
Eastern cottontail	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.061	Calculated using the ingestion rate equation for herbivorous mammals from Nagy 2001 (FIR = (0.859*BW^0.628)/BW)
American robin	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.21	Calculated using the specific ingestion rate for Robins (DMI) from Nagy 2001 based on the 18.7 g BW cited in Nagy 2001 (FIR = 3.96/18.7)
Deer mouse	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.21	Calculated using the specific ingestion rate for the deer mouse (DMI) from Nagy 2001 based on the 17.9 g BW cited in Nagy 2001 (FIR = 3.81/17.9)
Mule deer	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.04	Calculated using the specific ingestion rate for Mule deer (DMI) from Nagy 2001 based on the 39,100 g BW cited in Nagy 2001 (FIR = 1565/39100)
Song sparrow	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.24	Calculated using the ingestion rate equation for all birds from Nagy 2001 (FIR = (0.638*BW^0.685)/BW)
Meadow vole	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.31	Calculated using the specific ingestion rate for the Meadow vole (DMI) from Nagy 2001 based on the 36.9 g BW cited in Nagy 2001 (FIR = 11.5/36.9)
Red-winged blackbird	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.16	Calculated using the ingestion rate equation for omnivorous birds from Nagy 2001 (FIR = (0.67*BW^0.627)/BW)
Great blue heron	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.065	Calculated using the ingestion rate equation for carnivorous birds from Nagy 2001 (FIR = (0.849*BW^0.663)/BW)
Mallard duck	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.07	Calculated using the ingestion rate equation for all birds from Nagy 2001 (FIR = (0.638*BW^0.685)/BW)
Raccoon	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.025	Calculated using the ingestion rate equation for omnivorous mammals from Nagy 2001 (FIR = (0.432*BW^0.678)/BW)
Mink	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.05	Calculated using the ingestion rate equation for carnivorous mammals from Nagy 2001 (FIR = (0.153*BW^0.834)/BW)
Coyote	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.033	Calculated using the ingestion rate equation for carnivorous mammals from Nagy 2001 (FIR = (0.153*BW^0.834)/BW)
Northern harrier	Food ingestion rate[1]	grams per grams BW per day (g/g-day)	0.1	Calculated using the ingestion rate equation for carnivorous birds from Nagy 2001 (FIR = (0.849*BW^0.663)/BW)
Water Ingestion Rate				
Northern bobwhite	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	From Prey Items	
Eastern cottontail	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	From Prey Items	
American robin	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	From Prey Items	
Deer mouse	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	From Prey Items	
Mule deer	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	0.066	Value shown is based on the following equation: IRwater = (0.099 x BW(kg)^0.9)/BW(kg) (USEPA 1993)
Song sparrow	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	From Prey Items	
Meadow vole	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	From Prey Items	
Red-winged blackbird	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	From Prey Items	
Great blue heron	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	0.046	Value shown is based on the following equation: IRwater = (0.059 x BW(kg)^0.67)/BW(kg) (USEPA 1993)
Mallard duck	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	0.057	Value shown is based on the following equation: IRwater = (0.059 x BW(kg)^0.67)/BW(kg) (USEPA 1993)

Table 2.3-12
Summary of Exposure Parameters for Representative Wildlife Receptors

Representative Receptor	Exposure Parameter	Units	Conservative Value	Reference and Basis of Value
Raccoon	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	0.082	Value shown is based on the following equation: IRwater = (0.099 x BW(kg)^0.9)/BW(kg) (USEPA 1993)
Mink	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	0.1	Value shown is based on the following equation: IRwater = (0.099 x BW(kg)^0.9)/BW(kg) (USEPA 1993)
Coyote	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	0.078	Value shown is based on the following equation: IRwater = (0.099 x BW(kg)^0.9)/BW(kg) (USEPA 1993)
Northern harrier	Water ingestion rate	kilograms per kilograms BW per day (kg/kg-day)	From Prey Items	
Soil/Sediment Ingestion Rate				
Northern bobwhite	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0019	Ingestion of soil (Isoil) as percentage of food intake reported at 2% for omnivores (Beyer 1994)
Eastern cottontail	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0015	Ingestion of soil (Isoil) as percentage of food intake reported at 2.4% for herbivores (Beyer 1994)
American robin	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0027	Ingestion of soil (Isoil) as percentage of food intake reported at 2% for omnivores (Beyer 1994)
Deer mouse	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0032	Deer mouse consumption habits are assumed to be similar to those of the white-footed mouse. Ingestion of soil (Isoil) as percentage of food intake reported at 2% for the white-footed mouse (Beyer 1994)
Mule deer	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0003	Ingestion of soil (Isoil) as percentage of food intake reported at < 2% (Beyer 1994)
Song sparrow	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0048	Ingestion of soil (Isoil) as percentage of food intake reported at 2% for omnivores (Beyer 1994)
Meadow vole	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0054	Ingestion of soil (Isoil) as percentage of food intake reported at 2.4% for the meadow vole (Beyer 1994)
Red-winged blackbird	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0032	Ingestion of soil (Isoil) as percentage of food intake reported at 2% for omnivores (Beyer 1994)
Great blue heron	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0005	Ingestion of sediment (Ised) as percentage of food intake based on 0.7 percent of IR, which is based on studies of the bald eagle (Pascoe and others 1996)
Mallard duck	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0023	Ingestion of sediment (Ised) as percentage of food intake reported at 3.3% for the mallard (Beyer 1994)
Raccoon	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0024 (0.0012 from sediment and 0.0012 from riparian soil)	Ingestion of soil/sediment (Isoil/sed) as percentage of food intake reported at 9.4% for the raccoon (Beyer 1994)
Mink	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0047 (0.00235 from sediment and 0.00235 from riparian soil)	Mink food consumption habits are assumed to be similar to those of the raccoon. Ingestion of soil/sediment (Isoil/sed) as percentage of food intake reported at 9.4% for the raccoon (Beyer 1994)
Coyote	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0009	Coyote food consumption habits are assumed to be similar to those of the red fox. Based on ingestion of soil (Isoil) as percentage of food intake reported at 2.8% for the red fox (Beyer 1994)
Northern harrier	Soil/sediment ingestion rate[1]	grams per grams BW per day (g/g-day)	0.0007	Harrier food consumption habits are assumed to be similar to those of bald eagles. Based on 0.7% of estimated sediment ingestion rate for the bald eagle in Pascoe and others (1996)

Notes:

BW - body weight IR - ingestion rate

FIR- food ingestion rate

[1] - Food and sediment ingestion rates are presented in g/g BW/day as indicated in Nagy 2001. The units are mathematically equivalent to kg/kg BW/day to be used in SSERA exposure estimations.

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Table 2.3-12
Summary of Exposure Parameters for Representative Wildlife Receptors

Representative Receptor	Exposure Parameter	Units	Conservative Value	Reference and Basis of Value

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Table 2.3-13
Screening-Level TRVs for Terrestrial/Riparian Wildlife Receptors

COPC	Bird (mg/kg-BW/day)	Source	Endpoint	Subchronic/ Chronic	Uncertainty Factors	Notes	Mammal (mg/kg-BW/day)	Source	Endpoint	Subchronic/ Chronic	Uncertainty Factors	Notes
Aluminum	Not a COPC if soil pH > 5.5	EcoSSL	NA	NA	NA		Not a COPC if soil pH > 5.5	EcoSSL				
Antimony	NA	None Available	NA	NA	NA		0.059	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.
Arsenic	2.24	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Lowest NOAEL	1.04	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.
Barium	20.8	AWERA/Sample et al. 1996/USACHPMM	Mortality	Sub-chronic	0.1	Cited as Johnson et al. 1960. EcoSSL notes this as the only applicable study.	51.8	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.
Beryllium	NA	None Available	NA	NA	NA		0.532	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Lowest NOAEL
Boron	28.8	AWERA/Sample et al. 1996/USACHPMM	Reproduction	Chronic	NA	Cited as Smith and Anders, 1989	28	AWERA/USACHPPM/LANL/Sample et al. 1996	Reproduction	Chronic	NA	Cited as Weir and Fisher, 1972
Cadmium	1.47	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.	0.77	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.
Chromium	2.66	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.	9.24	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.
Cobalt	7.61	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.	7.33	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.
Copper	4.05	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.	5.6	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.
Iron	NA	None Available	NA	NA	NA		NA	None Available	NA	NA	NA	
Lead	1.63	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.	4.7	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.
Manganese	179	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.	51.5	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.
Mercury	0.039	AWERA/USACHPPM/Region IX BTAG	Reproduction	Chronic	NA	USEPA (GreatLakes), 1995	0.032	USACHPPM/LANL/Sample et al. 1996	Reproduction	Chronic	NA	Lower than NOAEL used in AWERA.
Molybdenum	3.5	AWERA/USACHPPM	Reproduction	Chronic	0.1	NOAEL estimated from LOAEL using uncertainty factor	0.26	AWERA/USACHPPM/Sample et al. 1996	Reproduction	Chronic	0.1	NOAEL estimated from LOAEL using uncertainty factor.
Nickel	6.71	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.	1.7	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.
Selenium	0.29	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.	0.143	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.
Silver	2.02	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Lowest LOAEL/10	6.02	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Lowest LOAEL/10
Thallium	0.35	USACHPPM/LANL	Mortality	Chronic	0.1	Uncertainty factor applied to NOAEL.	0.48	USACHPPM/LANL/Region IX BTAG	Growth. Reproduction and Survival	Chronic	NA	Cited as PRC, 1994
Uranium	16	AWERA/USACHPPM/Sample et al. 1996	Mortality, body weight, liver and kidney effects	Sub-chronic	0.1	NOAEL estimated from sub-chronic NOAEL using uncertainty factor. Cited as Haseltine and Sileo. 1983.	3.07	AWERA/USACHPPM/Sample et al. 1996	Reproduction	Chronic	NA	Cited as Paternain et al. 1989
Vanadium	0.344	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.	4.16	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Highest NOAEL < lowest bounded LOAEL.
Zinc	66.1	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.	75.4	EcoSSL	Growth. Reproduction and Survival	Chronic	NA	Geometric mean NOAEL.

Table 2.3-13
Screening-Level TRVs for Terrestrial/Riparian Wildlife Receptors

Notes:

COPC - Chemical of Potential Concern
TRV - Toxicity Reference Value
mg/kg-BW/day - milligrams per kilograms of body weight per day
NOAEL - No Observed Adverse Effect Level
LOAEL - Lowest Observed Adverse Effect Level
EcoSSL - Ecological Soil Screening Level

Hierarchy:
1) EcoSSL selected NOAEL TRV
2) AWERA if supported by other major databases.
3) If more conservative values available than used in AWERA, value supported by multiple major databases used.
4) If no value available in AWERA (thallium), other major databases consulted.

Sources:

(1) EPA Region 9 BTAGs - U.S. Environmental Protection Agency (USEPA). 2009. Currently Recommended U.S. EPA Region 9 Biological Technical Assistance Group (BTAG) Mammalian and Avian Toxicity Reference Values (TRVs) – Revision Date February 24, 2009. Available at http://www.dtsc.ca.gov/AssessingRisk/upload/Eco_Btag-mammal-bird-TRV-table.pdf(note: .pdf file online says revision date 11/21/2002).

(2) USACHPPM's Terrestrial Toxicity Database - U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). 2009. Directorate of Toxicology Downloads, USACHPPM TRV database. Available at http://chppm-www.apgea.army.mil/tox/download.aspx. Accessed October 2009.

(3) EcoSSLs - U.S. Environmental Protection Agency (USEPA). 2005. Guidance for Developing Ecological Soil Screening Levels (EcoSSLs). EPA Office of Solid Waste and Emergency Response (OSWER), OSWER Directive 9285.7-55. Published November 2003, Revised November 2005 and subsequent contaminant-specific EcoSSL documents.

(4) PoP BERA Draft - Tables811_812 - Portland Harbor RI, Appendix G Baseline Ecological Risk Assessment. Windward Environmental, LLC. 2009. Attachment 14 Recommended Literature Based Fish Dietary and Wildlife TRVs. August 19, 2009.

(5) Sample et al., 1996 - Sample, B.E., D.M. Opresko, and G.W Suter II, 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. Oak Ridge National Laboratory, Oak Ridge, TN. 227 pp. ES/ER/TM-86/R3.

(6) ADJUSTED values from Final AWERA - TetraTech EM, Inc. (TTEMI). 2002. Final Area Wide Human Health and Ecological Risk Assessment, Selenium Project, Southeast Idaho Phosphate Mining Resource Area. Prepared for Idaho Department of Environmental Quality by TetraTech EM, Inc.

(7) Los Alamos National Laboratory (LANL). 2008. ECORISK Database (Release 2.3), ER package #186. Environmental Programs Directorate, Waster and Environmental Services Division, Los Alamos, NM. ER ID 103352. LA-UR-08-06673. October.

(8) UNADJUSTED values from AWERA Work Plan 2002 - TetraTech EM, Inc. (TTEMI). 2002. Final Area Wide Human Health and Ecological Risk Assessment Work Plan, Selenium Project, Southeast Idaho Phosphate Mining Resource Area. Prepared for Idaho Department of Environmental Quality by TetraTech EM, Inc., April, 2002.

Table 2.3-14
Screening Results for Wildlife Receptors

COPC	Receptor	Exposure (mg/kg-BW/day)				TRV (mg/kg-BW/day)	ECOPC?
		Food	Water	Soil/Sediment	Total		
Aluminum	American robin	4.69E+02	5.22E+00	6.40E+01	5.39E+02	N/A*	Not an ECOPC
	Coyote	1.91E+01	2.95E+00	2.13E+01	4.34E+01	N/A*	Not an ECOPC
	Deer mouse	5.45E+02	5.52E+00	7.58E+01	6.27E+02	N/A*	Not an ECOPC
	Eastern cottontail	1.81E+02	3.67E+00	3.56E+01	2.20E+02	N/A*	Not an ECOPC
	Great blue heron	1.77E+02	1.74E+00	1.37E+01	1.93E+02	N/A*	Not an ECOPC
	Mallard	4.78E+02	2.15E+00	6.28E+01	5.43E+02	N/A*	Not an ECOPC
	Meadow vole	9.09E+02	5.22E+00	1.28E+02	1.04E+03	N/A*	Not an ECOPC
	Mink	1.51E+02	3.78E+00	1.76E+02	3.31E+02	N/A*	Not an ECOPC
	Mule deer	1.18E+02	2.49E+00	7.11E+00	1.28E+02	N/A*	Not an ECOPC
	Northern bobwhite	2.61E+02	3.86E+00	4.50E+01	3.10E+02	N/A*	Not an ECOPC
	Northern harrier	4.39E+01	2.80E+00	1.66E+01	6.33E+01	N/A*	Not an ECOPC
	Raccoon	1.24E+02	3.10E+00	8.96E+01	2.17E+02	N/A*	Not an ECOPC
	Red-winged blackbird	4.24E+02	6.31E+00	7.58E+01	5.06E+02	N/A*	Not an ECOPC
Antimony	American robin	5.20E-02	7.04E-04	3.48E-02	8.75E-02	N/A	Uncertain
	Coyote	1.89E-02	3.98E-04	1.16E-02	3.09E-02	0.059	Not an ECOPC
	Deer mouse	5.83E-02	7.45E-04	4.13E-02	1.00E-01	0.059	**ECOPC**
	Eastern cottontail	1.68E-02	4.95E-04	1.94E-02	3.66E-02	0.059	Not an ECOPC
	Great blue heron	1.95E-02	2.35E-04	3.00E-03	2.27E-02	N/A	Uncertain
	Mallard	1.00E-01	2.91E-04	1.38E-02	1.14E-01	N/A	Uncertain
	Meadow vole	6.12E-02	7.04E-04	2.70E-02	8.89E-02	0.059	**ECOPC**
	Mink	2.18E-02	5.10E-04	5.62E-02	7.84E-02	0.059	**ECOPC**
	Mule deer	1.10E-02	3.37E-04	3.87E-03	1.52E-02	0.059	Not an ECOPC
	Northern bobwhite	2.54E-02	5.20E-04	2.45E-02	5.04E-02	N/A	Uncertain
	Northern harrier	6.00E-02	3.77E-04	9.03E-03	6.94E-02	N/A	Uncertain
	Raccoon	3.15E-02	4.18E-04	2.87E-02	6.06E-02	0.059	**ECOPC**
	Red-winged blackbird	3.23E-02	8.52E-04	1.60E-02	4.92E-02	N/A	Uncertain
Arsenic	American robin	8.74E-01	3.48E-02	1.56E-01	1.06E+00	2.24	Not an ECOPC
	Coyote	4.76E-02	1.97E-02	5.21E-02	1.19E-01	1.04	Not an ECOPC
	Deer mouse	1.02E+00	3.68E-02	1.85E-01	1.24E+00	1.04	**ECOPC**
	Eastern cottontail	3.37E-01	2.44E-02	8.69E-02	4.49E-01	1.04	Not an ECOPC
	Great blue heron	6.37E-02	1.16E-02	1.49E-02	9.01E-02	2.24	Not an ECOPC
	Mallard	6.96E-01	1.44E-02	6.83E-02	7.79E-01	2.24	Not an ECOPC
	Meadow vole	8.82E-01	3.48E-02	2.14E-01	1.13E+00	1.04	**ECOPC**
	Mink	1.06E-01	2.52E-02	2.99E-01	4.30E-01	1.04	Not an ECOPC
	Mule deer	2.21E-01	1.66E-02	1.74E-02	2.55E-01	1.04	Not an ECOPC
	Northern bobwhite	4.88E-01	2.57E-02	1.10E-01	6.24E-01	2.24	Not an ECOPC
	Northern harrier	1.21E-01	1.86E-02	4.05E-02	1.80E-01	2.24	Not an ECOPC
	Raccoon	2.14E-01	2.07E-02	1.53E-01	3.87E-01	1.04	Not an ECOPC
	Red-winged blackbird	4.47E-01	4.21E-02	1.27E-01	6.16E-01	2.24	Not an ECOPC
Barium	American robin	6.27E+01	3.33E-02	3.62E+00	6.63E+01	20.8	**ECOPC**
	Coyote	1.36E+00	1.88E-02	1.21E+00	2.58E+00	51.8	Not an ECOPC
	Deer mouse	7.95E+01	3.52E-02	4.29E+00	8.38E+01	51.8	**ECOPC**
	Eastern cottontail	3.43E+01	2.34E-02	2.01E+00	3.64E+01	51.8	Not an ECOPC
	Great blue heron	3.95E+00	1.11E-02	5.25E-01	4.49E+00	20.8	Not an ECOPC
	Mallard	1.86E+01	1.37E-02	2.42E+00	2.10E+01	20.8	**ECOPC**
	Meadow vole	1.71E+02	3.33E-02	2.12E+00	1.73E+02	51.8	**ECOPC**
	Mink	5.06E+00	2.41E-02	6.54E+00	1.16E+01	51.8	Not an ECOPC
	Mule deer	2.25E+01	1.59E-02	4.02E-01	2.29E+01	51.8	Not an ECOPC
	Northern bobwhite	4.62E+01	2.46E-02	2.55E+00	4.88E+01	20.8	**ECOPC**
	Northern harrier	1.89E+00	1.78E-02	9.38E-01	2.84E+00	20.8	Not an ECOPC
	Raccoon	8.54E+00	1.98E-02	3.34E+00	1.19E+01	51.8	Not an ECOPC
	Red-winged blackbird	7.19E+01	4.02E-02	1.25E+00	7.32E+01	20.8	**ECOPC**

Table 2.3-14
Screening Results for Wildlife Receptors

COPC	Receptor	Exposure (mg/kg-BW/day)				TRV (mg/kg-BW/day)	ECOPC?
		Food	Water	Soil/Sediment	Total		
Beryllium	American robin	3.29E-02	3.31E-04	5.40E-03	3.86E-02	N/A	Uncertain
	Coyote	1.11E-03	1.87E-04	1.80E-03	3.10E-03	0.532	Not an ECOPC
	Deer mouse	3.99E-02	3.50E-04	6.40E-03	4.66E-02	0.532	Not an ECOPC
	Eastern cottontail	1.53E-02	2.33E-04	3.00E-03	1.85E-02	0.532	Not an ECOPC
	Great blue heron	5.72E-03	1.10E-04	9.00E-04	6.73E-03	N/A	Uncertain
	Mallard	1.93E-02	1.37E-04	4.14E-03	2.36E-02	N/A	Uncertain
	Meadow vole	7.63E-02	3.31E-04	8.10E-03	8.48E-02	0.532	Not an ECOPC
	Mink	5.58E-03	2.40E-04	1.25E-02	1.83E-02	0.532	Not an ECOPC
	Mule deer	1.00E-02	1.58E-04	6.00E-04	1.08E-02	0.532	Not an ECOPC
	Northern bobwhite	2.12E-02	2.45E-04	3.80E-03	2.52E-02	N/A	Uncertain
	Northern harrier	2.30E-03	1.78E-04	1.40E-03	3.88E-03	N/A	Uncertain
	Raccoon	6.42E-03	1.97E-04	6.36E-03	1.30E-02	0.532	Not an ECOPC
	Red-winged blackbird	3.36E-02	4.01E-04	4.80E-03	3.88E-02	N/A	Uncertain
Boron	American robin	1.02E+01	1.32E-02	3.70E-01	1.05E+01	28.8	Not an ECOPC
	Coyote	3.48E-01	7.48E-03	1.23E-01	4.79E-01	28	Not an ECOPC
	Deer mouse	1.18E+01	1.40E-02	4.38E-01	1.23E+01	28	Not an ECOPC
	Eastern cottontail	3.95E+00	9.30E-03	2.06E-01	4.16E+00	28	Not an ECOPC
	Great blue heron	8.45E-01	4.41E-03	1.48E-02	8.64E-01	28.8	Not an ECOPC
	Mallard	1.04E+01	5.47E-03	6.81E-02	1.05E+01	28.8	Not an ECOPC
	Meadow vole	1.50E+01	1.32E-02	2.09E-01	1.52E+01	28	Not an ECOPC
	Mink	1.74E+00	9.59E-03	4.82E-01	2.23E+00	28	Not an ECOPC
	Mule deer	2.59E+00	6.33E-03	4.11E-02	2.64E+00	28	Not an ECOPC
	Northern bobwhite	5.70E+00	9.78E-03	2.60E-01	5.97E+00	28.8	Not an ECOPC
	Northern harrier	7.33E-01	7.10E-03	9.59E-02	8.36E-01	28.8	Not an ECOPC
	Raccoon	4.19E+00	7.86E-03	2.46E-01	4.45E+00	28	Not an ECOPC
	Red-winged blackbird	7.23E+00	1.60E-02	1.24E-01	7.37E+00	28.8	Not an ECOPC
Cadmium	American robin	8.61E+00	6.78E-02	3.35E-01	9.01E+00	1.47	**ECOPC**
	Coyote	1.57E-01	3.83E-02	1.12E-01	3.07E-01	0.77	Not an ECOPC
	Deer mouse	1.05E+01	7.17E-02	3.97E-01	1.09E+01	0.77	**ECOPC**
	Eastern cottontail	4.00E+00	4.76E-02	1.86E-01	4.24E+00	0.77	**ECOPC**
	Great blue heron	3.58E-02	2.26E-02	5.70E-02	1.15E-01	1.47	Not an ECOPC
	Mallard	2.00E+00	2.80E-02	2.62E-01	2.29E+00	1.47	**ECOPC**
	Meadow vole	2.64E+00	6.78E-02	2.41E-01	2.95E+00	0.77	**ECOPC**
	Mink	1.76E-01	4.91E-02	6.64E-01	8.89E-01	0.77	**ECOPC**
	Mule deer	2.62E+00	3.24E-02	3.72E-02	2.69E+00	0.77	**ECOPC**
	Northern bobwhite	5.56E+00	5.01E-02	2.36E-01	5.84E+00	1.47	**ECOPC**
	Northern harrier	1.66E-01	3.63E-02	8.68E-02	2.89E-01	1.47	Not an ECOPC
	Raccoon	4.59E-01	4.03E-02	3.39E-01	8.39E-01	0.77	**ECOPC**
	Red-winged blackbird	1.19E+00	8.20E-02	1.43E-01	1.41E+00	1.47	Not an ECOPC
Chromium	American robin	1.10E+01	1.50E-01	4.54E+00	1.57E+01	2.66	**ECOPC**
	Coyote	3.86E-01	8.50E-02	1.51E+00	1.98E+00	9.24	Not an ECOPC
	Deer mouse	1.22E+01	1.59E-01	5.38E+00	1.77E+01	9.24	**ECOPC**
	Eastern cottontail	3.26E+00	1.06E-01	2.52E+00	5.89E+00	9.24	Not an ECOPC
	Great blue heron	2.37E-01	5.01E-02	3.05E-01	5.91E-01	2.66	Not an ECOPC
	Mallard	1.10E+01	6.21E-02	1.40E+00	1.25E+01	2.66	**ECOPC**
	Meadow vole	4.27E+00	1.50E-01	3.78E+00	8.20E+00	9.24	Not an ECOPC
	Mink	9.74E-01	1.09E-01	7.02E+00	8.11E+00	9.24	Not an ECOPC
	Mule deer	2.14E+00	7.19E-02	5.04E-01	2.72E+00	9.24	Not an ECOPC
	Northern bobwhite	5.06E+00	1.11E-01	3.19E+00	8.36E+00	2.66	**ECOPC**
	Northern harrier	8.27E-01	8.07E-02	1.18E+00	2.08E+00	2.66	Not an ECOPC
	Raccoon	2.50E+00	8.94E-02	3.59E+00	6.18E+00	9.24	Not an ECOPC
	Red-winged blackbird	3.41E+00	1.82E-01	2.24E+00	5.83E+00	2.66	**ECOPC**

Table 2.3-14
Screening Results for Wildlife Receptors

COPC	Receptor	Exposure (mg/kg-BW/day)				TRV (mg/kg-BW/day)	ECOPC?
		Food	Water	Soil/Sediment	Total		
Cobalt	American robin	2.21E-01	9.66E-04	6.08E-02	2.82E-01	7.61	Not an ECOPC
	Coyote	1.61E-02	5.46E-04	2.03E-02	3.68E-02	7.33	Not an ECOPC
	Deer mouse	2.64E-01	1.02E-03	7.20E-02	3.38E-01	7.33	Not an ECOPC
	Eastern cottontail	9.76E-02	6.79E-04	3.38E-02	1.32E-01	7.33	Not an ECOPC
	Great blue heron	3.75E-02	3.22E-04	7.20E-03	4.50E-02	7.61	Not an ECOPC
	Mallard	3.13E-01	3.99E-04	3.31E-02	3.47E-01	7.61	Not an ECOPC
	Meadow vole	4.89E-01	9.66E-04	1.03E-01	5.93E-01	7.33	Not an ECOPC
	Mink	5.41E-02	7.00E-04	1.31E-01	1.86E-01	7.33	Not an ECOPC
	Mule deer	6.40E-02	4.62E-04	6.75E-03	7.12E-02	7.33	Not an ECOPC
	Northern bobwhite	1.37E-01	7.14E-04	4.28E-02	1.80E-01	7.61	Not an ECOPC
	Northern harrier	4.38E-02	5.18E-04	1.58E-02	6.00E-02	7.61	Not an ECOPC
	Raccoon	1.01E-01	5.74E-04	6.71E-02	1.68E-01	7.33	Not an ECOPC
	Red-winged blackbird	2.17E-01	1.17E-03	6.08E-02	2.79E-01	7.61	Not an ECOPC
Copper	American robin	6.80E+00	3.12E-02	5.51E-01	7.39E+00	4.04	**ECOPC**
	Coyote	7.31E-01	1.76E-02	1.84E-01	9.33E-01	5.6	Not an ECOPC
	Deer mouse	6.89E+00	3.30E-02	6.53E-01	7.58E+00	5.6	**ECOPC**
	Eastern cottontail	1.07E+00	2.19E-02	3.06E-01	1.40E+00	5.6	Not an ECOPC
	Great blue heron	8.78E-01	1.04E-02	8.00E-02	9.68E-01	4.04	Not an ECOPC
	Mallard	3.22E+00	1.29E-02	3.68E-01	3.60E+00	4.04	Not an ECOPC
	Meadow vole	3.62E+00	3.12E-02	8.53E-01	4.51E+00	5.6	Not an ECOPC
	Mink	8.19E-01	2.26E-02	1.23E+00	2.07E+00	5.6	Not an ECOPC
	Mule deer	7.04E-01	1.49E-02	6.12E-02	7.80E-01	5.6	Not an ECOPC
	Northern bobwhite	2.08E+00	2.31E-02	3.88E-01	2.49E+00	4.04	Not an ECOPC
	Northern harrier	2.14E+00	1.67E-02	1.43E-01	2.30E+00	4.04	Not an ECOPC
	Raccoon	8.43E-01	1.85E-02	6.26E-01	1.49E+00	5.6	Not an ECOPC
	Red-winged blackbird	2.62E+00	3.77E-02	5.06E-01	3.17E+00	4.04	Not an ECOPC
Iron	American robin	5.44E+02	5.40E+00	9.91E+01	6.48E+02	N/A	Uncertain
	Coyote	2.74E+01	3.05E+00	3.30E+01	6.35E+01	N/A	Uncertain
	Deer mouse	6.55E+02	5.71E+00	1.17E+02	7.78E+02	N/A	Uncertain
	Eastern cottontail	2.44E+02	3.79E+00	5.51E+01	3.03E+02	N/A	Uncertain
	Great blue heron	1.13E+02	1.80E+00	2.48E+01	1.40E+02	N/A	Uncertain
	Mallard	3.50E+02	2.23E+00	1.14E+02	4.67E+02	N/A	Uncertain
	Meadow vole	1.22E+03	5.40E+00	1.37E+02	1.36E+03	N/A	Uncertain
	Mink	1.08E+02	3.91E+00	2.62E+02	3.74E+02	N/A	Uncertain
	Mule deer	1.60E+02	2.58E+00	1.10E+01	1.74E+02	N/A	Uncertain
	Northern bobwhite	3.41E+02	3.99E+00	6.97E+01	4.15E+02	N/A	Uncertain
	Northern harrier	6.79E+01	2.89E+00	2.57E+01	9.65E+01	N/A	Uncertain
	Raccoon	1.21E+02	3.21E+00	1.34E+02	2.58E+02	N/A	Uncertain
	Red-winged blackbird	5.43E+02	6.53E+00	8.10E+01	6.30E+02	N/A	Uncertain
Lead	American robin	7.23E-01	4.26E-03	2.70E+00	3.43E+00	1.63	**ECOPC**
	Coyote	1.64E-01	2.41E-03	9.00E-01	1.07E+00	4.7	Not an ECOPC
	Deer mouse	8.95E-01	4.51E-03	3.20E+00	4.10E+00	4.7	Not an ECOPC
	Eastern cottontail	3.62E-01	3.00E-03	1.50E+00	1.87E+00	4.7	Not an ECOPC
	Great blue heron	4.44E-02	1.42E-03	1.36E-02	5.94E-02	1.63	Not an ECOPC
	Mallard	2.26E-01	1.76E-03	6.26E-02	2.90E-01	1.63	Not an ECOPC
	Meadow vole	1.81E+00	4.26E-03	1.61E-01	1.98E+00	4.7	Not an ECOPC
	Mink	5.81E-02	3.09E-03	2.48E+00	2.55E+00	4.7	Not an ECOPC
	Mule deer	2.38E-01	2.04E-03	3.00E-01	5.40E-01	4.7	Not an ECOPC
	Northern bobwhite	4.96E-01	3.15E-03	1.90E+00	2.40E+00	1.63	**ECOPC**
	Northern harrier	5.08E-01	2.29E-03	7.00E-01	1.21E+00	1.63	Not an ECOPC
	Raccoon	1.00E-01	2.53E-03	1.27E+00	1.37E+00	4.7	Not an ECOPC
	Red-winged blackbird	7.79E-01	5.16E-03	9.54E-02	8.79E-01	1.63	Not an ECOPC

Table 2.3-14
Screening Results for Wildlife Receptors

COPC	Receptor	Exposure (mg/kg-BW/day)				TRV (mg/kg-BW/day)	ECOPC?
		Food	Water	Soil/Sediment	Total		
Manganese	American robin	9.20E+01	2.90E-01	1.31E+01	1.05E+02	179	Not an ECOPC
	Coyote	2.20E+00	1.64E-01	4.36E+00	6.72E+00	51.5	Not an ECOPC
	Deer mouse	1.12E+02	3.07E-01	1.55E+01	1.28E+02	51.5	**ECOPC**
	Eastern cottontail	4.30E+01	2.04E-01	7.26E+00	5.05E+01	51.5	Not an ECOPC
	Great blue heron	2.91E+01	9.66E-02	1.29E+00	3.04E+01	179	Not an ECOPC
	Mallard	4.18E+02	1.20E-01	5.91E+00	4.24E+02	179	**ECOPC**
	Meadow vole	2.15E+02	2.90E-01	1.49E+01	2.30E+02	51.5	**ECOPC**
	Mink	5.94E+01	2.10E-01	2.39E+01	8.35E+01	51.5	**ECOPC**
	Mule deer	2.82E+01	1.39E-01	1.45E+00	2.98E+01	51.5	Not an ECOPC
	Northern bobwhite	5.97E+01	2.14E-01	9.20E+00	6.91E+01	179	Not an ECOPC
	Northern harrier	3.47E+00	1.55E-01	3.39E+00	7.01E+00	179	Not an ECOPC
	Raccoon	1.38E+02	1.72E-01	1.22E+01	1.50E+02	51.5	**ECOPC**
	Red-winged blackbird	9.44E+01	3.51E-01	8.83E+00	1.04E+02	179	Not an ECOPC
Mercury	American robin	8.09E-03	2.07E-05	9.72E-03	1.78E-02	0.039	Not an ECOPC
	Coyote	1.53E-03	1.17E-05	3.24E-03	4.78E-03	0.032	Not an ECOPC
	Deer mouse	8.43E-03	2.19E-05	1.15E-02	2.00E-02	0.032	Not an ECOPC
	Eastern cottontail	1.65E-03	1.46E-05	5.40E-03	7.06E-03	0.032	Not an ECOPC
	Great blue heron	4.39E-02	6.90E-06	4.50E-04	4.44E-02	0.039	**ECOPC**
	Mallard	1.97E-02	8.55E-06	2.07E-03	2.18E-02	0.039	Not an ECOPC
	Meadow vole	6.39E-03	2.07E-05	3.24E-03	9.65E-03	0.032	Not an ECOPC
	Mink	2.95E-02	1.50E-05	1.20E-02	4.15E-02	0.032	**ECOPC**
	Mule deer	1.08E-03	9.90E-06	1.08E-03	2.17E-03	0.032	Not an ECOPC
	Northern bobwhite	2.88E-03	1.53E-05	6.84E-03	9.73E-03	0.039	Not an ECOPC
	Northern harrier	4.71E-03	1.11E-05	2.52E-03	7.24E-03	0.039	Not an ECOPC
	Raccoon	6.59E-03	1.23E-05	6.12E-03	1.27E-02	0.032	Not an ECOPC
	Red-winged blackbird	4.23E-03	2.51E-05	1.92E-03	6.18E-03	0.039	Not an ECOPC
Molybdenum	American robin	7.79E+00	3.67E-02	2.57E-01	8.08E+00	3.5	**ECOPC**
	Coyote	1.41E-01	2.07E-02	8.55E-02	2.48E-01	0.26	Not an ECOPC
	Deer mouse	9.68E+00	3.88E-02	3.04E-01	1.00E+01	0.26	**ECOPC**
	Eastern cottontail	3.96E+00	2.58E-02	1.43E-01	4.13E+00	0.26	**ECOPC**
	Great Blue heron	1.04E-02	1.22E-02	1.36E-02	3.62E-02	3.5	Not an ECOPC
	Mallard	2.91E+00	1.52E-02	6.26E-02	2.99E+00	3.5	Not an ECOPC
	Meadow vole	2.91E+00	3.67E-02	1.65E-01	3.11E+00	0.26	**ECOPC**
	Mink	2.97E-01	2.66E-02	3.59E-01	6.83E-01	0.26	**ECOPC**
	Mule deer	2.60E+00	1.76E-02	2.85E-02	2.64E+00	0.26	**ECOPC**
	Northern bobwhite	5.40E+00	2.71E-02	1.81E-01	5.61E+00	3.5	**ECOPC**
	Northern harrier	1.46E-01	1.97E-02	6.65E-02	2.32E-01	3.5	Not an ECOPC
	Raccoon	9.69E-01	2.18E-02	1.83E-01	1.17E+00	0.26	**ECOPC**
	Red-winged blackbird	1.32E+00	4.44E-02	9.76E-02	1.46E+00	3.5	Not an ECOPC
Nickel	American robin	6.03E+00	3.71E-02	1.43E+00	7.49E+00	6.71	**ECOPC**
	Coyote	2.59E-01	2.10E-02	4.75E-01	7.55E-01	1.7	Not an ECOPC
	Deer mouse	6.77E+00	3.93E-02	1.69E+00	8.49E+00	1.7	**ECOPC**
	Eastern cottontail	1.96E+00	2.61E-02	7.92E-01	2.78E+00	1.7	**ECOPC**
	Great blue heron	1.40E-01	1.24E-02	1.83E-01	3.35E-01	6.71	Not an ECOPC
	Mallard	5.50E+00	1.53E-02	8.40E-01	6.35E+00	6.71	Not an ECOPC
	Meadow vole	3.62E+00	3.71E-02	1.89E+00	5.55E+00	1.7	**ECOPC**
	Mink	5.83E-01	2.69E-02	2.92E+00	3.53E+00	1.7	**ECOPC**
	Mule deer	1.28E+00	1.78E-02	1.58E-01	1.46E+00	1.7	Not an ECOPC
	Northern bobwhite	2.96E+00	2.74E-02	1.00E+00	3.99E+00	6.71	Not an ECOPC
	Northern harrier	6.10E-01	1.99E-02	3.70E-01	1.00E+00	6.71	Not an ECOPC
	Raccoon	1.60E+00	2.21E-02	1.49E+00	3.12E+00	1.7	**ECOPC**
	Red-winged blackbird	2.30E+00	4.49E-02	1.12E+00	3.47E+00	6.71	Not an ECOPC

Table 2.3-14
Screening Results for Wildlife Receptors

COPC	Receptor	Exposure (mg/kg-BW/day)				TRV (mg/kg-BW/day)	ECOPC?
		Food	Water	Soil/Sediment	Total		
Selenium	American robin	7.67E+02	9.51E-01	7.56E+00	7.75E+02	0.29	**ECOPC**
	Coyote	1.14E+01	5.37E-01	2.52E+00	1.44E+01	0.143	**ECOPC**
	Deer mouse	9.84E+02	1.01E+00	8.96E+00	9.94E+02	0.143	**ECOPC**
	Eastern cottontail	4.38E+02	6.68E-01	4.20E+00	4.43E+02	0.143	**ECOPC**
	Great blue heron	2.37E+00	3.17E-01	3.12E-01	2.99E+00	0.29	**ECOPC**
	Mallard	2.88E+01	3.93E-01	1.44E+00	3.07E+01	0.29	**ECOPC**
	Meadow vole	4.77E+01	9.51E-01	3.87E+00	5.25E+01	0.143	**ECOPC**
	Mink	3.85E+00	6.89E-01	9.73E+00	1.43E+01	0.143	**ECOPC**
	Mule deer	2.87E+02	4.55E-01	8.40E-01	2.88E+02	0.143	**ECOPC**
	Northern bobwhite	5.86E+02	7.03E-01	5.32E+00	5.92E+02	0.29	**ECOPC**
	Northern harrier	5.70E+00	5.10E-01	1.96E+00	8.17E+00	0.29	**ECOPC**
	Raccoon	7.27E+00	5.65E-01	4.97E+00	1.28E+01	0.143	**ECOPC**
	Red-winged blackbird	2.26E+01	1.15E+00	2.29E+00	2.61E+01	0.29	**ECOPC**
Silver	American robin	4.46E-02	1.57E-03	3.27E-02	7.89E-02	2.02	Not an ECOPC
	Coyote	1.94E-03	8.89E-04	1.09E-02	1.37E-02	6.02	Not an ECOPC
	Deer mouse	4.60E-02	1.66E-03	3.87E-02	8.64E-02	6.02	Not an ECOPC
	Eastern cottontail	8.24E-03	1.11E-03	1.82E-02	2.75E-02	6.02	Not an ECOPC
	Great blue heron	6.50E-03	5.24E-04	4.60E-03	1.16E-02	2.02	Not an ECOPC
	Mallard	1.03E-01	6.50E-04	2.12E-02	1.25E-01	2.02	Not an ECOPC
	Meadow vole	4.28E-02	1.57E-03	3.08E-02	7.52E-02	6.02	Not an ECOPC
	Mink	1.39E-02	1.14E-03	6.35E-02	7.85E-02	6.02	Not an ECOPC
	Mule deer	5.40E-03	7.52E-04	3.63E-03	9.78E-03	6.02	Not an ECOPC
	Northern bobwhite	1.49E-02	1.16E-03	2.30E-02	3.91E-02	2.02	Not an ECOPC
	Northern harrier	4.63E-03	8.44E-04	8.47E-03	1.39E-02	2.02	Not an ECOPC
	Raccoon	3.27E-02	9.35E-04	3.24E-02	6.61E-02	6.02	Not an ECOPC
	Red-winged blackbird	2.69E-02	1.90E-03	1.82E-02	4.71E-02	2.02	Not an ECOPC
Thallium	American robin	1.97E-01	6.76E-04	1.84E-02	2.16E-01	0.35	Not an ECOPC
	Coyote	6.63E-03	3.82E-04	6.12E-03	1.31E-02	0.48	Not an ECOPC
	Deer mouse	2.38E-01	7.15E-04	2.18E-02	2.61E-01	0.48	Not an ECOPC
	Eastern cottontail	9.03E-02	4.75E-04	1.02E-02	1.01E-01	0.48	Not an ECOPC
	Great blue heron	7.28E-03	2.25E-04	1.00E-03	8.51E-03	0.35	Not an ECOPC
	Mallard	5.91E-02	2.79E-04	4.60E-03	6.40E-02	0.35	Not an ECOPC
	Meadow vole	3.02E-02	6.76E-04	8.10E-03	3.90E-02	0.48	Not an ECOPC
	Mink	9.64E-03	4.90E-04	2.42E-02	3.43E-02	0.48	Not an ECOPC
	Mule deer	5.92E-02	3.23E-04	2.04E-03	6.16E-02	0.48	Not an ECOPC
	Northern bobwhite	1.26E-01	5.00E-04	1.29E-02	1.39E-01	0.35	Not an ECOPC
	Northern harrier	1.38E-02	3.63E-04	4.76E-03	1.89E-02	0.35	Not an ECOPC
	Raccoon	1.62E-02	4.02E-04	1.24E-02	2.90E-02	0.48	Not an ECOPC
	Red-winged blackbird	1.62E-02	8.18E-04	4.80E-03	2.19E-02	0.35	Not an ECOPC
Uranium	American robin	1.84E-01	3.09E-03	3.02E-01	4.89E-01	16	Not an ECOPC
	Coyote	6.66E-03	1.75E-03	1.01E-01	1.09E-01	3.07	Not an ECOPC
	Deer mouse	1.84E-01	3.27E-03	3.58E-01	5.46E-01	3.07	Not an ECOPC
	Eastern cottontail	2.56E-02	2.17E-03	1.68E-01	1.96E-01	3.07	Not an ECOPC
	Great blue heron	7.93E-03	1.03E-03	5.95E-02	6.85E-02	16	Not an ECOPC
	Mallard	2.61E-01	1.28E-03	2.74E-01	5.36E-01	16	Not an ECOPC
	Meadow vole	1.36E-01	3.09E-03	2.11E-01	3.50E-01	3.07	Not an ECOPC
	Mink	2.68E-02	2.24E-03	6.35E-01	6.64E-01	3.07	Not an ECOPC
	Mule deer	1.68E-02	1.48E-03	3.36E-02	5.19E-02	3.07	Not an ECOPC
	Northern bobwhite	5.23E-02	2.28E-03	2.13E-01	2.67E-01	16	Not an ECOPC
	Northern harrier	1.47E-02	1.66E-03	7.84E-02	9.48E-02	16	Not an ECOPC
	Raccoon	6.89E-02	1.84E-03	3.24E-01	3.95E-01	3.07	Not an ECOPC
	Red-winged blackbird	9.85E-02	3.74E-03	1.25E-01	2.27E-01	16	Not an ECOPC

Table 2.3-14
Screening Results for Wildlife Receptors

COPC	Receptor	Exposure (mg/kg-BW/day)				TRV (mg/kg-BW/day)	ECOPC?
		Food	Water	Soil/Sediment	Total		
Vanadium	American robin	3.89E+00	2.22E-01	7.05E+00	1.12E+01	0.344	**ECOPC**
	Coyote	1.18E-01	1.26E-01	2.35E+00	2.59E+00	4.16	Not an ECOPC
	Deer mouse	4.61E+00	2.35E-01	8.35E+00	1.32E+01	4.16	**ECOPC**
	Eastern cottontail	1.64E+00	1.56E-01	3.92E+00	5.71E+00	4.16	**ECOPC**
	Great blue heron	2.79E-01	7.41E-02	4.71E-01	8.24E-01	0.344	**ECOPC**
	Mallard	5.59E+00	9.18E-02	2.17E+00	7.84E+00	0.344	**ECOPC**
	Meadow vole	2.61E+00	2.22E-01	2.45E+00	5.28E+00	4.16	**ECOPC**
	Mink	6.31E-01	1.61E-01	9.41E+00	1.02E+01	4.16	**ECOPC**
	Mule deer	1.08E+00	1.06E-01	7.83E-01	1.97E+00	4.16	Not an ECOPC
	Northern bobwhite	2.33E+00	1.64E-01	4.96E+00	7.45E+00	0.344	**ECOPC**
	Northern harrier	2.29E-01	1.19E-01	1.83E+00	2.18E+00	0.344	**ECOPC**
	Raccoon	1.43E+00	1.32E-01	4.81E+00	6.37E+00	4.16	**ECOPC**
	Red-winged blackbird	1.40E+00	2.69E-01	1.45E+00	3.12E+00	0.344	**ECOPC**
Zinc	American robin	1.01E+02	1.71E-01	7.91E+00	1.09E+02	66.1	**ECOPC**
	Coyote	4.91E+01	9.67E-02	2.64E+00	5.18E+01	75.4	Not an ECOPC
	Deer mouse	1.12E+02	1.81E-01	9.38E+00	1.22E+02	75.4	**ECOPC**
	Eastern cottontail	3.17E+01	1.20E-01	4.40E+00	3.62E+01	75.4	Not an ECOPC
	Great blue heron	2.46E+01	5.70E-02	6.45E-01	2.53E+01	66.1	Not an ECOPC
	Mallard	2.86E+01	7.07E-02	2.97E+00	3.16E+01	66.1	Not an ECOPC
	Meadow vole	5.53E+01	1.71E-01	7.67E+00	6.31E+01	75.4	Not an ECOPC
	Mink	1.81E+01	1.24E-01	1.33E+01	3.15E+01	75.4	Not an ECOPC
	Mule deer	2.08E+01	8.18E-02	8.79E-01	2.17E+01	75.4	Not an ECOPC
	Northern bobwhite	4.82E+01	1.26E-01	5.57E+00	5.39E+01	66.1	Not an ECOPC
	Northern harrier	1.57E+02	9.18E-02	2.05E+00	1.59E+02	66.1	**ECOPC**
	Raccoon	8.86E+00	1.02E-01	6.77E+00	1.57E+01	75.4	Not an ECOPC
	Red-winged blackbird	3.68E+01	2.07E-01	4.54E+00	4.16E+01	66.1	Not an ECOPC

Notes:
COPC - Chemical of Potential Concern
mg/kg-BW/day - milligrams per kilograms of body weight per day
Ecological Chemical of Potential Concern (ECOPC) - Bold if the maximum exposure estimate was greater than the screening Toxicity Reference Value (TRV).
Not an ECOPC - The maximum exposure estimate was less than the screening TRV.
N/A - A TRV was not available for that COPC/Receptor pair. The COPC will be carried forward as constituent of uncertain risk.
* Aluminum was not identified as a COPC because soil pH at the site is generally greater than 5.5.

Table 2.3-15
Radionuclide Screening Summary
Terrestrial Receptors

U-238 decay string		Soil Conc	Soil	Terrestrial Animal - Soil		Terrestrial Plant - Soil	
TERRESTRIAL		mg/kg	Activity	RESRAD-BIOTA	Ratio	RESRAD-BIOTA	Ratio
Site Data for Uranium		112	pCi/g	Level I BCG (pCi/g)	(Activity/BCG)	Level I BCG (pCi/g)	(Activity/BCG)
Assumed U-238		112	37.6	1.58E+03	2.4E-02	1.57E+04	2.4E-03
	Ra-226		37.6	5.06E+01	7.4E-01	2.88E+02	1.3E-01
	Rn-222		37.6	----	----	----	----
	Pb-210		37.6	1.39E+03	2.7E-02	1.29E+04	2.9E-03
	Po-210		37.6	4.33E+03	8.7E-03	1.83E+05	2.1E-04
			SUM OF RATIOS	SOIL SUM	8.0E-01	SOIL SUM	1.4E-01

U-238 decay string		Water Conc	Water	Terrestrial Animal - Water		Terrestrial Plant - Water	
TERRESTRIAL		mg/L	Activity	RESRAD-BIOTA	Ratio	RESRAD-BIOTA	Ratio
Site Data for Uranium		0.0224	pCi/L	Level I BCG (pCi/L)	(Activity/BCG)	Level I BCG (pCi/L)	(Activity/BCG)
Assumed U-238		0.0224	7.52	4.06E+05	0.000	4.28E+07	1.8E-07
	Ra-226		7.52	8.11E+03	0.001	1.45E+07	5.2E-07
	Rn-222		7.52	----	----	----	----
	Pb-210		7.52	2.9E+05	2.58E-05	9.18E+07	8.20E-08
	Po-210		7.52	6.2E+05	1.22E-05	4.59E+12	1.64E-12
			SUM OF RATIOS	Water SUM	9.84E-04	Water SUM	7.8E-07

Terrestrial Animal - Risk Estimation		Terrestrial Plant - Risk Estimation	
Soil - Sum of Ratios	8.0E-01	Soil - Sum of Ratios	1.4E-01
Water - Sum of Ratios	0.001	Water - Sum of Ratios	0.000
TIR risks	**8.0E-01**	**TIR risks**	**1.4E-01**
Exceed 1?	Does not exceed		Does not exceed

Notes:

TIR - Total Ionizing Radiation
BCG - Biota Concentration Guide
pCi/g - picocurie per gram
PCi/L - picocurie per liter
mg/kg - milligram per kilogram
mg/L - milligram per liter

From USDOE (2002): If the sum of fractions (total ratio) is less than 1.0, the dose to an aquatic or terrestrial receptor is below the biota dose limit, indicating that the user has passed the general screening evaluation. If the sum of fractions is greater than 1.0, further investigation is required, and the user can move to a Level 2 analysis.

Sources:

Activity conversion factors: USEPA. 2009. Preliminary Remediation Goals for Radionuclides - PRGs in activity (pCi) units. Available at http://epa-prgs.ornl.gov/radionuclides/. Accessed October 2009.

Level I BCGS from U.S. Department of Energy (USDOE). 2009. RESRAD-Biota software, Version 1.5. Developed by USDOE's Biota Dose Assessment Committee (BDAC). Available at http://web.ead.anl.gov/resrad/home2/biota.cfm. Updated November 18, 2009.

Based on information in U.S. Department of Energy (USDOE). 2002. Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota. DOE Technical Standard DOE-STD-1153-2002. Developed by USDOE's Biota Dose Assessment Committee (BDAC).

Table 2.3-16
Radionuclide Screening Summary
Riparian/Aquatic Receptors

U-238 decay string		Sed Conc	Sediment	Riparian Animal - Sediment		Aquatic Animal - Sediment	
AQUATIC/RIPARIAN		mg/kg	Activity	RESRAD-BIOTA	Ratio	RESRAD-BIOTA	Ratio
Site Data for Uranium		119	pCi/g	Level I BCG (pCi/g)	(Activity/BCG)	Level I BCG (pCi/g)	(Activity/BCG)
Assumed U-238		119	40.0	2.49E+03	1.6E-02	4.28E+04	9.3E-04
	Ra-226		40.0	1.01E+02	4.0E-01	1.45E+04	2.8E-03
	Rn-222		40.0	----	----	----	----
	Pb-210		40.0	1.73E+03	2.3E-02	9.18E+04	4.4E-04
	Po-210		40.0	4.36E+03	9.2E-03	4.59E+09	8.7E-09
			SUM OF RATIOS	SEDIMENT SUM	4.4E-01	SEDIMENT SUM	4.1E-03

U-238 decay string		Water Conc	Water Activity	Riparian Animal - Water		Aquatic Animal - Water	
AQUATIC/RIPARIAN		mg/L		RESRAD-BIOTA	Ratio	RESRAD-BIOTA	Ratio
Site Data for Uranium		0.0224	pCi/L	Level I BCG (pCi/L)	(Activity/BCG)	Level I BCG (pCi/L)	(Activity/BCG)
Assumed U-238		0.0224	7.52	7.56E+02	9.95E-03	2.23E+02	3.37E-02
	Ra-226		7.52	4.08E+00	1.84E+00	1.02E+01	7.38E-01
	Rn-222		7.52	----	----	----	----
	Pb-210		7.52	9.26E+02	8.13E-03	6.01E+02	1.25E-02
	Po-210		7.52	1.14E+03	6.60E-03	3.65E+02	2.06E-02
			SUM OF RATIOS	Water SUM	1.87E+00	Water SUM	8.05E-01

	Riparian Animal - Risk Estimation		Aquatic Animal - Risk Estimation
Sediment - Sum of Ratios	4.4E-01	Soil - Sum of Ratios	4.1E-03
Water - Sum of Ratios	1.9E+00	Water - Sum of Ratios	8.0E-01
TIR risks	**2.3E+00**	**TIR risks**	**8.1E-01**
Exceed 1?	Exceeds 1		Does not exceed

Notes:

TIR - Total Ionizing Radiation
BCG - Biota Concentration Guide
pCi/g - picocurie per gram
PCi/L - picocurie per liter
mg/kg - milligram per kilogram
mg/L - milligram per liter

From USDOE (2002): If the sum of fractions (total ratio) is less than 1.0, the dose to an aquatic or terrestrial receptor is below the biota dose limit, indicating that the user has passed the general screening evaluation. If the sum of fractions is greater than 1.0, further investigation is required, and the user can move to a Level 2 analysis.

Sources:

Activity conversion factors: USEPA. 2009. Preliminary Remediation Goals for Radionuclides - PRGs in activity (pCi) units. Available at http://epa-prgs.ornl.gov/radionuclides/. Accessed October 2009.

Level I BCGS from U.S. Department of Energy (USDOE). 2009. RESRAD-Biota software, Version 1.5. Developed by USDOE's Biota Dose Assessment Committee (BDAC). Available at http://web.ead.anl.gov/resrad/home2/biota.cfm. Updated November 18, 2009.

based on information in U.S. Department of Energy (USDOE). 2002. Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota. DOE Technical Standard DOE-STD-1153-2002. Developed by USDOE's Biota Dose Assessment Committee (BDAC).

Table 2.3-17
Overall ECOPC Summary for Aquatic Habitat

Surface Waters		Sediments	
ECOPC - Aquatic Habitat	**ECOPC - Mine Features**	**ECOPC - Aquatic Habitat**	**ECOPC - Mine Features**
Aluminum	Aluminum	Aluminum	Aluminum
Cadmium	Cadmium	Antimony	Antimony
Iron	Fluoride	Arsenic	Arsenic
Lead	Iron	Barium	Barium
Selenium	Nickel	Beryllium	Beryllium
Zinc	Selenium	Boron	Boron
	Vanadium	Cadmium	Cadmium
	Zinc	Chromium	Chromium
		Copper	Copper
		Iron	Manganese
		Manganese	Mercury
		Mercury	Molybdenum
		Molybdenum	Nickel
		Nickel	Selenium
		Selenium	Silver
		Silver	Thallium
		Thallium	Vanadium
		Vanadium	Zinc
		Zinc	

Notes:
ECOPC - Ecological Chemical of Potential Concern
ECOPCs for aquatic life are also considered ECOPCs for amphibians

Table 2.3-18
ECOPC Summary for
Plant, Terrestrial Invertebrate, and Wildlife Receptors

ECOPC	Receptor
Antimony	Plants/Invertebrates
	Mink
	Deer mouse
	Meadow vole
	Raccoon
Arsenic	Plants/Invertebrates
	Deer mouse
	Meadow vole
Barium	Plants/Invertebrates
	Deer mouse
	Meadow vole
	Mallard
	Red-winged blackbird
	American robin
	Northern bobwhite
Boron	Plants/Invertebrates
Cadmium	Plants/Invertebrates
	Mink
	Raccoon
	Deer mouse
	Meadow vole
	Mule deer
	Eastern cottontail
	Mallard
	American robin
	Northern bobwhite
Chromium	Plants/Invertebrates
	Deer mouse
	Mallard
	Red-winged blackbird
	American robin
	Northern bobwhite
Cobalt	Plants/Invertebrates
Copper	Plants/Invertebrates
	Deer mouse
	American robin
Lead	Plants/Invertebrates
	American robin
	Northern bobwhite
Manganese	Plants/Invertebrates
	Mink
	Raccoon
	Deer mouse
	Meadow vole
	Mallard
Mercury	Plants/Invertebrates
	Mink
	Great blue heron

ECOPC	Receptor
Molybdenum	Plants/Invertebrates
	Mink
	Raccoon
	Deer mouse
	Meadow vole
	Mule deer
	Eastern cottontail
	American robin
	Northern bobwhite
Nickel	Plants/Invertebrates
	Mink
	Raccoon
	Deer mouse
	Meadow vole
	Eastern cottontail
	American robin
Selenium	Plants/Invertebrates
	Mink
	Raccoon
	Deer mouse
	Meadow vole
	Coyote
	Mule deer
	Eastern cottontail
	Mallard
	Great blue heron
	Red-winged blackbird
	Northern harrier
	American robin
	Northern bobwhite
Thallium	Plants/Invertebrates
Uranium	Plants/Invertebrates
Vanadium	Plants/Invertebrates
	Mink
	Raccoon
	Deer mouse
	Meadow vole
	Eastern cottontail
	Mallard
	Great blue heron
	Red-winged blackbird
	Northern harrier
	American robin
	Northern bobwhite
Zinc	Plants/Invertebrates
	Deer mouse
	Northern harrier
	American robin

Notes:
ECOPC - Ecological Chemical of Potential Concern
ECOPCs identified for any bird species are also considered ECOPCs for reptiles.

Table 2.3-19
Overall ECOPC Summary for Plant, Terrestrial Invertebrate, and Wildlife Receptors

ECOPC For One or More Wildlife Receptor(s)	ECOPC For Plants/Invertebrates	ECOPC for ONLY Plants/Invertebrates (i.e., Not an ECOPC for Any Wildlife Receptor)	Uncertain
Antimony (mammals)	Antimony	Boron	Antimony (birds)
Arsenic	Arsenic	Cobalt	Beryllium (birds)
Barium	Barium	Thallium	Iron
Cadmium	Boron	Uranium	Organics
Chromium	Cadmium		
Copper	Chromium		
Lead (birds)	Cobalt		
Manganese	Copper		
Mercury	Lead		
Molybdenum	Manganese		
Nickel	Mercury		
Selenium	Molybdenum		
Vanadium	Nickel		
Zinc	Selenium		
	Thallium		
	Uranium		
	Vanadium		
	Zinc		

Notes:
ECOPC - Ecological Chemical of Potential Concern
Wildlife receptors include bird and mammal receptors; ECOPCs for birds are also considered ECOPCs

Table 2.4-1
Assessment and Measurement Endpoints

Receptor Groups (Trophic Level / Feeding Guild)	Potential Representative Receptors	Ecosystem Type	Assessment Endpoint	Measurement Endpoint
Terrestrial Ecosystems				
1° Consumers – Terrestrial Herbivorous Birds	Chipping sparrow (*Spizella passerina)* [Surrogate = Northern Bobwhite (*Colinus virginianus*)]	Terrestrial	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
1° Consumers – Terrestrial Herbivorous Mammals	Black-tailed jackrabbit (*Lepus californicus)* [Surrogate = Eastern Cottontail (*Sylvilagus floridanus*)]	Terrestrial	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
	Mule Deer (*Odocoileus hemionus)*	Terrestrial	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
2° Consumers – Terrestrial Omnivorous Birds	American Robin (*Turdus migratorius)*	Terrestrial	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
2° Consumers – Terrestrial Omnivorous Mammals	Deer Mouse (*Peromyscus maniculatus)*	Terrestrial	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
2° Consumers – Terrestrial Reptiles	Western garter snake (*Thamnophis elegans*)	Terrestrial	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	Qualitatively assessed through other communities and guilds (2° Consumers – Terrestrial Omnivorous Mammals)[3]
3° Consumers – Terrestrial Carnivorous Mammals	Coyote (*Canis latrans)*	Terrestrial	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
3° Consumers – Terrestrial Raptors	Northern Harrier (*Circus cyaneus*)	Terrestrial	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
Aquatic and Riparian Ecosystems				
1° Producers and Consumers – Non-fish Aquatic Life	Benthic invertebrates	Aquatic	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Community composition at impacted sites compared to reference areas
1° Consumers – Fish	Sculpin (*Cottus sp.*) [Surrogate = Common carp (*Cyprinus carpio*)]	Aquatic	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Community composition at impacted sites compared to reference areas; 3. Fish tissue COPC concentrations compared to toxicity-based benchmarks, if available and applicable
2° and 3° Consumers – Fish	Yellowstone Cutthroat Trout (Oncorhynchus clarki bouvieri) [Surrogate = Rainbow trout (Oncorhynchus mykiss)]	Aquatic	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Community composition at impacted sites compared to reference areas; 3. Fish tissue COPC concentrations compared to toxicity-based benchmarks, if available and applicable
1° Consumers – Aquatic and Riparian Herbivorous Birds	Song Sparrow *(Melospiza melodia)*	Aquatic/ Riparian	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
1° Consumers – Aquatic and Riparian Herbivorous Mammals	Long-tailed Vole (*Microtus longicaudus)* [Surrogate = Meadow vole *(Microtus pennsylvanicus*)]	Aquatic/ Riparian	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
2° Consumers – Aquatic and Riparian Omnivorous Birds	Red-winged blackbird (*Agelaius phoeniceus)*	Aquatic/ Riparian	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
2° Consumers – Aquatic and Riparian Piscivorous Birds	Great blue heron *(Ardea herodias)*	Aquatic/ Riparian	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
2° Consumers – Aquatic and Riparian Benthic-feeding Birds	Mallard (*Anas platyrhynchas)*	Aquatic/ Riparian	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
2° Consumers – Aquatic and Riparian Omnivorous Mammals	Raccoon (*Procyon lotor)*	Aquatic/ Riparian	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas
2° Consumers – Aquatic and Riparian Carnivorous Mammals	Mink (*Mustela vison)*	Aquatic/ Riparian	Survival, growth, and reproduction adequate to sustain populations at the Site[1]	1. Comparison of abiotic media concentrations to toxicity-based benchmarks; 2. Measurement of COPC concentrations in abiotic media and selected food items; calculation of total intake from receptor-specific ingestion models; comparison of dose to TRVs to calculate HQs; 3. Comparison to HQs based on background and reference areas

Notes:
1° - primary trophic level
2° - secondary trophic level
3° - tertiary trophic level
COPCs - Chemical of Potential Concern
TRV - Toxicity Reference Value
HQ - Hazard Quotient
[1]For species with regulatory protection, such as threatened/endangered species and species protected under the Migratory Bird Treaty Act (MBTA), the measurement and assessment endpoints are related to survival, growth, and reproduction of individuals at the Site.

Table 3.1-1
Hardness Summary Statistics and Range of Available pH Data
for Different Exposure Units, Habitats, and Aquatic Mine Features at the Site

	Hardness (mg/L)[1]							pH	
EU/Habitat/Mine Feature	**Count**	**Minimum**	**Maximum**	**Mean**	**Standard Deviation**	**Standard Error**	**95% LCL**	**Minimum**	**Maximum**
Exposure Units									
Camp G Creek EU	45	173	277	213.57	22.25	3.32	207.07	7.90	8.26
Pedro Creek EU	74	84.2	2290	571.99	610.89	71.01	432.80	7.75	8.7
State Land Creek EU	112	36	314	157.54	47.70	4.51	148.71	7.10	8.4
Trail Canyon Creek EU	4	113	155	128.75	18.41	9.20	110.71	ND	
Westside Ponds EU	32	108	1190	319.10	208.53	36.86	246.85	7.43	7.53
Woodall Springs Area EU	50	456	933	586.16	113.67	16.08	554.65	6.50	9.3
Formation Creek EU	6	517	569	535.67	17.88	7.30	521.36	ND	
Northwest Conda Creek Reference Area	50	29.9	233	169.00	46.05	6.51	156.23	ND	
Jouglard Canyon Spring (JCS-1)	3	270	328	297.06	115.01	66.40	166.91	ND	
Habitats									
All Habitats	390	29.9	2290	324.20	332.80	16.85	290.51	6.50	9.30
Streams	113	82.9	277	188.32	32.70	3.08	182.29	7.60	8.7
Ponds	55	74.8	1190	221.15	170.26	22.96	176.15	7.43	9.3
Wetlands (includes Springs)	222	29.9	2290	418.92	407.72	27.36	365.29	6.50	8.5
Mine Features									
All Features	62	0.44	2700	629.99	566.24	71.91	486.16		
French Drain	31	0.84	911	663.24	235.51	42.30	578.64	7.98	8.05
Tailings Pond	8	0.72	828	623.12	258.26	91.31	440.50	8.68	ND
Pit Lake	12	122	235	183.00	32.87	9.49	164.02	ND	
Sediment Basin	6	2.63	2700	244.24	177.32	72.39	99.46	ND	
NE Seep Mine Pond	5	0.44	524	1970.53	1112.23	497.41	975.72	ND	

Notes:

[1]Hardness data is presented in mg/L as $CaCO_3$

pH data is presented as standard pH units

Table 3.1-2
Tier 1 Risk Characterization for Surface Waters in Aquatic Habitats in Each EU

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		COPC Concentration Max	Exposure Point Concentration	Surface Water Benchmark for Aquatic Life	Hazard Quotient (HQ)
CASNo	Analyte	Units			Min	Max			Based on 95LCL hardness[1,2]	
Camp G Creek Exposure Unit										
7429-90-5	Aluminum, Total	mg/L	15	3	0.046	5.4	5.4	2.38	0.087	**27**
7440-43-9	Cadmium, Dissolved	mg/L	41	39	0.00004	0.0001	0.0001	0.00003	0.00041	0.1
7439-89-6	Iron, Total	mg/L	15	3	0.038	4.56	4.56	2.75	1.0	**3**
7439-92-2	Lead, Dissolved	mg/L	35	34	0.00046	0.00046	0.00046	0.00046	0.0055	0.1
7782-49-2	Selenium, Total	mg/L	61	10	0.00028	0.044	0.044	0.014	0.005	**3**
7440-66-6	Zinc, Dissolved	mg/L	41	35	0.0019	0.01	0.01	0.002	0.22	0.01
Pedro Creek Exposure Unit										
7429-90-5	Aluminum, Total	mg/L	18	5	0.046	2.59	2.59	0.79	0.087	**9**
7440-43-9	Cadmium, Dissolved	mg/L	41	19	0.000037	0.0035	0.0035	0.00093	0.00064	1
7439-89-6	Iron, Total	mg/L	18	3	0.029	1.67	1.67	0.95	1.0	1.0
7439-92-2	Lead, Dissolved	mg/L	33	30	0.00014	0.007	0.007	0.0007	0.011	0.1
7782-49-2	Selenium, Total	mg/L	90	1	0.0011	4.08	4.08	1.4	0.005	**279**
7440-66-6	Zinc, Dissolved	mg/L	41	18	0.00041	0.04	0.04	0.013	0.38	0.03
State Land Creek Exposure Unit										
7429-90-5	Aluminum, Total	mg/L	25	2	0.015	2.55	2.55	1.034	0.087	**12**
7440-43-9	Cadmium, Dissolved	mg/L	104	74	0.000037	0.0015	0.0015	0.0001	0.00032	0.4
7439-89-6	Iron, Total	mg/L	25	0	0.022	1.76	1.76	0.63	1.0	0.6
7439-92-2	Lead, Dissolved	mg/L	75	69	0.00004	0.001	0.001	0.0001	0.0039	0.04
7782-49-2	Selenium, Total	mg/L	260	50	0.00023	0.98	0.98	0.084	0.005	**17**
7440-66-6	Zinc, Dissolved	mg/L	104	79	0.00092	0.12	0.12	0.019	0.17	0.1
Trail Canyon Creek Exposure Unit										
7429-90-5	Aluminum, Total	mg/L	3	0	0.20	7.92	7.92	10.18	0.087	**117**
7440-43-9	Cadmium, Dissolved	mg/L	6	6	--	--	0.0001	0.0001	0.00026	0.4
7439-89-6	Iron, Total	mg/L	3	0	0.17	5.68	5.68	7.35	1.0	**7**
7439-92-2	Lead, Dissolved	mg/L	5	5	--	--	0.0039	0.0039	0.0028	1
7782-49-2	Selenium, Total	mg/L	6	1	0.00023	0.00072	0.00072	0.00059	0.005	0.1
7440-66-6	Zinc, Dissolved	mg/L	6	5	0.0025	0.0025	0.0025	0.0025	0.13	0.02
West Side Ponds Exposure Unit										
7429-90-5	Aluminum, Total	mg/L	17	1	0.026	3.79	3.79	1.59	0.087	**18**
7440-43-9	Cadmium, Dissolved	mg/L	30	23	0.00002	0.0005	0.0005	0.0001	0.00046	0.2
7439-89-6	Iron, Total	mg/L	17	0	0.047	2.91	2.91	0.89	1.0	0.9
7439-92-2	Lead, Dissolved	mg/L	26	25	0.0006	0.0006	0.0006	0.0006	0.0066	0.1
7782-49-2	Selenium, Total	mg/L	40	3	0.00024	0.08	0.08	0.023	0.005	**5**
7440-66-6	Zinc, Dissolved	mg/L	30	17	0.00099	0.075	0.075	0.0099	0.25	0.04
Woodall Springs Exposure Unit										
7429-90-5	Aluminum, Total	mg/L	11	8	0.0263	0.416	0.42	0.133	0.087	**2**
7440-43-9	Cadmium, Dissolved	mg/L	44	42	0.000043	0.000061	0.000061	0.000031	0.00064	0.05
7439-89-6	Iron, Total	mg/L	11	6	0.0343	0.555	0.56	0.206	1.0	0.2
7439-92-2	Lead, Dissolved	mg/L	31	30	0.001	0.001	0.001	0.001	0.0109	0.1
7782-49-2	Selenium, Total	mg/L	52	3	0.001	0.004	0.004	0.00278	0.005	1
7440-66-6	Zinc, Dissolved	mg/L	44	33	0.0014	0.26	0.26	0.0482	0.38	0.1
Formation Creek Exposure Unit										
7429-90-5	Aluminum, Total	mg/L	3	3	--	--	0.019	0.019	0.087	0.2
7440-43-9	Cadmium, Dissolved	mg/L	6	4	0.000077	0.0001	0.00009	0.0001	0.00064	0.1
7439-89-6	Iron, Total	mg/L	3	3	--	--	0.02	0.02	1.0	0.02
7439-92-2	Lead, Dissolved	mg/L	3	3	--	--	0.0039	0.0039	0.0109	0.4
7782-49-2	Selenium, Total	mg/L	8	0	0.0015	0.0023	0.0023	0.00201	0.005	0.4
7440-66-6	Zinc, Dissolved	mg/L	6	0	0.0033	0.02	0.02	0.0195	0.38	0.1
Northwest Reference Area Exposure Unit										
7429-90-5	Aluminum, Total	mg/L	5	0	0.015	0.42	0.42	0.34	0.087	**4**
7440-43-9	Cadmium, Dissolved	mg/L	50	50	--	--	0.0001	0.0001	0.00033	0.3
7439-89-6	Iron, Total	mg/L	5	1	0.09	0.34	0.34	0.28	1.0	0.3
7439-92-2	Lead, Dissolved	mg/L	32	29	0.001	0.002	0.002	0.0004	0.0041	0.1
7782-49-2	Selenium, Total	mg/L	50	37	0.0002	0.002	0.002	0.0005	0.005	0.09
7440-66-6	Zinc, Dissolved	mg/L	50	38	0.0028	0.11	0.11	0.023	0.17	0.1
Jouglard Canyon Spring (JCS1)										
7429-90-5	Aluminum, Total	mg/L	3	0	0.0769	4.62	4.62	4.62	0.087	**53**
7440-43-9	Cadmium, Dissolved	mg/L	3	3	--	--	0.0001	0.0001	0.00049	0.2
7439-89-6	Iron, Total	mg/L	3	0	0.0635	4.12	4.12	4.12	1.0	**4**
7439-92-2	Lead, Dissolved	mg/L	3	2	0.0041	0.0041	0.0041	0.0041	0.0073	0.6
7782-49-2	Selenium, Total	mg/L	4	0	0.00076	0.0012	0.0012	0.0012	0.005	0.2
7440-66-6	Zinc, Dissolved	mg/L	4	4	--	--	0.0026	0.0026	0.27	0.01

Notes:
EU - Exposure Unit
HQ - Hazard Quotient
ECOPC - Ecological Chemical of Potential Concern
IRQ - Incremental Risk Quotient

[1]Hardness (mg/L as CaCO3): Camp G Creek = 207; Pedro Creek = 433; State Land Creek = 149; Trail Canyon Creek = 111; West Side Ponds = 247; Woodall Springs = 555; Formation Creek = 521; Northwest Reference Area = 156; and Jouglard Canyon Creek = 270.

[2] Hardness values used are the 95 % lower confidence limit value of the mean. Where hardness exceeded 400 mg/L, then a value of 400 mg/L was used in

Bold = HQ > 1.0

Table 3.1-3
Tier 1 Risk Characterization for Surface Waters in Aquatic Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		COPC Concentration Max	Exposure Point Concentration	Surface Water Benchmark for Aquatic Life	Hazard Quotient (HQ)
CASNo	Analyte	Units			Min	Max			Based on 95LCL hardness[1,2]	
Tailings Pond Mine Feature										
7429-90-5	Aluminum, Total	mg/L	6	1	0.057	1.21	1.21	0.68	0.087	**8**
7440-43-9	Cadmium, Dissolved	mg/L	10	4	0.00004	0.0002	0.0002	0.0001	0.00064	0.2
7782-41-4	Fluoride	mg/L	8	5	0.13	0.55	0.55	0.31	2.7	0.1
7439-89-6	Iron, Total	mg/L	6	0	0.033	0.89	0.89	0.51	1	0.5
7440-02-0	Nickel, Dissolved	mg/L	10	1	0.0034	0.015	0.015	0.011	0.17	0.1
7782-49-2	Selenium, Total	mg/L	10	0	0.00073	0.01	0.01	0.0058	0.005	1
7440-62-2	Vanadium, Total	mg/L	6	0	0.015	0.036	0.036	0.03	0.027	1
7440-66-6	Zinc, Dissolved	mg/L	10	5	0.002	0.03	0.03	0.011	0.38	0.03
French Drain Mine Feature										
7429-90-5	Aluminum, Total	mg/L	12	4	0.02	0.902	0.902	0.58	0.087	**7**
7440-43-9	Cadmium, Dissolved	mg/L	22	14	0.00002	0.0046	0.0046	0.0013	0.00064	**2.0**
7782-41-4	Fluoride	mg/L	28	1	0.13	1.16	1.16	0.618	2.7	0.2
7439-89-6	Iron, Total	mg/L	12	1	0.026	1.66	1.66	0.91	1	0.9
7440-02-0	Nickel, Dissolved	mg/L	22	2	0.0044	0.054	0.054	0.026	0.17	0.2
7782-49-2	Selenium, Total	mg/L	34	0	0.009	0.87	0.87	0.331	0.005	**66**
7440-62-2	Vanadium, Total	mg/L	12	1	0.0016	0.016	0.016	0.008	0.027	0
7440-66-6	Zinc, Dissolved	mg/L	22	1	0.0014	0.328	0.328	0.312	0.38	0.8
Pit Lake Mine Feature										
7429-90-5	Aluminum, Total	mg/L	6	1	0.030	0.58	0.58	0.39	0.087	**4**
7440-43-9	Cadmium, Dissolved	mg/L	8	3	0.00018	0.0062	0.0062	0.0028	0.00035	**8**
7782-41-4	Fluoride	mg/L	17	0	0.58	1.32	1.32	0.85	2.7	0.3
7439-89-6	Iron, Total	mg/L	6	1	0.066	0.70	0.70	0.47	1	0.5
7440-02-0	Nickel, Dissolved	mg/L	8	2	0.0059	0.0228	0.0228	0.018	0.08	0.2
7782-49-2	Selenium, Total	mg/L	18	0	0.0386	0.41	0.41	0.25	0.005	**50**
7440-62-2	Vanadium, Total	mg/L	6	0	0.0418	0.11	0.11	0.087	0.027	**3**
7440-66-6	Zinc, Dissolved	mg/L	8	2	0.0029	0.036	0.036	0.02	0.18	0.11
Sedimentation Basins Mine Feature										
7429-90-5	Aluminum, Total	mg/L	5	0	0.270	4.37	4.37	3.68	0.087	**42**
7440-43-9	Cadmium, Dissolved	mg/L	5	1	0.00019	0.0014	0.0014	0.0012	0.00025	**5**
7782-41-4	Fluoride	mg/L	6	0	0.37	0.93	0.93	0.69	2.7	0.3
7439-89-6	Iron, Total	mg/L	5	0	0.284	3.8	3.8	3.16	1	**3**
7440-02-0	Nickel, Dissolved	mg/L	5	0	0.0056	0.0187	0.0187	0.017	0.05	0.3
7782-49-2	Selenium, Total	mg/L	14	0	0.029	0.67	0.67	0.64	0.005	**127**
7440-62-2	Vanadium, Total	mg/L	5	0	0.0085	0.036	0.036	0.03	0.027	1
7440-66-6	Zinc, Dissolved	mg/L	5	1	0.0042	0.0595	0.0595	0.046	0.12	0.39
NE Seep Pond Mine Feature										
7429-90-5	Aluminum, Total	mg/L	4	3	0.001	0.018	0.018	0.02	0.087	0
7440-43-9	Cadmium, Dissolved	mg/L	4	0	0.00140	0.018	0.018	0.021	0.00064	**32**
7782-41-4	Fluoride	mg/L	4	0	2.49	3.79	3.79	3.62	2.7	1
7439-89-6	Iron, Total	mg/L	4	3	0.39	0.58	0.58	0.58	1	0.6
7440-02-0	Nickel, Dissolved	mg/L	4	0	0.39	0.58	0.58	0.58	0.17	**3**
7782-49-2	Selenium, Total	mg/L	7	0	2.72	8.55	8.55	7.37	0.005	**1474**
7440-62-2	Vanadium, Total	mg/L	4	0	0.0179	0.029	0.029	0.029	0.027	1
7440-66-6	Zinc, Dissolved	mg/L	4	0	0.64	1.65	1.65	1.70	0.38	**4**

Notes:
ECOPC - Ecological Chemical of Potential Concern
HQ - Hazard Quotient

[1]Hardness (mg/L as CaCO3): Tailings Pond = 440; French Drain = 579; Pit Lake = 164; NE Seep Ponds = 975; Sediment Basin = 100.

[2] Hardness values used are the 95 % lower confidence limit value of the mean. Where hardness exceeded 400 mg/L, then a value of 400 mg/L was used in
Bold = HQ > 1.0

Table 3.1-4
Tier 1 Risk Characterization for Sediments in Aquatic Habitats in Each EU

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		HQ		Carried Forward?
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	
Camp G Creek Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	11	0	7830	15800	13686	22500	--	0.6	--	NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	11	4	0.08	0.96	0.51	3		0.2		NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	11	0	1.6	6	3.96	9.8	33	0.4	0.1	NO, HQ is 1 or less
7440-39-3	Barium	mg/kg dw	11	0	108	238	182.6	20	60	**9**	**3**	**YES**
7440-41-7	Beryllium	mg/kg dw	11	0	0.5	0.94	0.77	--	--	--	--	**NoTRV**
7440-42-8	Boron	mg/kg dw	11	0	4	8.5	6.56	235.5	--	0.03	--	NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	11	0	0.93	3.3	2.32	1	4.98	**2**	0.5	**YES**
7440-47-3	Chromium	mg/kg dw	11	0	14.2	23.1	21.55	43	111	0.5	0.2	NO, HQ is 1 or less
7440-50-8	Copper	mg/kg dw	11	0	9.3	21.1	18.54	32	149	0.6	0.1	NO, HQ is 1 or less
7439-89-6	Iron	mg/kg dw	11	0	11500	32200	22655	20000	40000	1	0.6	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	11	0	538	2020	1567	460	1800	**3**	0.9	**YES**
7439-97-6	Mercury	mg/kg dw	11	0	0.023	0.17	0.097	0.18	1.06	0.5	0.1	NO, HQ is 1 or less
7439-98-7	Molybdenum	mg/kg dw	11	0	0.6	2.3	2.15	3742	--	0.001	--	NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	11	0	11	26.6	22.15	23	48.6	1	0.5	NO, HQ is 1 or less
7782-49-2	Selenium	mg/kg dw	11	0	0.33	7.9	6.2	2	4	**3**	**2**	**YES**
7440-22-4	Silver	mg/kg dw	11	4	0.17	0.34	0.20	1	2.2	0.2	0.09	NO, HQ is 1 or less
7440-28-0	Thallium	mg/kg dw	11	7	0.09	0.77	0.29	0.858	--	0.3	--	NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	11	0	14.4	27.9	24.9	--	--	--	--	**NoTRV**
7440-66-6	Zinc	mg/kg dw	11	0	62.5	140	112.2	121	459	0.9	0.2	NO, HQ is 1 or less
Pedro Creek Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	11	0	8930	16200	14261	22500	--	0.6	--	NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	11	1	0.07	2.5	1.42	3		0.5		NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	14	0	2.6	19.7	12.12	9.8	33	1	0.4	NO, HQ is 1 or less
7440-39-3	Barium	mg/kg dw	11	0	61.3	233	184.2	20	60	**9**	**3**	**YES**
7440-41-7	Beryllium	mg/kg dw	11	0	0.76	1.3	0.995	--	--	--	--	**NoTRV**
7440-42-8	Boron	mg/kg dw	11	0	4.2	28.2	16.3	235.5	--	0.1	--	NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	14	0	0.65	29	14.1	1	4.98	**14**	**3**	**YES**
7440-47-3	Chromium	mg/kg dw	14	0	19.8	356	201.8	43	111	**5**	**2**	**YES**
7440-50-8	Copper	mg/kg dw	11	0	15.2	86.7	56.67	32	149	**2**	0.4	**YES**
7439-89-6	Iron	mg/kg dw	11	0	11900	23300	18568	20000	40000	1	0.5	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	11	0	110	1700	1070	460	1800	**2**	0.6	**YES**
7439-97-6	Mercury	mg/kg dw	11	0	0.04	0.66	0.38	0.18	1.1	**2**	0.4	**YES**
7439-98-7	Molybdenum	mg/kg dw	11	0	0.89	15.4	13.59	3742	--	0.004	--	NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	11	0	20.6	202	128.5	23	48.6	**6**	**3**	**YES**
7782-49-2	Selenium	mg/kg dw	14	0	1.2	1430	474.4	2	4	**237**	**119**	**YES**
7440-22-4	Silver	mg/kg dw	11	4	0.099	3.1	1.53	1	2.2	**2**	0.7	**YES**
7440-28-0	Thallium	mg/kg dw	11	6	0.2	1.2	0.64	0.86	--	0.7	--	NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	14	0	21	179	178	--	--	--	--	**NoTRV**
7440-66-6	Zinc	mg/kg dw	14	0	79.9	824	493	121	459	**4**	1	**YES**

Table 3.1-4
Tier 1 Risk Characterization for Sediments in Aquatic Habitats in Each EU

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		HQ		Carried Forward?
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	
State Land Creek Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	20	0	5990	27300	17573	22500	--	0.8	--	NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	20	5	0.07	3	1.14	3		0.4		NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	20	0	2.1	13	5.77	9.8	33	0.6	0.2	NO, HQ is 1 or less
7440-39-3	Barium	mg/kg dw	20	0	82.5	250	182.6	20	60	**9**	**3**	**YES**
7440-41-7	Beryllium	mg/kg dw	20	0	0.76	1.4	1.06	--	--	--	--	**NoTRV**
7440-42-8	Boron	mg/kg dw	20	0	4.3	17.5	9.02	235.5	--	0.04	--	NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	20	0	0.49	20.8	8.81	1	4.98	**9**	**2**	**YES**
7440-47-3	Chromium	mg/kg dw	20	0	17.2	286	117.3	43	111	**3**	1	**YES**
7440-50-8	Copper	mg/kg dw	20	0	14.2	78.9	31.43	32	149	1.0	0.2	NO, HQ is 1 or less
7439-89-6	Iron	mg/kg dw	20	0	11300	22400	16781	20000	40000	0.8	0.4	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	20	0	62.4	1420	620.6	460	1800	1	0.3	NO, HQ is 1 or less
7439-97-6	Mercury	mg/kg dw	20	0	0.042	0.41	0.197	0.18	1.06	1	0.2	NO, HQ is 1 or less
7439-98-7	Molybdenum	mg/kg dw	20	3	0.56	17.3	6.32	3742	--	0.0017	--	NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	20	0	11.4	153	56.91	23	48.6	**2**	1	**YES**
7782-49-2	Selenium	mg/kg dw	20	0	0.32	31	12.35	2	4	**6**	**3**	**YES**
7440-22-4	Silver	mg/kg dw	20	8	0.083	1.5	0.48	1	2.2	0.5	0.2	NO, HQ is 1 or less
7440-28-0	Thallium	mg/kg dw	20	14	0.18	0.98	0.36	0.86	--	0.4	--	NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	20	0	22.4	151	76.2	--	--	--	--	**NoTRV**
7440-66-6	Zinc	mg/kg dw	20	0	69.5	599	298.9	121	459	**2**	0.7	**YES**
Trail Canyon Creek Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	4	0	10100	14200	14755	22500	--	0.7	--	NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	4	2	0.82	0.91	1.12	3		0.4		NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	4	0	2.1	4.3	4.87	9.8	33	0.5	0.1	NO, HQ is 1 or less
7440-39-3	Barium	mg/kg dw	4	0	96.8	184	185.2	20	60	**9**	**3**	**YES**
7440-41-7	Beryllium	mg/kg dw	4	0	0.59	0.86	0.87	--	--	--	--	**NoTRV**
7440-42-8	Boron	mg/kg dw	4	0	4	9.2	10.53	235.5	--	0.04	--	NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	4	0	0.85	7.8	7.1	1	4.98	**7**	1	**YES**
7440-47-3	Chromium	mg/kg dw	4	0	24.2	36.5	34.75	43	111	0.8	0.3	NO, HQ is 1 or less
7440-50-8	Copper	mg/kg dw	4	0	17.1	19.7	19.31	32	149	0.6	0.1	NO, HQ is 1 or less
7439-89-6	Iron	mg/kg dw	4	0	11600	16700	17709	20000	40000	0.9	0.4	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	4	0	465	751	766	460	1800	**2**	0.4	**YES**
7439-97-6	Mercury	mg/kg dw	4	0	0.02	0.073	0.07	0.18	1.06	0.4	0.06	NO, HQ is 1 or less
7439-98-7	Molybdenum	mg/kg dw	4	0	0.77	3.1	3.19	3742	--	0.0009	--	NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	4	0	14.8	28.2	27.91	23	48.6	1	0.6	NO, HQ is 1 or less
7782-49-2	Selenium	mg/kg dw	4	0	0.24	0.76	0.7	2	4	0.4	0.2	NO, HQ is 1 or less
7440-22-4	Silver	mg/kg dw	4	1	0.11	0.3	0.32	1	2.2	0.3	0.14	NO, HQ is 1 or less
7440-28-0	Thallium	mg/kg dw	4	3	0.74	0.74	0.74	0.858	--	0.9	--	NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	4	0	23.6	46	43.47	--	--	--	--	**NoTRV**
7440-66-6	Zinc	mg/kg dw	4	0	62.8	187	184.5	121	459	**2**	0.4	**YES**

Table 3.1-4
Tier 1 Risk Characterization for Sediments in Aquatic Habitats in Each EU

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		HQ		Carried Forward?
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	
West Side Ponds Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	6	0	9960	15600	14283	22500	--	0.6	--	NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	6	1	0.09	2.8	2	3		0.7		NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	6	0	2	29.7	35.38	9.8	33	**4**	1	**YES**
7440-39-3	Barium	mg/kg dw	6	0	130	181	172.3	20	60	**9**	**3**	**YES**
7440-41-7	Beryllium	mg/kg dw	6	0	0.51	1	0.96	--	--	--	--	**NoTRV**
7440-42-8	Boron	mg/kg dw	6	0	5.4	10.1	9.77	235.5	--	0.0	--	NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	6	0	2.8	14.9	9.75	1	4.98	**10**	**2**	**YES**
7440-47-3	Chromium	mg/kg dw	6	0	28.3	278	252.2	43	111	**6**	**2**	**YES**
7440-50-8	Copper	mg/kg dw	6	0	18.1	121	121.9	32	149	**4**	0.8	**YES**
7439-89-6	Iron	mg/kg dw	6	0	9150	25500	20426	20000	40000	1	0.5	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	6	0	144	945	750.9	460	1800	**2**	0.4	**YES**
7439-97-6	Mercury	mg/kg dw	6	0	0.082	0.9	0.99	0.18	1.1	**5**	0.9	**YES**
7439-98-7	Molybdenum	mg/kg dw	6	0	0.85	18.4	9.59	3742	--	0.003	--	NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	6	0	22	253	229.4	23	48.6	**10**	**5**	**YES**
7782-49-2	Selenium	mg/kg dw	6	0	0.32	47.1	56.78	2	4	**28**	**14**	**YES**
7440-22-4	Silver	mg/kg dw	6	2	0.12	3.5	1.94	1	2.2	**2**	0.9	**YES**
7440-28-0	Thallium	mg/kg dw	6	3	0.23	1.1	0.78	0.858	--	0.9	--	NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	6	0	25.5	177	163.4	--	--	--	--	**NoTRV**
7440-66-6	Zinc	mg/kg dw	6	0	112	890	524	121	459	**4**	1	**YES**
Woodall Springs Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	5	0	280	2790	2028	22500	--	0.1	--	NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	5	1	0.53	0.95	0.88	3		0.3		NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	5	2	0.81	1.6	1.5	9.8	33	0.2	0.05	NO, HQ is 1 or less
7440-39-3	Barium	mg/kg dw	5	0	71.4	124	109.7	20	60	**5**	**2**	**YES**
7440-41-7	Beryllium	mg/kg dw	5	1	0.15	0.94	0.88	--	--	--	--	**NoTRV**
7440-42-8	Boron	mg/kg dw	5	2	0.97	2.5	2.1	235.5	--	0.01	--	NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	5	0	0.082	1	0.82	1	4.98	0.8	0.2	NO, HQ is 1 or less
7440-47-3	Chromium	mg/kg dw	5	0	4.8	15.7	13.1	43	111	0.3	0.1	NO, HQ is 1 or less
7440-50-8	Copper	mg/kg dw	5	0	1.7	4.1	4.2	32	149	0.1	0.03	NO, HQ is 1 or less
7439-89-6	Iron	mg/kg dw	5	0	351	2670	1966	20000	40000	0.1	0.05	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	5	0	19.2	122	108.4	460	1800	0.2	0.1	NO, HQ is 1 or less
7439-97-6	Mercury	mg/kg dw	5	0	0.025	0.19	0.14	0.18	1.06	0.8	0.1	NO, HQ is 1 or less
7439-98-7	Molybdenum	mg/kg dw	5	4	0.69	0.69	0.69	3742	--	0.0002	--	NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	5	0	0.34	14.9	10.8	23	48.6	0.5	0.2	NO, HQ is 1 or less
7782-49-2	Selenium	mg/kg dw	5	0	0.21	5.1	3.87	2	4	**2**	**1**	**YES**
7440-22-4	Silver	mg/kg dw	5	5	ND	ND	0.095	1	2.2	0.1	0.04	NO, HQ is 1 or less
7440-28-0	Thallium	mg/kg dw	5	5	ND	ND	0.54	0.86	--	0.6	--	NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	5	0	2.4	10.7	10.6	--	--	--	--	**NoTRV**
7440-66-6	Zinc	mg/kg dw	5	0	10.1	95.2	69.07	121	459	0.6	0.2	NO, HQ is 1 or less

Table 3.1-4
Tier 1 Risk Characterization for Sediments in Aquatic Habitats in Each EU

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		HQ		Carried Forward?
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	
Formation Creek Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	1	0	735	735	735	22500	--	0.03	--	NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	1	1	ND	ND	0.16	3		0.1		NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	1	1	ND	ND	0.07	9.8	33	0.01	0.002	NO, HQ is 1 or less
7440-39-3	Barium	mg/kg dw	1	1	65.4	65.4	65.4	20	60	**3**	1	**YES**
7440-41-7	Beryllium	mg/kg dw	1	0	0.097	0.097	0.1	--	--	--	--	**NoTRV**
7440-42-8	Boron	mg/kg dw	1	0	12	12	12	235.5	--	0.1	--	NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	1	0	5.6	5.6	5.6	1	4.98	**6**	1	**YES**
7440-47-3	Chromium	mg/kg dw	1	0	12.5	12.5	12.5	43	111	0.3	0.1	NO, HQ is 1 or less
7440-50-8	Copper	mg/kg dw	1	0	4.1	4.1	4.1	32	149	0.1	0.03	NO, HQ is 1 or less
7439-89-6	Iron	mg/kg dw	1	0	586	586	586	20000	40000	0.03	0.01	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	1	0	9.6	9.6	9.6	460	1800	0.02	0.005	NO, HQ is 1 or less
7439-97-6	Mercury	mg/kg dw	1	0	0.17	0.17	0.17	0.18	1.06	0.9	0.2	NO, HQ is 1 or less
7439-98-7	Molybdenum	mg/kg dw	1	0	0.17	0.17	0.17	3742	--	0.00005	--	NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	1	0	26.2	26.2	26.2	23	48.6	1	0.5	**YES**
7782-49-2	Selenium	mg/kg dw	1	0	5.9	5.9	5.9	2	4	**3**	1	**YES**
7440-22-4	Silver	mg/kg dw	1	0	0.34	0.34	0.34	1	2.2	0.3	0.2	NO, HQ is 1 or less
7440-28-0	Thallium	mg/kg dw	1	0	0.62	0.62	0.62	0.86	--	0.7	--	NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	1	0	7.8	7.8	7.8	--	--	--	--	**NoTRV**
7440-66-6	Zinc	mg/kg dw	1	0	252	252	252	121	459	**2**	0.5	**YES**
Downgradient Exposure Unit - Westside (JCS-1)												
7429-90-5	Aluminum	mg/kg dw	1	0	9120	9120	9120	22500	--	0.4	--	NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	1	0	0.64	0.64	0.64	3		0.2		NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	1	0	1.6	1.6	1.6	9.8	33	0.2	0.05	NO, HQ is 1 or less
7440-39-3	Barium	mg/kg dw	1	0	149	149	149	20	60	**7**	**2**	**YES**
7440-41-7	Beryllium	mg/kg dw	1	0	0.69	0.69	0.69	--	--	--	--	**NoTRV**
7440-42-8	Boron	mg/kg dw	1	0	5.8	5.8	5.8	235.5	--	0.02	--	NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	1	0	0.59	0.59	0.59	1	4.98	0.6	0.1	NO, HQ is 1 or less
7440-47-3	Chromium	mg/kg dw	1	0	12.4	12.4	12.4	43	111	0.3	0.1	NO, HQ is 1 or less
7440-50-8	Copper	mg/kg dw	1	0	13.6	13.6	13.6	32	149	0.4	0.1	NO, HQ is 1 or less
7439-89-6	Iron	mg/kg dw	1	0	11400	11400	11400	20000	40000	0.6	0.3	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	1	0	318	318	318	460	1800	0.7	0.2	NO, HQ is 1 or less
7439-97-6	Mercury	mg/kg dw	1	0	0.042	0.042	0.04	0.18	1.06	0.2	0.04	NO, HQ is 1 or less
7439-98-7	Molybdenum	mg/kg dw	1	0	0.87	0.87	0.87	3742	--	0.0002	--	NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	1	0	9.8	9.8	9.8	23	48.6	0.4	0.2	NO, HQ is 1 or less
7782-49-2	Selenium	mg/kg dw	1	0	0.93	0.93	0.93	2	4	0.5	0.2	NO, HQ is 1 or less
7440-22-4	Silver	mg/kg dw	1	1	ND	ND	0.1	1	2.2	0.1	0.04	NO, HQ is 1 or less
7440-28-0	Thallium	mg/kg dw	1	1	ND	ND	0.54	0.858	--	0.6	--	NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	1	0	15.9	15.9	15.9	--	--	--	--	**NoTRV**
7440-66-6	Zinc	mg/kg dw	1	0	50.7	50.7	50.7	121	459	0.4	0.1	NO, HQ is 1 or less

Table 3.1-4
Tier 1 Risk Characterization for Sediments in Aquatic Habitats in Each EU

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		HQ		Carried Forward?
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	
North Woodall Creek EU												
7429-90-5	Aluminum	mg/kg dw	3	0	16100	17200	17200	22500	--	0.8	--	NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	3	1	0.99	1.5	1.5	3		0.5		NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	3	0	3.4	4.5	4.5	9.8	33	0.5	0.1	NO, HQ is 1 or less
7440-39-3	Barium	mg/kg dw	3	0	161	214	214	20	60	**11**	**4**	**YES**
7440-41-7	Beryllium	mg/kg dw	3	0	0.92	1.1	1.1	--	--	--	--	**NoTRV**
7440-42-8	Boron	mg/kg dw	3	0	6.1	6.5	6.5	235.5	--	0.03	--	NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	3	1	0.091	1.3	1.3	1	4.98	1	0.3	NO, HQ is 1 or less
7440-47-3	Chromium	mg/kg dw	3	0	21.9	23.3	23.3	43	111	0.5	0.2	NO, HQ is 1 or less
7440-50-8	Copper	mg/kg dw	3	0	20.5	25.4	25.4	32	149	0.8	0.2	NO, HQ is 1 or less
7439-89-6	Iron	mg/kg dw	3	0	19000	23000	23000	20000	40000	1.2	0.6	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	3	0	1270	2260	2260	460	1800	4.9	1.3	**YES**
7439-97-6	Mercury	mg/kg dw	3	0	0.093	0.23	0.23	0.18	1.06	1.3	0.2	NO, HQ is 1 or less
7439-98-7	Molybdenum	mg/kg dw	3	0	1.2	2.5	2.5	3742	--	0.0001	--	NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	3	0	21.9	26.6	26.6	23	48.6	1.2	0.5	NO, HQ is 1 or less
7782-49-2	Selenium	mg/kg dw	3	0	0.26	0.6	0.6	2	4	0.3	0.2	NO, HQ is 1 or less
7440-22-4	Silver	mg/kg dw	3	3	ND	ND	0.095	1	2.2	0.1	0.04	NO, HQ is 1 or less
7440-28-0	Thallium	mg/kg dw	3	2	0.17	0.17	0.17	0.858	--	0.2	--	NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	3	0	25.8	29.8	29.8	--	--	--	--	**NoTRV**
7440-66-6	Zinc	mg/kg dw	3	0	98.4	109	109	121	459	0.9	0.2	NO, HQ is 1 or less

Notes:
EU - Exposure Unit
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
Bold = HQ > 1.0

Table 3.1-5
Tier 1 Risk Characterization for Sediments in Aquatic Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		HQ		Carried Forward?
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	
Pit Lake Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	2	0	7750	9050	9050	25500	--	0.4		NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	2	0	4.1	4.8	4.8		3		**2**	**YES**
7440-38-2	Arsenic	mg/kg dw	2	0	3.1	17.9	17.9	9.8	33	**2**	0.5	**YES**
7440-39-3	Barium	mg/kg dw	2	0	55.3	125	125	20	60	**6**	**2**	**YES**
7440-41-7	Beryllium	mg/kg dw	2	0	1.2	1.6	1.6	--	--			NoTRV
7440-42-8	Boron	mg/kg dw	2	0	23.9	29.6	29.6	235.5		0.1		NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	2	0	81.3	108	108	1	5.0	**108**	**22**	**YES**
7440-47-3	Chromium	mg/kg dw	2	0	329	581	581	43	111	**14**	**5**	**YES**
7440-50-8	Copper	mg/kg dw	2	0	80.7	146	146	32	149	**5**	1	**YES**
7439-96-5	Manganese	mg/kg dw	2	0	93.6	172	172	460	1100	0.4	0.2	NO, HQ is 1 or less
7439-97-6	Mercury	mg/kg dw	2	0	0.5	0.58	0.58	0.18	1.06	**3**	0.5	**YES**
7439-98-7	Molybdenum	mg/kg dw	2	0	14.8	17.8	17.8	3742		0.005		NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	2	0	146	157	157	23	48.6	**7**	**3**	**YES**
7782-49-2	Selenium	mg/kg dw	2	0	147	253	253	2	4	**127**	**63**	**YES**
7440-22-4	Silver	mg/kg dw	2	0	4.5	9.2	9.2	1	2.2	**9**	**4**	**YES**
7440-28-0	Thallium	mg/kg dw	2	0	0.71	2	2	0.86		**2**		**YES**
7440-62-2	Vanadium	mg/kg dw	2	0	557	942	942	--	--			NoTRV
7440-66-6	Zinc	mg/kg dw	2	0	790	973	973	121	459	**8**	**2**	**YES**
Tailings Pond Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	2	0	10700	13600	13600	25500	--	1		NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	2	0	0.05	0.14	0.14		3		0.05	NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	2	0	3.7	6.5	6.5	9.8	33	1	0.2	NO, HQ is 1 or less
7440-39-3	Barium	mg/kg dw	2	0	86.1	146	146	20	60	**7**	**2**	**YES**
7440-41-7	Beryllium	mg/kg dw	2	0	0.63	0.86	0.86	--	--			NoTRV
7440-42-8	Boron	mg/kg dw	2	0	3.6	11.3	11.3	235.5		0.05		NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	2	0	1.7	8.1	8.1	1	4.98	**8**	**2**	**YES**
7440-47-3	Chromium	mg/kg dw	2	0	20	21.7	21.7	43	111	1	0.2	NO, HQ is 1 or less
7440-50-8	Copper	mg/kg dw	2	0	10.4	13.9	13.9	32	149	0.4	0.1	NO, HQ is 1 or less
7439-96-5	Manganese	mg/kg dw	2	0	185	689	689	460	1100	1	0.6	NO, HQ is 1 or less
7439-97-6	Mercury	mg/kg dw	2	0	0.55	0.95	0.95	0.18	1.06	**5**	0.9	**YES**
7439-98-7	Molybdenum	mg/kg dw	2	0	0.17	2.3	2.3	3742		0.001		NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	2	0	19.4	31.4	31.4	23	48.6	1	1	No, HQ is 1 or less
7782-49-2	Selenium	mg/kg dw	2	0	0.4	1.4	1.4	2	4	1	0.4	NO, HQ is 1 or less
7440-22-4	Silver	mg/kg dw	2	0	ND	ND	0.05	1	2.2	0.1	0.02	NO, HQ is 1 or less
7440-28-0	Thallium	mg/kg dw	2	0	0.33	0.33	0.33	0.86		0.4		NO, HQ is 1 or less
7440-62-2	Vanadium	mg/kg dw	2	0	31.5	42.5	42.5	--	--			NoTRV
7440-66-6	Zinc	mg/kg dw	2	0	62.4	93.6	93.6	121	459	1	0.2	NO, HQ is 1 or less

Table 3.1-5
Tier 1 Risk Characterization for Sediments in Aquatic Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		HQ		Carried Forward?
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	
French Drain Exposure Unit												
7429-90-5	Aluminum	mg/kg dw	4	0	2820	27200	24330	25500	--	1		NO, HQ is 1 or less
7440-36-0	Antimony	mg/kg dw	4	0	0.32	1.6	1.63		3		0.5	NO, HQ is 1 or less
7440-38-2	Arsenic	mg/kg dw	4	0	9.7	29.5	26.89	9.8	33	**3**	0.8	**YES**
7440-39-3	Barium	mg/kg dw	4	0	70.2	1050	909.3	20	60	**45**	**15**	**YES**
7440-41-7	Beryllium	mg/kg dw	4	0	0.54	1.8	1.65	--	--			NoTRV
7440-42-8	Boron	mg/kg dw	4	0	4.9	16.6	16.04	235.5		0.1		NO, HQ is 1 or less
7440-43-9	Cadmium	mg/kg dw	4	0	2.2	65.1	74.9	1	4.98	**75**	**15**	**YES**
7440-47-3	Chromium	mg/kg dw	4	0	20.9	150	168.1	43	111	**4**	**2**	**YES**
7440-50-8	Copper	mg/kg dw	4	0	17.3	62.8	62.36	32	149	**2**	0.4	**YES**
7439-96-5	Manganese	mg/kg dw	4	0	68	1310	1288	460	1100	**3**	1.2	YES
7439-97-6	Mercury	mg/kg dw	4	0	0.14	0.44	0.45	0.18	1.06	**3**	0.4	**YES**
7439-98-7	Molybdenum	mg/kg dw	4	0	3.9	12.1	13.79	3742		0.004		NO, HQ is 1 or less
7440-02-0	Nickel	mg/kg dw	4	0	46.8	211	225.1	23	48.6	**10**	**5**	**YES**
7782-49-2	Selenium	mg/kg dw	4	0	22.4	624	599.9	2	4	**300**	**150**	**YES**
7440-22-4	Silver	mg/kg dw	4	0	0.18	1.4	1.37	1	2.2	1	0.6	NO, HQ is 1 or less
7440-28-0	Thallium	mg/kg dw	4	1	0.29	1.2	1.29	0.86		**2**		**YES**
7440-62-2	Vanadium	mg/kg dw	4	0	28.1	137	137.6	--	--			NoTRV
7440-66-6	Zinc	mg/kg dw	4	0	219	1220	1286	121	459	**11**	**2.8**	**YES**
Sediment Exposure Unit												
7440-38-2	Arsenic	mg/kg dw	1	0	11	11	11	9.8	33	1	0.3	NO, HQ is 1 or less
7440-41-7	Beryllium	mg/kg dw	0		NM	NM		--	--			NoTRV
7440-43-9	Cadmium	mg/kg dw	1	0	11	11	11	1	4.98	**11**	**2**	**YES**
7440-47-3	Chromium	mg/kg dw	1	0	154	154	154	43	111	**4**	1	**YES**
7782-49-2	Selenium	mg/kg dw	1	0	40.6	40.6	40.6	2	4	**20**	**10**	**YES**
7440-62-2	Vanadium	mg/kg dw	1	0	126	126	126	--	--		--	NoTRV
7440-66-6	Zinc	mg/kg dw	1	0	376	376	376	121	459	**3**	0.8	**YES**

Notes:
mg/kg dw - milligrams per kilogram dry weight
EU - Exposure Unit
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
Bold = HQ > 1.0

Table 3.1-6
Tier 1 Risk Characterization for
Fish Tissues in Three Perennial Drainages

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	Fish Tissue TRV	HQ
CASNo	Analyte	Units			Min	Max			
Camp G Creek (CGC-0)									
7429-90-5	Aluminum	mg/kg dw	8	0	37.3	273	223.5	33	**7**
7440-39-3	Barium	mg/kg dw	8	0	8.08	23.9	19.25	ND	--
7440-42-8	Boron	mg/kg dw	8	0	1.4	4	3.27	4	0.8
7440-50-8	Copper	mg/kg dw	8	0	3.97	6.29	5.23	6.7	0.8
7440-48-4	Cobalt	mg/kg dw	8	0	0.07	0.22	0.16	0.25	0.6
7439-89-6	Iron	mg/kg dw	8	0	85	297	254.4	34.6	**7**
7439-96-5	Manganese	mg/kg dw	8	0	20.8	99.3	71.5	ND	--
7440-02-0	Nickel	mg/kg dw	8	0	0.94	1.46	1.34	1.54	0.9
7782-49-2	Selenium	mg/kg dw	8	0	4.36	10.4	8.62	8.5 - 17	1 - 0.5
7440-62-2	Vanadium	mg/kg dw	8	1	0.21	0.74	0.64	2.62	0.2
7440-66-6	Zinc	mg/kg dw	8	0	139	217	197.6	130.8	**2**
Pedro Creek (PC-1)									
7429-90-5	Aluminum	mg/kg dw	6	0	28.8	437	379.2	33	**11**
7440-39-3	Barium	mg/kg dw	6	0	10.4	24.2	21.3	ND	--
7440-42-8	Boron	mg/kg dw	6	0	1	3.8	3.3	4	0.8
7440-50-8	Copper	mg/kg dw	6	0	4.16	9.47	8.16	6.7	1
7440-48-4	Cobalt	mg/kg dw	6	0	0.07	0.15	0.15	0.25	0.6
7439-89-6	Iron	mg/kg dw	6	0	65	300	264.3	34.6	**8**
7439-96-5	Manganese	mg/kg dw	6	0	8.9	20.3	19.14	ND	--
7440-02-0	Nickel	mg/kg dw	6	0	0.29	0.82	0.749	1.5	0.5
7782-49-2	Selenium	mg/kg dw	6	0	20.3	36.4	32.9	8.5 - 17	**4 - 2**
7440-62-2	Vanadium	mg/kg dw	6	0	0.23	0.97	0.85	2.62	0.3
7440-66-6	Zinc	mg/kg dw	6	0	129	198	194.7	130.8	**2**
State Land Creek (SLC-0, SLC-1, SLC-2)									
7429-90-5	Aluminum	mg/kg dw	15	0	19.4	503	239.2	33	**7**
7440-39-3	Barium	mg/kg dw	15	0	7.5	33.6	18.5	ND	--
7440-42-8	Boron	mg/kg dw	15	0	0.9	13	4.5	4	1
7440-50-8	Copper	mg/kg dw	15	0	2.89	8.15	5.56	6.7	1
7440-48-4	Cobalt	mg/kg dw	15	0	0.05	0.26	0.15	0.25	0.6
7439-89-6	Iron	mg/kg dw	15	0	56	391	204.8	34.6	**6**
7439-96-5	Manganese	mg/kg dw	15	0	9.3	59.8	29.27	ND	--
7440-02-0	Nickel	mg/kg dw	15	0	0.38	1.21	0.86	1.54	0.6
7782-49-2	Selenium	mg/kg dw	15	0	11.8	33.5	21.05	8.5 - 17	**3 - 1**
7440-62-2	Vanadium	mg/kg dw	15	0	0.15	1.19	0.62	2.62	0.2
7440-66-6	Zinc	mg/kg dw	15	0	127	378	233.9	130.8	**2**

Notes:
mg/kg dw - milligrams per kilogram dry weight
ND - non-detect
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
Bold = HQ > 1.0

Table 3.1-7
Tier 1 Amphibian HQs by Site for Selenium
in Fish Tissues and Salamander Tissues

Drainage	Location	Tissue Type	EPC Type (number of samples)	Tissue EPC (mg/kg dw)	NOEC TRV (mg/kg dw)	LOEC TRV (mg/kg dw)	NOEC HQ	LOEC HQ
Camp G Creek								
Camp G Creek	CGC-0	Speckled dace	95UCL (n=6)	9.57	20	24.8	0.5	0.4
Camp G Creek	CGC-0	Redside shiners	Max (n=2)	6.18	20	24.8	0.3	0.2
Camp G Creek	CGC-0	Speckled dace and redside shiner	95UCL (n= 8)	8.62	20	24.8	0.4	0.3
Pedro Creek Creek								
Pedro Creek	PC-1	Speckled dace	95UCL (n=6)	32.9	20	24.8	**2**	1
State Land Creek								
State Land Creek	SLC-0	Speckled dace	Max (n=1)	19.8	20	24.8	1	0.8
State Land Creek	SLC-0	Redside shiner	Max (n=2)	19.3	20	24.8	1	0.8
State Land Creek	SLC-1	Speckled dace	95UCL (n=7)	18.8	20	24.8	0.9	0.8
State Land Creek	SLC-1	Redside shiner	Max (n=3)	18.1	20	24.8	0.9	0.7
State Land Creek	SLC-1	Speckled dace and redside shiner	95UCL (n=10)	17.9	20	24.8	0.9	0.7
State Land Creek	SLC-2	Speckled dace	Max (n=2)	33.5	20	24.8	**2**	1
State Land Creek	All	Speckled dace and redside shiner	95UCL (n=15)	21.1	20	24.8	1	0.8
Hoorah Hollow								
Hoorah Hollow	HHP-1	Salamander	Max (n=1)	6.18	20	24.8	0.3	0.2

Notes:
Fish tissue data are used here as a similarly sensitive surrogate for amphibian tissue due to lack of amphibian data and similar feeding habits.
Amphibian TRVs used are discussed in Section 3.2.1.3.
mg/kg dw - milligrams per kilogram dry weight
HQ - Hazard Quotient
TRV - Toxicity Reference Value
LOEC - Lowest Observed Effect Concentration
NOEC - No Observed Effect Concentration
EPC - Exposure Point Concentration
95UCL - 95% Upper Confidence Level
N - number of samples
Bold = HQ > 1.0

Table 3.1-8
Tier 1 Benthic Tissue HQs by Site for Selenium
in Each Drainage Exceeding the Tier 2 Screening TRV

Drainage	Location	Benthic Invertebrate Tissue EPC (mg/kg dw)	TRV_{NOEC} (mg/kg dw)	TRV_{LOEC} (mg/kg dw)	HQ_{NOEC}	HQ_{LOEC}
Camp G Creek	CGC-0	5.38	24.2	26.9	0.2	0.2
Camp G Creek	CGC-1	1.42	24.2	26.9	0.1	0.1
Camp G Creek	CGC-4A	65.2	24.2	26.9	**3**	**2**
Pedro Creek	PC-1	36.1	24.2	26.9	**2**	**1**
Pedro Creek	PC-2	11.4	24.2	26.9	0.5	0.4
State Land Creek	SLC-0	11	24.2	26.9	0.5	0.4
State Land Creek	SLC-1	7.98	24.2	26.9	0.3	0.3
State Land Creek	SLC-2	13.8	24.2	26.9	0.6	0.5
Hoorah Hollow	HHP-1	17.1	24.2	26.9	1	1
North Woodall Creek	NWC-2	1.65	24.2	26.9	0.1	0.1
French Drain	SWP-4	428	24.2	26.9	**18**	**16**
Tailings Pond	TP-1	4.44	24.2	26.9	0.2	0.2
Pit Lake	NL4P-1	102	24.2	26.9	**4**	**4**

Notes:
EPC = Exposure Point Cocentration, HQ = Hazard Quotient, mg/kg dw = miligrams per kilogram dry weight,
TRV = Toxicity Reference Value

Bold = HQ > 1.0
Benthic Invertebrate EPCs are the measured concentrations observed from locations in 2009 sampling efforts.
TRV_{NOEC} = No Observed Effect Concentration
TRV_{LOEC} = Lowest Observed Effect Concentration

Table 3.3-1
Tier 2 Risk Characterization for Surface Waters in Aquatic Habitats and Mine Features

ECOPC			Habitat Type	Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV[1,2]	TRV[1,2]	HQ	HQ	Incremental Risk Quotient	
CASNo	Analyte	Units				Min	Max		Chronic	Acute	Chronic	Acute	Background Concentration	IRQ
Camp G Creek Exposure Unit														
7429-90-5	Aluminum, Total[3]	mg/L	Streams	9	2	0.067	2.39	0.948	3.7	9.27	0.3	0.1	5.08	-1.11
7429-90-5	Aluminum, Total[3]	mg/L	Wetlands	6	1	0.046	5.4	2.96	3.7	9.27	0.8	0.3	5.08	-0.57
7439-89-6	Iron, Total	mg/L	Streams	9	2	0.14	2.63	2.27	1	--	**2**	--	2.546	-0.28
7439-89-6	Iron, Total	mg/L	Wetlands	6	1	0.038	4.56	2.46	1	--	**2**	--	2.546	-0.08
7782-49-2	Selenium, Total	mg/L	Streams	41	9	0.0003	0.026	0.0094	0.005	0.02	**2**	0.5	0.00068	1.75
7782-49-2	Selenium, Total	mg/L	Wetlands	20	1	0.00028	0.044	0.02	0.005	0.02	**4**	1	0.00068	3.92
Pedro Creek Exposure Unit														
7429-90-5	Aluminum, Total[3]	mg/L	Streams	8	0	0.089	1.65	0.86	4	10.07	0.2	0.1	5.08	-1.05
7429-90-5	Aluminum, Total[3]	mg/L	Ponds	4	0	0.133	2.59	2.45	4	10.07	0.6	0.2	5.08	-0.65
7429-90-5	Aluminum, Total[3]	mg/L	Wetlands	6	5	0.046	0.046	0.05	4	10.07	**0.01**	0.005	5.08	-1.25
7782-49-2	Selenium, Total	mg/L	Streams	37	1	0.001	0.37	0.09	0.005	0.02	**19**	4.7	0.00068	18.62
7782-49-2	Selenium, Total	mg/L	Wetlands	33	0	0.0076	4.08	2.12	0.005	0.02	**425**	106.2	0.00068	424.66
7782-49-2	Selenium, Total	mg/L	Ponds	20	0	0.0066	0.28	0.14	0.005	0.02	**27**	7	0.00068	27.06
State Land Creek Exposure Unit														
7429-90-5	Aluminum, Total[3]	mg/L	Streams	17	1	0.015	2.55	1.12	2.4	5.91	0.5	0.2	5.08	-1.67
7429-90-5	Aluminum, Total[3]	mg/L	Ponds	1	0	1.67	1.67	1.67	2.4	5.91	0.7	0.3	5.08	-1.44
7429-90-5	Aluminum, Total[3]	mg/L	Wetlands	7	1	0.124	1.05	0.77	2.4	5.91	0.3	0.1	5.08	-1.82
7782-49-2	Selenium, Total	mg/L	Streams	64	6	0.00023	0.39	0.091	0.005	0.02	**18**	**5**	0.00068	18.12
7782-49-2	Selenium, Total	mg/L	Ponds	2	0	0.0011	0.0012	0.0012	0.005	0.02	0.2	0.1	0.00068	0.10
7782-49-2	Selenium, Total	mg/L	Wetlands	69	15	0.00031	0.98	0.16	0.005	0.02	**33**	**8**	0.00068	32.46
Trail Canyon Creek Exposure Unit														
7429-90-5	Aluminum, Total[3]	mg/L	Ponds	3	0	0.20	7.92	7.92	1.6	3.95	**5**	**2**	5.08	1.80
7439-89-6	Iron, Total	mg/L	Ponds	3	0	0.17	5.68	5.68	1.0	--	**6**	--	2.546	3.13
West Side Ponds Exposure Unit														
7429-90-5	Aluminum, Total[3]	mg/L	Ponds	11	1	0.026	1.97	0.70	4.0	10.07	0.2	0.1	5.08	-1.09
7429-90-5	Aluminum, Total[3]	mg/L	Wetlands	6	0	0.12	3.79	5.45	4.0	10.07	1	0.5	5.08	0.09
7782-49-2	Selenium, Total	mg/L	Wetlands	15	2	0.00024	0.0179	0.012	0.005	0.02	**2**	0.6	0.00068	2.16
7782-49-2	Selenium, Total	mg/L	Ponds	25	1	0.00033	0.0083	0.048	0.005	0.02	**10**	**2**	0.00068	9.50
Woodall Springs Exposure Unit														
7429-90-5	Aluminum, Total[3]	mg/L	Wetlands	11	8	0.026	0.42	0.13	4.0	10.07	0.03	0.01	5.08	-1.23
Formation Creek Exposure Unit														
All HQs < 1, no Tier 2 Screening Required														
Jouglard Canyon Creek (JCS1)														
7429-90-5	Aluminum, Total[3]	mg/L	Wetlands	3.00	0.00	0.08	4.62	4.62	2.8	6.90	**2**	0.7	5.08	-0.17
7439-89-6	Iron, Total	mg/L	Wetlands	3	0	0.064	4.12	4.12	1.0	--	**4**	--	2.546	1.57
Northwest Reference Area Exposure Unit														
7429-90-5	Aluminum, Total[3]	mg/L	Streams	1	0	0.14	0.14	0.14	2.5	6.29	0.1	0.0	5.08	-1.96
7429-90-5	Aluminum, Total[3]	mg/L	Wetlands	4	0	0.015	0.42	0.41	2.5	6.29	0.2	0.1	5.08	-1.85
Jouglard Spring (JS1)														
7429-90-5	Aluminum, Total[4]	mg/L	Wetlands	4	2	0.0028	1.83	1.54	4.0	10.07	0.4	0.2	5.08	-0.88
7439-89-6	Iron, Total	mg/L	Wetlands	4	1	0.0247	1.76	1.48	1.0	--	**1.5**	--	2.546	-1.07
Pit Lake Mine Feature														
7429-90-5	Aluminum, Total[3]	mg/L	Ponds	6	1	0.030	0.58	0.39	2.7	6.74	0.1	0.1	5.08	-1.74
7440-43-9	Cadmium, Dissolved	mg/L	Ponds	8	3	0.00018	0.0062	0.0028	0.00035	0.0019	**8**	1	0.00008	7.82

Table 3.3-1
Tier 2 Risk Characterization for Surface Waters in Aquatic Habitats and Mine Features

ECOPC			Habitat Type	Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV[1,2]	TRV[1,2]	HQ	HQ	Incremental Risk Quotient	
CASNo	Analyte	Units				Min	Max		Chronic	Acute	Chronic	Acute	Background Concentration	IRQ
7782-49-2	Selenium, Total	mg/L	Ponds	18	0	0.039	0.41	0.25	0.005	0.02	**50**	**12**	0.00068	49.46
7440-62-2	Vanadium, Total	mg/L	Ponds	6	0	0.042	0.11	0.087	0.027	0.079	**3**	1	0.00325	3.10
Tailings Ponds Mine Feature														
7429-90-5	Aluminum, Total[3]	mg/L	Ponds	6	1	0.057	1.21	0.68	4.0	10.07	0.2	0.1	5.08	-1.09
French Drain Mine Feature														
7429-90-5	Aluminum, Total[3]	mg/L	Ponds	12	4	0.020	0.902	0.58	4.0	10.07	0.1	0.1	5.08	-1.11
7440-43-9	Cadmium, Dissolved	mg/L	Ponds	22	14	0.00002	0.0046	0.0013	0.00064	0.0038	**2**	0.3	0.00008	1.90
7782-49-2	Selenium, Total	mg/L	Ponds	34	0	0.009	0.87	0.331	0.005	0.02	**66**	**17**	0.00068	66.06
Sedimentation Basins Mine Feature														
7429-90-5	Aluminum, Total[3]	mg/L	Ponds	5	0	0.27	4.37	3.68	1.4	3.42	**3**	1	5.08	-1.02
7440-43-9	Cadmium, Dissolved	mg/L	Ponds	5	1	0.00019	0.0014	0.0012	0.00025	0.0013	**5**	0.9	0.00008	4.40
7439-89-6	Iron, Total	mg/L	Ponds	5	0	0.28	3.8	3.16	1	--	**3**		2.546	0.62
7782-49-2	Selenium, Total	mg/L	Ponds	14	0	0.029	0.67	0.64	0.005	0.02	**127**	**32**	0.00068	126.86
NE Seep Pond Mine Feature														
7429-90-5	Aluminum, Total[3]	mg/L	Ponds	4	3	0.0014	0.018	0.021	4.0	10.07	0.01	0.002	5.08	-1.25
7440-43-9	Cadmium, Dissolved	mg/L	Ponds	4	0	0.0014	0.018	0.021	0.00064	0.0038	**32**	**5**	0.00008	32.22
7440-02-0	Nickel, Dissolved	mg/L	Ponds	4	0	0.39	0.58	0.58	0.17	1.51	**3**	0.4	0.00167	3.44
7782-49-2	Selenium, Total	mg/L	Ponds	7	0	2.72	8.55	7.37	0.005	0.02	**1474**	**369**	0.00068	1474.26
7440-66-6	Zinc, Dissolved	mg/L	Ponds	4	0	0.64	1.65	1.70	0.38	0.38	**4**	**4**	0.0177	4.41

Notes:

EU - Exposure Unit

HQ - Hazard Quotient

ECOPC - Ecological Chemical of Potential Concern

IRQ - Incremental Risk Quotient

[1]Hardness (mg/L as CaCO3): Camp G Creek = 207; Pedro Creek = 433; State Land Creek = 149; Trail Canyon Creek = 111; West Side Ponds = 247; Woodall Springs = 555; Formation Creek = 521; Northwest Reference Area = 156; Jouglard Canyon Creek = 270; Tailings Pond = 440; French Drain = 479; Pit Lake = 164; NE Seep Pond = 975, and sedimentation basin = 100.

[2] Hardness values used are the 95 % lower confidence limit value of the mean. Where hardness exceeded 400 mg/L, then a value of 400 mg/L was used in hardness-based criteria calculations.

[3]Applicable range of the hardness values used for this aluminum criteria range from 26 to 220 mg/L.

Bold = HQ > 1.0

Table 3.3-2
Tier 2 Risk Characterization for Sediments in Aquatic Habitats and Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		Hazard Quotient		Incremental Risk Quotient		
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	Background Concentration	IRQ_{Low}	IRQ_{High}
Camp G Creek Exposure Unit - Streams														
7440-39-3	Barium	mg/kg dw	4	0	134	209	207.8	20	60	**10**	**3**	181	1.3	0.4
7440-41-7	Beryllium	mg/kg dw	4	0	0.5	0.66	0.64	0.841	--	0.8	--			
7440-43-9	Cadmium	mg/kg dw	4	0	1.3	1.8	1.93	1	4.98	**2**	0.4	2.63	-0.7	-0.1
7439-96-5	Manganese	mg/kg dw	4	0	1220	2020	2142	460	1800	**5**	1	1258	1.9	0.5
7782-49-2	Selenium	mg/kg dw	4	0	0.76	1.5	1.45	2	4	0.7	0.4	1.818	-0.2	-0.1
7440-62-2	Vanadium	mg/kg dw	4	0	14.4	19.2	19.26	30.8	--	0.6	--			
Camp G Creek Exposure Unit - Wetlands														
7440-39-4	Barium	mg/kg dw	7	0	108	238	189.1	20	60	**9**	**3**	181	0.4	0.1
7440-41-8	Beryllium	mg/kg dw	7	0	0.6	0.94	0.85	0.841	--	1.0	--			
7440-43-9	Cadmium	mg/kg dw	7	0	0.93	3.3	2.73	1	4.98	**3**	0.5	2.63	0.1	0.02
7439-96-5	Manganese	mg/kg dw	7	0	538	1470	1333	460	1800	**3**	0.7	1258	0.2	0.04
7782-49-2	Selenium	mg/kg dw	7	0	0.33	7.9	6.32	2	4	**3**	**2**	1.818	2.3	1.1
7440-62-2	Vanadium	mg/kg dw	7	0	23.2	27.9	26.9	30.8	--	0.9	--			
Pedro Creek Exposure Unit - Streams														
7440-38-2	Arsenic	mg/kg dw	10	0	2.6	19.7	13.07	9.8	33	1	0.4	3.815	0.9	0.3
7440-39-3	Barium	mg/kg dw	9	0	61.3	233	194.7	20	60	**10**	**3**	181	0.7	0.2
7440-41-7	Beryllium	mg/kg dw	9	0	0.76	≤ 1	1.03	0.841	--	1	--			
7440-43-9	Cadmium	mg/kg dw	10	0	0.8	17.7	12.67	1	4.98	**13**	**3**	2.63	10.0	2.0
7440-47-3	Chromium	mg/kg dw	10	0	25.4	300	191.6	43	111	**4**	**2**	24.13	3.9	1.5
7440-50-8	Copper	mg/kg dw	9	0	15.2	86.7	58.85	32	149	**2**	0.4	21.18	1.2	0.3
7439-96-5	Manganese	mg/kg dw	9	0	110	1690	1035	460	1800	**2**	0.6	1258	-0.5	-0.1
7439-97-6	Mercury	mg/kg dw	9	0	0.08	0.66	0.41	0.18	1.06	**2**	0.4	0.156	1.4	0.2
7440-02-0	Nickel	mg/kg dw	9	0	22.2	202	135.8	23	48.6	**6**	**3**	25.64	4.8	2.3
7782-49-2	Selenium	mg/kg dw	10	0	1.2	207	108.5	2	4	**54**	**27**	1.818	53.3	26.7
7440-22-4	Silver	mg/kg dw	9	4	0.3	3.1	1.69	1	2.2	**2**	0.8	0.149	1.5	0.7
7440-62-2	Vanadium	mg/kg dw	10	0	21	176	132.3	30.8	--	**4**	--			
7440-66-6	Zinc	mg/kg dw	10	0	90.9	824	534.5	120	459	**4**	1	129.4	3.4	0.9

Table 3.3-2
Tier 2 Risk Characterization for Sediments in Aquatic Habitats and Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		Hazard Quotient		Incremental Risk Quotient		
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	Background Concentration	IRQ_{Low}	IRQ_{High}
Pedro Creek Exposure Unit - Wetlands														
7440-38-2	Arsenic	mg/kg dw	2	0	12.7	15	15	9.8	33	**2**	0.5	3.815	1.1	0.3
7440-39-3	Barium	mg/kg dw	1	0	72.4	72.4	72.4	20	60	**4**	1	181	-5.4	-1.8
7440-41-7	Beryllium	mg/kg dw	1	0	0.87	0.87	0.87	0.841	--	1	--			
7440-43-9	Cadmium	mg/kg dw	2	0	19.6	29	29	1	4.98	**29**	**6**	2.63	26.4	5.3
7440-47-3	Chromium	mg/kg dw	2	0	301	356	356	43	111	**8**	**3**	24.13	7.7	3.0
7440-50-8	Copper	mg/kg dw	1	0	65.8	65.8	65.8	32	149	**2**	0.4	21.18	1.4	0.3
7439-96-5	Manganese	mg/kg dw	1	0	166	166	166	460	1800	0.4	0.1	1258	-2.4	-0.6
7439-97-6	Mercury	mg/kg dw	1	0	0.36	0.36	0.36	0.18	1.06	**2**	0.3	0.156	1.1	0.2
7440-02-0	Nickel	mg/kg dw	1	0	150	150	150	23	48.6	**7**	**3**	25.64	5.4	2.6
7782-49-2	Selenium	mg/kg dw	2	0	227	1430	1430	2	4	**715**	**358**	1.82	714.1	357.0
7440-22-4	Silver	mg/kg dw	1	0	1.6	1.6	1.6	1	2.2	**2**	0.7	0.149	1.5	0.7
7440-62-2	Vanadium	mg/kg dw	2	0	179	179	179	30.8	--	**6**	--			
7440-66-6	Zinc	mg/kg dw	2	0	573	619	619	120	459	**5**	1	129.4	4.1	1.1
Pedro Creek Exposure Unit - Ponds														
7440-38-2	Arsenic	mg/kg dw	2	0	4	4.5	4.5	9.8	33	0.5	0.1	3.815	0.1	0.02
7440-39-3	Barium	mg/kg dw	1	0	177	177	177	20	60	**9**	**3**	181	-0.2	-0.1
7440-41-7	Beryllium	mg/kg dw	1	0	0.87	0.87	0.87	0.841	--	1	--			
7440-43-9	Cadmium	mg/kg dw	2	0	0.65	0.86	0.86	1	4.98	0.9	0.2	2.63	-1.8	-0.4
7440-47-3	Chromium	mg/kg dw	2	0	19.8	26	26	43	111	0.6	0.2	24.13	0.04	0.02
7440-50-8	Copper	mg/kg dw	1	0	21.3	21.3	21.3	32	149	0.7	0.1	21.18	0.004	0.001
7439-96-5	Manganese	mg/kg dw	1	0	1700	1700	1700	460	1800	**4**	0.9	1258	1.0	0.2
7439-97-6	Mercury	mg/kg dw	1	0	0.04	0.04	0.04	0.18	1.06	0.2	0.04	0.156	-0.6	-0.1
7440-02-0	Nickel	mg/kg dw	1	0	20.6	20.6	20.6	23	48.6	0.9	0.4	25.64	-0.2	-0.1
7782-49-2	Selenium	mg/kg dw	2	0	2.4	4.9	4.9	2	4	**2**	**1**	1.82	1.5	0.8
7440-22-4	Silver	mg/kg dw	1	0	0.099	0.099	0.099	1	2.2	0.1	0.05	0.149	-0.1	-0.02
7440-62-2	Vanadium	mg/kg dw	2	0	23.4	32.2	32.2	30.8	--	1	--			
7440-66-6	Zinc	mg/kg dw	2	0	79.9	81	81	120	459	0.7	0.2	129.4	-0.4	-0.1

Table 3.3-2
Tier 2 Risk Characterization for Sediments in Aquatic Habitats and Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		Hazard Quotient		Incremental Risk Quotient		
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	Background Concentration	IRQ_{Low}	IRQ_{High}
State Land Creek Exposure Unit - Streams														
7440-39-3	Barium	mg/kg dw	14	0	82.5	242	191	20	60	**10**	**3**	181	0.5	0.2
7440-41-7	Beryllium	mg/kg dw	14	0	0.84	1.3	1.03	0.841	--	1	--			
7440-43-9	Cadmium	mg/kg dw	14	0	1.7	20.8	10.36	1	4.98	**10**	**2**	2.63	7.7	1.6
7440-47-3	Chromium	mg/kg dw	14	0	24.4	286	143.9	43	111	**3**	1	24.13	2.8	1.1
7440-02-0	Nickel	mg/kg dw	14	0	17.4	153	85.94	23	48.6	**4**	**2**	25.64	2.6	1.2
7782-49-2	Selenium	mg/kg dw	14	0	0.52	31	16.87	2	4	**8**	**4**	1.82	7.5	3.8
7440-62-2	Vanadium	mg/kg dw	14	0	22.4	151	92.46	30.8	--	**3**	--			
7440-66-6	Zinc	mg/kg dw	14	0	105	599	348.4	120	459	**3**	0.8	129.4	1.8	0.5
State Land Creek Exposure Unit - Wetlands														
7440-39-3	Barium	mg/kg dw	6	0	104	250	195.7	20	60	**10**	**3**	181	0.7	0.2
7440-41-7	Beryllium	mg/kg dw	6	0	0.76	1.4	1.23	0.841	--	1	--			
7440-43-9	Cadmium	mg/kg dw	6	0	0.49	11.6	8.55	1	4.98	**9**	**2**	2.63	5.9	1.2
7440-47-3	Chromium	mg/kg dw	6	0	17.2	102	74.21	43	111	**2**	0.7	24.13	1.2	0.5
7440-02-0	Nickel	mg/kg dw	6	0	11.4	86.6	65.08	23	48.6	**3**	1	25.6	1.7	0.8
7782-49-2	Selenium	mg/kg dw	6	0	0.32	13.7	8.86	2	4	**4**	**2**	1.82	3.5	1.8
7440-62-2	Vanadium	mg/kg dw	6	0	22.8	48	45.1	30.8	--	1	--			
7440-66-6	Zinc	mg/kg dw	6	0	69.5	283	229.6	120	459	**2**	0.5	129.4	0.8	0.2
Trail Canyon Creek Exposure Unit - Pond														
7440-39-3	Barium	mg/kg dw	1	0	152	152	152	20	60	**8**	**3**	181	-1.5	-0.5
7440-41-7	Beryllium	mg/kg dw	1	0	0.86	0.86	0.86	0.841	--	1	--			
7440-43-9	Cadmium	mg/kg dw	1	0	0.85	8.5	0.85	1	4.98	0.9	0.2	2.63	-1.8	-0.4
7439-96-5	Manganese	mg/kg dw	1	0	751	751	751	460	1800	**2**	0.4	1258	-1.1	-0.3
7440-62-2	Vanadium	mg/kg dw	1	0	23.6	23.6	23.6	30.8	--	0.8	--			
7440-66-6	Zinc	mg/kg dw	1	0	62.8	62.8	62.8	120	459	0.5	0.1	129.4	-0.6	-0.1
Trail Canyon Creek Exposure Unit - Streams														
7440-39-3	Barium	mg/kg dw	3	0	96.8	184	184	20	60	**9**	**3**	181	0.1	0.1
7440-41-7	Beryllium	mg/kg dw	3	0	0.59	0.78	0.78	0.841	--	0.9	--			
7440-43-9	Cadmium	mg/kg dw	3	0	2.4	7.8	7.8	1	4.98	**8**	**2**	2.63	5.2	1.0
7439-96-5	Manganese	mg/kg dw	3	0	465	684	684	460	1800	1	0.4	1258	-1.2	-0.3
7440-62-2	Vanadium	mg/kg dw	3	0	28.7	46	46	30.8	--	**2**	--			
7440-66-6	Zinc	mg/kg dw	3	0	80.2	187	187	120	459	**2**	0.4	129.4	0.5	0.1

Table 3.3-2
Tier 2 Risk Characterization for Sediments in Aquatic Habitats and Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		Hazard Quotient		Incremental Risk Quotient		
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	Background Concentration	IRQ_{Low}	IRQ_{High}
West Side Ponds Exposure Unit - Wetlands														
7440-38-2	Arsenic	mg/kg dw	4	0	2	29.7	25.39	9.8	33	**3**	0.8	3.815	2.2	0.7
7440-39-3	Barium	mg/kg dw	4	0	130	181	188.7	20	60	**9**	**3**	181	0.4	0.1
7440-41-7	Beryllium	mg/kg dw	4	0	0.73	1	1.055	0.841	--	1	--			
7440-43-9	Cadmium	mg/kg dw	4	0	2.8	14.9	13.66	1	4.98	**14**	**3**	2.63	11.0	2.2
7440-47-3	Chromium	mg/kg dw	4	0	28.3	278	239	43	111	**6**	**2**	24.13	5.0	1.9
7440-50-8	Copper	mg/kg dw	4	0	18.1	121	106.3	32	149	**3**	0.7	21.18	2.7	0.6
7439-96-5	Manganese	mg/kg dw	4	0	314	945	963.3	460	1800	**2**	0.5	1258	-0.6	-0.2
7439-97-6	Mercury	mg/kg dw	4	0	0.11	0.9	0.782	0.18	1.06	**4**	0.7	0.156	3.5	0.6
7440-02-0	Nickel	mg/kg dw	4	0	22.5	253	217.3	23	48.6	**9**	**4**	25.64	8.3	3.9
7782-49-2	Selenium	mg/kg dw	4	0	0.32	47.1	40.19	2	4	**20**	**10**	1.82	19.2	9.6
7440-22-4	Silver	mg/kg dw	4	0	0.12	3.5	3.003	1	2.2	**3**	1	0.149	2.9	1.3
7440-62-2	Vanadium	mg/kg dw	4	0	25.5	177	155.7	30.8	--	**5**	--			
7440-66-6	Zinc	mg/kg dw	4	0	112	890	778.3	120	459	**6**	**2**	129.4	5.4	1.4
West Side Ponds Exposure Unit - Ponds														
7440-38-2	Arsenic	mg/kg dw	2	0	2	2.5	2.5	9.8	33	0.3	0.1	3.815	-0.1	-0.04
7440-39-3	Barium	mg/kg dw	2	0	140	145	145	20	60	**7**	**2**	181	-1.8	-0.6
7440-41-7	Beryllium	mg/kg dw	2	0	0.51	0.63	0.63	0.841	--	0.7	--			
7440-43-9	Cadmium	mg/kg dw	2	0	3.5	3.7	3.7	1	4.98	**4**	0.7	2.63	1.1	0.2
7440-47-3	Chromium	mg/kg dw	2	0	29.2	29.2	29.2	43	111	0.7	0.3	24.13	0.1	0.05
7440-50-8	Copper	mg/kg dw	2	0	18.4	18.5	18.5	32	149	0.6	0.1	21.18	-0.1	-0.02
7439-96-5	Manganese	mg/kg dw	2	0	144	243	243	460	1800	0.5	0.1	1258	-2.2	-0.6
7439-97-6	Mercury	mg/kg dw	2	0	0.082	0.11	0.11	0.18	1.06	0.6	0.1	0.156	-0.3	-0.04
7440-02-0	Nickel	mg/kg dw	2	0	22	22.4	22.4	23	48.6	1	0.5	25.64	-0.1	-0.1
7782-49-2	Selenium	mg/kg dw	2	0	1.7	2.4	2.4	2	4	1	0.6	1.82	0.3	0.1
7440-22-4	Silver	mg/kg dw	2	2	ND	ND	0.88	1	2.2	0.9	0.4	0.149	0.7	0.3
7440-62-2	Vanadium	mg/kg dw	2	0	35.4	35.4	35.4	30.8	--	1	--			
7440-66-6	Zinc	mg/kg dw	2	0	124	135	135	120	459	1	0.3	129.4	0.05	0.01
Woodall Springs Exposure Unit - Wetland														
7440-39-3	Barium	mg/kg dw	5	0	71.4	124	109.7	20	60	**5**	**2**	181	-3.6	-1.2
7440-41-7	Beryllium	mg/kg dw	5	1	0.15	0.94	0.88	0.841	--	1	--			
7782-49-2	Selenium	mg/kg dw	5	0	0.21	5.1	4.77	2	4	**2**	1	1.82	1.5	0.7
7440-62-2	Vanadium	mg/kg dw	5	0	2.4	10.7	10.56	30.8	--	0.3	--			

Table 3.3-2
Tier 2 Risk Characterization for Sediments in Aquatic Habitats and Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		Hazard Quotient		Incremental Risk Quotient		
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	Background Concentration	IRQ_{Low}	IRQ_{High}
Formation Creek Exposure Unit														
7440-39-3	Barium	mg/kg dw	1	1	65.4	65.4	65.4	20	60	**3**	1	181	-5.8	-1.9
7440-41-7	Beryllium	mg/kg dw	1	0	0.097	0.097	0.097	0.841	--	0.1	--			
7440-43-9	Cadmium	mg/kg dw	1	0	5.6	5.6	5.6	1	4.98	**6**	1	2.63	3.0	0.6
7440-02-0	Nickel	mg/kg dw	1	0	26.2	26.2	26.2	23	48.6	1	0.5	25.64	0.02	0.01
7782-49-2	Selenium	mg/kg dw	1	0	5.9	5.9	5.9	2	4	**3**	1	1.82	2.0	1.0
7440-62-2	Vanadium	mg/kg dw	1	0	7.8	7.8	7.8	30.8	--	0.3	--			
7440-66-6	Zinc	mg/kg dw	1	0	252	252	252	120	459	**2**	0.5	129.4	1.0	0.3
Downgradient Exposure Unit - Westside (JCS-1)														
7440-39-3	Barium	mg/kg dw	1	0	149	149	149	20	60	**7**	**2**	181	-1.6	-0.5
7440-41-7	Beryllium	mg/kg dw	1	0	0.69	0.69	0.69	0.841	--	0.8	--			
7440-62-2	Vanadium	mg/kg dw	1	0	15.9	15.9	15.9	30.8	--	0.5	--			
North Woodall Creek EU (Northwest Reference) - Streams														
7440-39-3	Barium	mg/kg dw	1	0	186	186	186	20	60	**9**	**3**	181	0.3	0.1
7440-41-7	Beryllium	mg/kg dw	1	0	1	1	1	0.841	--	1	--			
7439-96-5	Manganese	mg/kg dw	1	0	1910	1910	1910	460	1800	**4**	1	1258	1.4	0.4
7439-97-6	Mercury	mg/kg dw	1	0	0.14	0.14	0.14	0.18	1.06	0.8	0.1	0.156	-0.1	-0.02
7440-62-2	Vanadium	mg/kg dw	1	0	27.4	27.4	27.4	30.8	--	0.9	--			
7440-66-6	Zinc	mg/kg dw	1	0	98.4	98.4	98.4	120	459	0.8	0.2	129.4	-0.3	-0.1
North Woodall Creek EU (Northwest Reference) - Wetland														
7440-39-3	Barium	mg/kg dw	2	0	161	214	214	20	60	**11**	**4**	181	1.7	0.6
7440-41-7	Beryllium	mg/kg dw	2	0	0.92	1.1	1.1	0.841	--	1	--			
7439-96-5	Manganese	mg/kg dw	2	0	1270	2260	2260	460	1800	**5**	1	1258	2.2	0.6
7439-97-6	Mercury	mg/kg dw	2	0	0.093	0.23	0.23	0.18	1.06	1	0.2	0.156	0.4	0.1
7440-62-2	Vanadium	mg/kg dw	2	0	25.8	29.8	29.8	30.8	--	1.0	--			
7440-66-6	Zinc	mg/kg dw	2	0	98.4	109	109	120	459	0.9	0.2	129.4	-0.2	-0.04

Table 3.3-2
Tier 2 Risk Characterization for Sediments in Aquatic Habitats and Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		Hazard Quotient		Incremental Risk Quotient		
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	Background Concentration	IRQ_{Low}	IRQ_{High}
Pit Lake Mine Feature														
7440-36-0	Antimony	mg/kg dw	2	0	4.1	4.8	4.8		3		**2**	0.733		1.4
7440-38-2	Arsenic	mg/kg dw	2	0	3.1	17.9	17.9	9.8	33	**2**	0.5	3.815	1.4	0.4
7440-39-3	Barium	mg/kg dw	2	0	55.3	125	125	20	60	**6**	**2**	181	-2.8	-0.9
7440-41-7	Beryllium	mg/kg dw	2	0	1.2	1.6	1.6	0.841		**2**				
7440-43-9	Cadmium	mg/kg dw	2	0	81.3	108	108	1	4.98	**108**	**22**	2.63	105.4	21.2
7440-47-3	Chromium	mg/kg dw	2	0	329	581	581	43	111	**14**	**5**	24.13	13.0	5.0
7440-50-8	Copper	mg/kg dw	2	0	80.7	146	146	32	149	**5**	1	21.18	3.9	0.8
7439-97-6	Mercury	mg/kg dw	2	0	0.5	0.58	0.58	0.18	1.06	**3**	0.5	0.156	2.4	0.4
7440-02-0	Nickel	mg/kg dw	2	0	146	157	157	23	48.6	**7**	**3**	25.6	5.7	2.7
7782-49-2	Selenium	mg/kg dw	2	0	147	253	253	2	4	**127**	**63**	1.8	125.6	62.8
7440-22-4	Silver	mg/kg dw	2	0	4.5	9.2	9.2	1	2.2	**9**	**4**	0.149	9.1	4.1
7440-28-0	Thallium	mg/kg dw	2	0	0.71	2	2	0.858		**2**		0.477	1.8	
7440-62-2	Vanadium	mg/kg dw	2	0	557	942	942	30.8		**31**				
7440-66-6	Zinc	mg/kg dw	2	0	790	973	973	120	459	**8**	**2**	129.4	7.0	1.8
Tailings Pond Mine Feature														
7440-39-3	Barium	mg/kg dw	2	0	86.1	146	146	20	60	**7**	**2**	181	-1.8	-0.6
7440-41-7	Beryllium	mg/kg dw	2	0	0.63	0.86	0.86	0.841		1				
7440-43-9	Cadmium	mg/kg dw	2	0	1.7	8.1	8.1	1	4.98	**8**	**2**	2.63	5.5	1.1
7439-97-6	Mercury	mg/kg dw	2	0	0.55	0.95	0.95	0.18	1.06	**5**	0.9	0.156	4.4	0.7
7440-02-0	Nickel	mg/kg dw	2	0	19.4	31.4	31.4	23	48.6	1	0.6	25.64	0.3	0.1
7440-62-2	Vanadium	mg/kg dw	2	0	31.5	42.5	42.5	30.8		1				

Table 3.3-2
Tier 2 Risk Characterization for Sediments in Aquatic Habitats and Mine Features

ECOPC			Number of Samples	Number of Non-detects	Detected Concentrations		Exposure Point Concentration	TRV		Hazard Quotient		Incremental Risk Quotient		
CASNo	Analyte	Units			Min	Max		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}	Background Concentration	IRQ_{Low}	IRQ_{High}
French Drain Mine Feature														
7440-38-2	Arsenic	mg/kg dw	4	0	9.7	29.5	26.89	9.8	33	**3**	0.8	3.815	2.4	0.7
7440-39-3	Barium	mg/kg dw	4	0	70.2	1050	909.3	20	60	**45**	**15**	181	36.4	12.1
7440-41-7	Beryllium	mg/kg dw	4	0	0.54	1.8	1.65	0.841		**2**				
7440-43-9	Cadmium	mg/kg dw	4	0	2.2	65.1	74.92	1	4.98	**75**	**15**	2.63	72.3	14.5
7440-47-3	Chromium	mg/kg dw	4	0	20.9	150	168.1	43	111	**4**	**2**	24.13	3.3	1.3
7440-50-8	Copper	mg/kg dw	4	0	17.3	62.8	62.36	32	149	**2**	0.4	21.18	1.3	0.3
7439-96-5	Manganese	mg/kg dw	4	0	68	1310	1288	460	1100	**3**	1	1258	0.1	0.03
7439-97-6	Mercury	mg/kg dw	4	0	0.14	0.44	0.452	0.18	1.06	**3**	0.4	0.156	1.6	0.3
7440-02-0	Nickel	mg/kg dw	4	0	46.8	211	225.1	23	48.6	**10**	**5**	25.64	8.7	4.1
7782-49-2	Selenium	mg/kg dw	4	0	22.4	624	599.9	2	4	**300**	**150**	1.82	299.0	149.5
7440-28-0	Thallium	mg/kg dw	4	1	0.29	1.2	1.287	0.86		**2**		0.477	0.9	
7440-62-2	Vanadium	mg/kg dw	4	0	28.1	137	137.6	30.8		**4**				
7440-66-6	Zinc	mg/kg dw	4	0	219	1220	1286	120	459	**11**	**3**	129.4	9.6	2.5
Sedimentation Basin Mine Feature														
7440-38-2	Arsenic	mg/kg dw	1	0	11	11	11	9.8	33	1	0.3	3.815	0.7	0.2
7440-41-7	Beryllium	mg/kg dw	0	NM	NM									
7440-43-9	Cadmium	mg/kg dw	1	0	11	11	11	1	4.98	**11**	**2**	2.63	8.4	1.7
7440-47-3	Chromium	mg/kg dw	1	0	154	154	154	43	111	**4**	1	24.13	3.0	1.2
7782-49-2	Selenium	mg/kg dw	1	0	40.6	40.6	40.6	2	4	**20**	**10**	1.82	19.4	9.7
7440-62-2	Vanadium	mg/kg dw	1	0	126	126	126	30.8	--	**4**	--			
7440-66-6	Zinc	mg/kg dw	1	0	376	376	376	120	459	**3.1**	0.8	129.4	2.1	0.5

Notes:
mg/kg dw - milligrams per kilogram dry weight
THQ - Target Hazard Quotient
EU - Exposure Unit
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
IRQ - Incremental Risk Quotient
Bold = HQ > 1.0
Values used for the TRV_{Low} for beryllium and vanadium are the background sediment values.

Table 3.3-3
Tier 2 Fish Tissue HQs by Site for Selenium in each Drainage
Exceeding the Tier 2 Screening TRV

Drainage	Location	Tissue Type	EPC Type (number of samples)	Tissue EPC (mg/kg dw)	AWQC Fish TissueTRV (mg/kg dw)	AWQC HQ	Cyprinid Fish TissueTRV (mg/kg dw)	Cyprind HQ
Camp G Creek								
Camp G Creek	CGC-0	Speckled Dace	95UCL (n=6)	9.566	8.5	1	17	0.6
Camp G Creek	CGC-0	Redside Shiners	Max (n=2)	6.18	8.5	0.7	17	0.4
Camp G Creek	CGC-0	Speckled Dace and Redside Shiner	95UCL (n= 8)	8.621	8.5	1	17	0.5
Pedro Creek Creek								
Pedro Creek	PC-1	Speckled Dace	95UCL (n=6)	32.9	8.5	**4**	17	**2**
State Land Creek								
State Land Creek	SLC-0	Speckled Dace	Max (n= 1)	19.8	8.5	**2**	17	1
State Land Creek	SLC-0	Redside Shiner	Max (n=2)	19.3	8.5	**2**	17	1
State Land Creek	SLC-1	Speckled Dace	95UCL (n=7)	18.75	8.5	**2**	17	1
State Land Creek	SLC-1	Redside Shiner	Max (n=3)	18.1	8.5	**2**	17	1
State Land Creek	SLC-1	Speckled Dace and Redside Shiner	95UCL (n=10)	17.92	8.5	**2**	17	1
State Land Creek	SLC-2	Speckled Dace	Max (n=2)	33.5	8.5	**4**	17	**2**
State Land Creek	All	Speckled Dace and Redside Shiner	95UCL (n=15)	21.05	8.5	**2**	17	1

Notes:
All tissue data are for whole body fish
EPC - Exposure Point Concentration
TRV - Toxicity Reference Value
mg/kg dw - milligrams per kilogram dry weight
EPC - Exposure Point Concentration
95UCL - 95% Upper Confidence Level
N - number of samples
HQ - Hazard Quotient
Bold = HQ > 1.0

Table 3.3-4
Tier 2 Risk Characterization for Selenium in Sediments and Aquatic Invertebrates in Aquatic Habitats and Mine Features

Drainage / Mine Feature	EPC (mg/kg dw)	Sediment TRV (mg/kg dw)		Sediment HQ		Location	Sediment Concentration (mg/kg dw)	Tissue EPC (mg/kg dw)	TRVs (mg/kg dw)		Tissue HQs	
		TRV_{LOW}	TRV_{HIGH}	HQ_{LOW}	HQ_{HIGH}				TRV_{NOEC}	TRV_{LOEC}	HQ_{NOEC}	HQ_{LOEC}
Camp G Creek Exposure Unit - Streams	1.448	2	4	0.7	0.4	CGC-1	1.5	1.42	24.2	26.9	0.1	0.1
Camp G Creek Exposure Unit - Wetlands	6.318	2	4	**3**	**2**	CGC-4A	7.9	65.2	24.2	26.9	**3**	**2**
Pedro Creek Exposure Unit - Streams	108.5	2	4	**54**	**27**	PC-1	6.4	36.1	24.2	26.9	**2**	**1**
Pedro Creek Exposure Unit - Wetlands	1430	2	4	**715**	**358**	PC-2	29.6	11.4	24.2	26.9	0.5	0.4
Pedro Creek Exposure Unit - Ponds	4.9	2	4	**2**	**1**							
State Land Creek Exposure Unit - Streams	16.87	2	4	**8**	**4**	SLC-0	3	11	24.2	26.9	0.5	0.4
State Land Creek Exposure Unit - Wetlands	8.864	2	4	**4**	**2**	SLC-1	5.7	7.98	24.2	26.9	0.3	0.3
						SLC-2	7	13.8	24.2	26.9	0.6	0.5
West Side Ponds Exposure Unit - Wetlands	40.19	2	4	**20**	**10**							
West Side Ponds Exposure Unit - Ponds	2.4	2	4	1	0.6	HHP-1	2.4	17.1	24.2	26.9	1	1
North Woodall Creek EU	0.6	2	4	0.3	0.2	NWC-2	0.6	1.65	24.2	26.9	0.1	0.1
Pit Lake Mine Feature	253	2	4	**127**	**63**	NL4P-1	253	102	24.2	26.9	**4**	**4**
Tailings Pond Mine Feature	1.4	2	4	1	0.4	TP-1	1.4	4.44	24.2	26.9	0.2	0.2
French Drain Mine Feature	599.9	2	4	**300**	**150**	SWP-4	360	428	24.2	26.9	**18**	**16**
Sedimentation Basin Mine Feature	40.6	2	4	**20**	**10**							
Formation Creek Exposure Unit	5.9	2	4	**3**	1							
Downgradient Exposure Unit - Westside (JCS-1)	0.93	2	4	0.5	0.2							
Woodall Springs Exposure Unit - Wetland	4.774	2	4	**2**	1							
Trail Canyon Creek Exposure Unit - Pond	0.70	2	4	0.4	0.2							

Notes:
mg/kg dw - milligrams per kilogram dry weight
EPC - Exposure point concentration
HQ - Hazard Quotient
TRV - Toxicity Reference Value
Values used for the TRV_{low} for beryllium and vanadium are the background sediment values.
NOEC = No Observed Effect Concentration
LOEC = Lowest Observed Effect Concentration
Bold = HQ > 1.0

Table 3.5-1
Camp G Creek Risk Summary for Aquatic Habitats

ECOPC	Tier 2 HQs									Incremental Risk HQs					
	Surface Water		Sediment HQ_{low}		Sediment HQ_{high}		Tissue no effect HQ			Surface Water		Sediment IRQ_{low}		Sediment IRQ_{high}	
	Stream	Wetland	Stream	Wetland	Stream	Wetland	Fish	Amph	Benthic	Stream	Wetland	Stream	Wetland	Stream	Wetland
Aluminum	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	7	NC	NC	≤ 0	≤ 0	NC	NC	NC	NC
Barium	≤ 1	≤ 1	10	9	3	3	U	NC	NC	NC	NC	1.3	0.4	0.4	0.1
Beryllium	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	≤ 1	≤ 1	2	3	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	≤ 0	≤ 0	0.1	0.02
Copper	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC
Iron	2	2	≤ 1	≤ 1	≤ 1	≤ 1	7	NC	NC	≤ 0	≤ 0	NC	NC	NC	NC
Manganese	≤ 1	≤ 1	5	3	≤ 1	≤ 1	U	NC	NC	NC	NC	2	0.2	0.5	0.04
Selenium	2	4	≤ 1	3	≤ 1	2	≤ 1	≤ 1	3	2	4	≤ 0	2.3	≤ 0	1.1
Vanadium	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	2	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.
U-Uncertain
NC - not calculated - most often because the HQ was already less than 1 or no TRV was available
IRQ - Incremental Risk Quotient
Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-2
Pedro Creek Risk Summary for Aquatic Habitats

ECOPC	Tier 2 HQs												Incremental Risk HQs								
	Surface Water Chronic			Sediment HQ_{low}			Sediment HQ_{high}			Tissue - no effect HQ			Surface Water			Sediment IRQ_{low}			Sediment IRQ_{high}		
	Stream	Wetland	Pond	Stream	Wetland	Pond	Stream	Wetland	Pond	Fish	Amph	Benthic	Stream	Wetland	Pond	Stream	Wetland	Pond	Stream	Wetland	Pond
Aluminum	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	11	NC	NC	≤ 0	≤ 0	≤ 0	NC	NC	NC	NC	NC	NC
Arsenic	≤ 1	≤ 1	≤ 1	1	2	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	0.9	1.1	0.1	0.3	0.3	0.02
Barium	≤ 1	≤ 1	≤ 1	10	4	9	3	1	3	U	NC	NC	NC	NC	NC	0.7	≤ 0	≤ 0	0.2	≤ 0	≤ 0
Beryllium	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Boron	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cobalt	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	≤ 1	≤ 1	≤ 1	13	29	≤ 1	3	6	≤ 1	≤ 1	NC	NC	NC	NC	NC	10	26.4	≤ 0	2	5.3	≤ 0
Chromium	≤ 1	≤ 1	≤ 1	4	8	≤ 1	2	3	≤ 1	≤ 1	NC	NC	NC	NC	NC	3.9	7.7	0.04	1.5	3	0.02
Copper	≤ 1	≤ 1	≤ 1	2	2	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	1.2	1.4	0.004	0.3	0.3	0.001
Iron	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	7.6	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Manganese	≤ 1	≤ 1	≤ 1	2	≤ 1	4	≤ 1	≤ 1	≤ 1	U	NC	NC	NC	NC	NC	≤ 0	≤ 0	1	≤ 0	≤ 0	0.2
Mercury	≤ 1	≤ 1	≤ 1	2	2	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	1.4	1.1	≤ 0	0.2	0.2	≤ 0
Nickel	≤ 1	≤ 1	≤ 1	6	7	≤ 1	3	3	≤ 1	≤ 1	NC	NC	NC	NC	NC	4.8	5.4	≤ 0	2.3	2.6	≤ 0
Selenium	19	425	27	54	715	2	27	358	≤ 1	4	2	2	18.6	425	27	53.3	714	1.5	26.7	357	0.8
Silver	≤ 1	≤ 1	≤ 1	2	2	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	1.5	1.5	≤ 0	0.7	0.7	≤ 0
Vanadium	≤ 1	≤ 1	≤ 1	3	4	≤ 1	NC	NC	NC	0.3	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	≤ 1	≤ 1	≤ 1	4	5	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	3.4	4.1	≤ 0	0.9	1.1	≤ 0

Notes:
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.
U-Uncertain
NC - not calculated - most often because the HQ was already less than 1 or no TRV was available
IRQ - Incremental Risk Quotient
Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-3
State Land Creek Risk Summary for Aquatic Habitats

ECOPC	Tier 2 HQs										Incremental Risk HQs						
	Surface Water			Sediment HQ_{low}		Sediment HQ_{high}		Tissue - no effect HQ			Surface Water			Sediment IRQ_{low}		Sediment IRQ_{high}	
	Stream	Wetland	Pond	Stream	Wetland	Stream	Wetland	Fish	Amph	Benthic	Stream	Wetland	Pond	Stream	Wetland	Stream	Wetland
Aluminum	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	7	NC	NC	≤ 0	≤ 0	≤ 0	NC	NC	NC	NC
Barium	≤ 1	≤ 1	≤ 1	10	10	3	3	U	NC	NC	NC	NC	NC	0.5	0.7	0.2	0.2
Beryllium	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	≤ 1	≤ 1	≤ 1	10	9	2	2	<1	NC	NC	NC	NC	NC	7.7	5.9	1.6	1.2
Chromium	≤ 1	≤ 1	≤ 1	3	2	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	2.8	1.2	1.1	0.5
Iron	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	6	NC	NC	NC	NC	NC	NC	NC	NC	NC
Manganese	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	U	NC	NC	NC	NC	NC	NC	NC	NC	NC
Mercury	≤ 1	≤ 1	≤ 1	1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nickel	≤ 1	≤ 1	≤ 1	4	3	2	≤ 1	≤ 1	NC	NC	NC	NC	NC	2.6	1.7	1.2	0.8
Selenium	18	33	≤ 1	8	4	4	2	3	2	≤ 1	18	32.5	0.1	7.5	3.5	3.8	1.8
Vanadium	≤ 1	≤ 1	≤ 1	2	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	≤ 1	≤ 1	≤ 1	3	2	≤ 1	≤ 1	2	NC	NC	NC	NC	NC	1.8	0.8	0.5	0.2

Notes:
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.
U-Uncertain
NC - not calculated - most often because the HQ was already less than 1 or no TRV was available
IRQ - Incremental Risk Quotient
Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-4
Trail Canyon Creek Risk Summary for Aquatic Habitats

ECOPC	Tier 2 HQs					Incremental Risk HQs				
	Surface Water	Sediment HQ_{low}		Sediment HQ_{high}		Surface Water	Sediment IRQ_{low}		Sediment IRQ_{high}	
	Pond	Pond	Stream	Pond	Stream	Pond	Pond	Stream	Pond	Stream
Aluminum	6	≤ 1	≤ 1	≤ 1	≤ 1	2	NC	NC	NC	NC
Barium	≤ 1	8	9	3	3	NC	≤ 0	0.1	≤ 0	0.1
Beryllium	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC
Cadmium	≤ 1	≤ 1	8	≤ 1	2	NC	≤ 0	5.2	≤ 0	1
Iron	6	≤ 1	≤ 1	NC	NC	3	NC	NC	NC	NC
Manganese	≤ 1	2	≤ 1	≤ 1	≤ 1	NC	≤ 0	≤ 0	≤ 0	≤ 0
Vanadium	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC
Zinc	≤ 1	≤ 1	2	≤ 1	≤ 1	NC	≤ 0	0.5	≤ 0	0.1

Notes:

HQ - Hazard Quotient

TRV - Toxicity Reference Value

ECOPC - Ecological Chemical of Potential Concern

The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.

U-Uncertain

NC - not calculated - most often because the HQ was already less than 1 or no TRV was available

IRQ - Incremental Risk Quotient

Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-5
Westside Ponds Risk Summary for Aquatic Habitats

ECOPC	Tier 2 HQs								Incremental Risk HQs					
	Surface Water		Sediment HQ_{low}		Sediment HQ_{high}		Tissue		Surface Water		Sediment IRQ_{low}		Sediment IRQ_{high}	
	Wetland	Pond	Wetland	Pond	Wetland	Pond	Amph	Benthic	Wetland	Pond	Wetland	Pond	Wetland	Pond
Aluminum	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	≤ 0	≤ 0	NC	NC	NC	NC
Arsenic	≤ 1	≤ 1	3	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	2.2	≤ 0	0.7	≤ 0
Barium	≤ 1	≤ 1	9	7	3	2	NC	NC	NC	NC	0.4	≤ 0	0.1	NC
Beryllium	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Cadmium	≤ 1	≤ 1	14	4	3	≤ 1	NC	NC	NC	NC	11	1.1	2.2	0.2
Chromium	≤ 1	≤ 1	6	≤ 1	2	≤ 1	NC	NC	NC	NC	5	0.1	1.9	0.05
Copper	≤ 1	≤ 1	3	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	2.7	≤ 0	0.6	≤ 0
Manganese	≤ 1	≤ 1	2	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	≤ 0	≤ 0	≤ 0	≤ 0
Mercury	≤ 1	≤ 1	4	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	3.5	≤ 0	0.6	≤ 0
Nickel	≤ 1	≤ 1	9	≤ 1	4	≤ 1	NC	NC	NC	NC	8.3	≤ 0	3.9	≤ 0
Selenium	2	10	20	≤ 1	10	≤ 1	≤ 1	≤ 1	2	9.5	19.2	0.3	9.6	0.1
Silver	≤ 1	≤ 1	3	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	2.9	0.7	1.3	0.3
Vanadium	≤ 1	≤ 1	3	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	≤ 1	≤ 1	6	≤ 1	2	≤ 1	NC	NC	NC	NC	5.4	0.05	1.4	0.01

Notes:

HQ - Hazard Quotient

TRV - Toxicity Reference Value

ECOPC - Ecological Chemical of Potential Concern

The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.

U-Uncertain

NC - not calculated - most often because the HQ was already less than 1 or no TRV was available

IRQ - Incremental Risk Quotient

Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-6
Woodall Springs Risk Summary for Aquatic Habitats

ECOPC	Tier 2 HQs				Incremental Risk HQs		
	Surface Water	Sediment HQ_{low}	Sediment HQ_{high}	Tissue	Surface Water	Sediment IRQ_{low}	Sediment IRQ_{high}
	Wetland	Wetland	Wetland	benthic	Wetland	Wetland	Wetland
Aluminum	≤ 1	≤ 1	≤ 1	NC	≤ 0	NC	NC
Barium	≤ 1	5	2	NC	NC	≤ 0	≤ 0
Beryllium	≤ 1	≤ 1	NC	NC	NC	NC	NC
Selenium	≤ 1	2	≤ 1	≤ 1	NC	1.5	0.7
Vanadium	≤ 1	≤ 1	NC	NC	NC	NC	NC

Notes:
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.
U-Uncertain
NC - not calculated - most often because the HQ was already less than 1 or no TRV was available
IRQ - Incremental Risk Quotient
Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-7
Formation Creek Risk Summary for Aquatic Habitats

ECOPC	Tier 2 HQs			Incremental Risk HQs		
	Surface Water	Sediment HQ_{low}	Sediment HQ_{high}	Surface Water	Sediment IRQ_{low}	Sediment IRQ_{high}
	Wetland	Wetland	Wetland	Wetland	Wetland	Wetland
Aluminum	≤ 1	≤ 1	≤ 1	≤ 0	NC	NC
Barium	≤ 1	3	1	NC	≤ 0	≤ 0
Beryllium	≤ 1	≤ 1	NC	NC	NC	NC
Cadmium	≤ 1	6	≤ 1	NC	3	0.6
Nickel	≤ 1	≤ 1	≤ 1	NC	0.02	0.01
Selenium	≤ 1	3	≤ 1	NC	2	1
Vanadium	≤ 1	≤ 1	NC	NC	NC	NC
Zinc	≤ 1	2	≤ 1	NC	1	0.3

Notes:
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.
U-Uncertain
NC - not calculated - most often because the HQ was already less than 1 or no TRV was available
IRQ - Incremental Risk Quotient

Table 3.5-8
Downgradient Exposure Unit (Jouglard Canyon Creek - JCS1)
Risk Summary for Aquatic Habitats

ECOPC	Tier 2 HQs			Incremental Risk HQs		
	Surface Water	Sediment HQ_{low}	Sediment HQ_{high}	Surface Water	Sediment IRQ_{low}	Sediment IRQ_{high}
	Wetland	Wetland	Wetland	Wetland	Wetland	Wetland
Aluminum	2	≤ 1	≤ 1	≤ 0	NC	NC
Barium	≤ 1	7	2	NC	≤ 0	≤ 0
Beryllium	≤ 1	≤ 1	NC	NC	NC	NC
Iron	4	≤ 1	≤ 1	1.6	NC	NC
Vanadium	≤ 1	≤ 1	NC	NC	NC	NC

Notes:
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.
U-Uncertain
NC - not calculated - most often because the HQ was already less than 1 or no TRV was available
IRQ - Incremental Risk Quotient
Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-9
Northwest Reference Area (North Woodall Creek) Exposure Unit
Risk Summary for Aquatic Habitats

ECOPC	Tier 2 HQs							Incremental Risk HQs					
	Surface Water		Sediment HQ_{low}		Sediment HQ_{high}		Tissue	Surface Water		Sediment IRQ_{low}		Sediment IRQ_{low}	
	Stream	Wetland	Stream	Wetland	Stream	Wetland	Benthic	Stream	Wetland	Stream	Wetland		
Aluminum	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	≤ 0	≤ 0	NC	NC	NC	NC
Barium	≤ 1	≤ 1	9	11	3	4	NC	NC	NC	0.3	1.7	0.1	0.6
Beryllium	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC
Manganese	≤ 1	≤ 1	4	5	≤ 1	≤ 1	NC	NC	NC	1.4	2.2	0.4	0.6
Mercury	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	≤ 0	0.4	≤ 0	0.1
Selenium	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC
Vanadium	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC	≤ 0	≤ 0	≤ 0	≤ 0

Notes:
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.
U-Uncertain
NC - not calculated - most often because the HQ was already less than 1 or no TRV was available
IRQ - Incremental Risk Quotient
Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-10
Pit Lake Risk Summary

ECOPC	Tier 2 HQs				Incremental Risk HQs		
	Surface Water	Sediment HQ_{low}	Sediment HQ_{high}	Benthic Tissue	Surface Water	Sediment IRQ_{low}	Sediment IRQ_{high}
Aluminum	≤ 1	≤ 1	≤ 1	ND	≤ 0	NC	NC
Antimony	≤ 1	NC	2	ND	NC	NC	1.4
Arsenic	≤ 1	2	≤ 1	ND	NC	1.4	0.4
Barium	≤ 1	6	2	ND	NC	≤ 0	≤ 0
Beryllium	≤ 1	2	NC	ND	NC	NC	NC
Cadmium	8	108	22	ND	7.8	105	21
Chromium	≤ 1	14	5	ND	NC	13	5
Copper	≤ 1	5	≤ 1	ND	NC	3.9	0.8
Mercury	≤ 1	3	≤ 1	ND	NC	2.4	0.4
Nickel	≤ 1	7	3	ND	NC	5.7	2.7
Selenium	50	127	63	4	49.5	126	63
Silver	≤ 1	9	2	ND	NC	9.1	4.1
Thallium	≤ 1	2	NC	ND	NC	1.8	NC
Vanadium	3	21	NC	ND	3.1	NC	NC
Zinc	≤ 1	8	2	ND	NC	7	1.8

Notes:

HQ - Hazard Quotient

TRV - Toxicity Reference Value

ECOPC - Ecological Chemical of Potential Concern

The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.

U-Uncertain

NC - not calculated - most often because the HQ was already less than 1 or no TRV was available

IRQ - Incremental Risk Quotient

Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-11
Tailings Pond Risk Summary

ECOPC	Tier 2 HQs				Incremental Risk HQs		
	Surface Water	Sediment HQ_{low}	Sediment HQ_{high}	Tissue	Surface Water	Sediment IRQ_{low}	Sediment IRQ_{high}
Aluminum	≤ 1	≤ 1	≤ 1	NC	≤ 0	NC	NC
Barium	≤ 1	7	2	NC	NC	≤ 0	≤ 0
Beryllium	≤ 1	≤ 1	NC	NC	NC	NC	NC
Cadmium	≤ 1	8	2	NC	NC	5.5	1.1
Mercury	≤ 1	5	≤ 1	NC	NC	4.4	0.7
Nickel	≤ 1	≤ 1	≤ 1	NC	NC	0.3	0.1
Selenium	≤ 1	≤ 1	≤ 1	≤ 1	NC	NC	NC
Vanadium	≤ 1	≤ 1	NC	NC	NC	NC	NC

Notes:

HQ - Hazard Quotient

TRV - Toxicity Reference Value

ECOPC - Ecological Chemical of Potential Concern

The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.

U-Uncertain

NC - not calculated - most often because the HQ was already less than 1 or no TRV was available

IRQ - Incremental Risk Quotient

Table 3.5-12
French Drain Risk Summary

ECOPC	Tier 2 HQs				Incremental Risk HQs		
	Surface Water	Sediment HQ_{low}	Sediment HQ_{high}	Benthic Tissue	Surface Water	Sediment IRQ_{low}	Sediment IRQ_{high}
Aluminum	≤ 1	≤ 1	≤ 1	ND	≤ 0	NC	NC
Arsenic	≤ 1	3	≤ 1	ND	NC	2.4	0.7
Barium	≤ 1	45	15	ND	NC	36.4	12.1
Beryllium	≤ 1	≤ 1	NC	ND	NC	NC	NC
Cadmium	2	75	15	ND	1.9	72.3	14.5
Chromium	≤ 1	4	2	ND	NC	3.3	1.3
Copper	≤ 1	2	≤ 1	ND	NC	1.3	0.3
Manganese	≤ 1	3	≤ 1	ND	NC	0.1	0.03
Mercury	≤ 1	3	≤ 1	ND	NC	1.6	0.3
Nickel	≤ 1	10	5	ND	NC	8.7	4.1
Selenium	66	300	150	18	66	299	150
Thallium	≤ 1	2	NC	ND	NC	0.9	NC
Vanadium	≤ 1	3	NC	ND	NC	NC	NC
Zinc	≤ 1	11	3	ND	NC	9.6	2.5

Notes:

HQ - Hazard Quotient

TRV - Toxicity Reference Value

ECOPC - Ecological Chemical of Potential Concern

The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.

U-Uncertain

NC - not calculated - most often because the HQ was already less than 1 or no TRV was available

IRQ - Incremental Risk Quotient

Table 3.5-13
Sedimentation Basin Risk Summary

ECOPC	Tier 2 HQs			Incremental Risk HQs		
	Surface Water	Sediment HQ_{low}	Sediment HQ_{high}	Surface Water	Sediment IRQ_{low}	Sediment IRQ_{high}
Aluminum	3	≤ 1	≤ 1	≤ 0	NC	NC
Arsenic	≤ 1	≤ 1	≤ 1	NC	0.7	0.2
Beryllium	≤ 1	NM	NM	NC	NC	NC
Cadmium	5	11	2	4.4	8.4	1.7
Chromium	≤ 1	4	≤ 1	NC	3	1.2
Iron	3	≤ 1	≤ 1	0.6	NC	NC
Selenium	127	20	10	127	19.4	9.7
Vanadium	≤ 1	2.8	NC	NC	NC	NC
Zinc	≤ 1	3.1	≤ 1	NC	2.1	0.5

Notes:
HQ - Hazard Quotient
TRV - Toxicity Reference Value
ECOPC - Ecological Chemical of Potential Concern
The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.
U-Uncertain
NC - not calculated - most often because the HQ was already less than 1 or no TRV was available
IRQ - Incremental Risk Quotient
Highlighting cells indicate ECOPCs pose a potential risk.

Table 3.5-14
NE Seep Pond Risk Summary

ECOPC	Tier 2 HQs		Incremental Risk HQs	
	Surface Water	Sediment	Surface Water	Sediment
Aluminum	≤ 1	NM	≤ 0	NC
Cadmium	32	NM	32.2	NC
Nickel	3	NM	3.4	NC
Selenium	1474	NM	1474	NC
Zinc	4	NM	4.4	NC

Notes:

HQ - Hazard Quotient

TRV - Toxicity Reference Value

ECOPC - Ecological Chemical of Potential Concern

The ECOPC list includes analytes carried forward in one or more media from the Tier 2 or highest assessment level for a media.

U-Uncertain

NC - not calculated - most often because the HQ was already less than 1 or no TRV was available

IRQ - Incremental Risk Quotient

Highlighting cells indicate ECOPCs pose a potential risk.

Table 4.1-1
Tier 1 Exposure Point Concentrations for the Terrestrial Ecological Receptors

ECOPC	Exposure Unit	Surface Soil (mg/kg)	Rooting Zone Soil (mg/kg)	Forage (mg/kg)	Forage and Browse (mg/kg)	Terrestrial Invertebrate (mg/kg)	Small Mammal (mg/kg)	Surface Water (mg/L)
Antimony	Camp G and H	4.45E+00	5.80E+00	5.70E-02	4.96E-02	1.20E-01	1.90E-01	7.95E-02
	Downgradient East	1.42E+00	1.06E+00	1.55E-01	1.27E-01	1.27E-01	3.38E-01	4.17E-04
	Downgradient West	1.63E+00	1.27E+00	2.63E-02	2.48E-02	2.00E-02	3.00E-01	2.96E-04
	Grace Panel	6.79E+00	6.03E+00	1.30E-01	1.48E-01	1.40E-01	8.00E-02	5.50E-04
	Ibex Complex	4.54E+00	4.15E+00	8.18E-02	5.08E-02	2.00E-02	3.34E-01	9.21E-04
	North Trail	2.81E+00	3.09E+00	1.50E-02	1.50E-02	2.00E-02	6.00E-02	9.89E-02
	Town Site	3.09E+00	2.18E+00	9.00E-03	1.80E-01	2.00E-02	3.70E-01	2.96E-04
	Woodall	2.94E+00	3.71E+00	4.60E-02	4.60E-02	1.80E-01	2.30E-01	5.83E-04
Arsenic	Camp G and H	2.02E+01	2.77E+01	8.50E-01	5.53E+00	1.90E-01	1.20E-01	7.20E-04
	Downgradient East	8.97E+00	7.44E+00	3.20E-01	1.43E-01	5.24E-01	2.34E-01	1.05E-02
	Downgradient West	1.54E+01	1.49E+01	2.53E+00	8.26E-01	1.50E-01	1.20E-01	1.30E-03
	Grace Panel	3.51E+01	3.83E+01	7.90E-01	7.90E-01	1.57E+00	1.17E+00	1.20E-03
	Ibex Complex	3.28E+01	2.89E+01	1.73E+00	1.12E+00	1.29E+00	1.01E+00	1.42E-02
	North Trail	3.64E+01	3.64E+01	1.10E-01	1.10E-01	2.70E-01	4.90E-01	2.40E-03
	Town Site	2.06E+01	1.79E+01	1.10E-01	1.40E-01	2.20E-01	2.20E-01	1.30E-03
	Woodall	1.83E+01	2.32E+01	1.73E+00	1.47E+00	2.09E+00	1.13E+00	1.03E-01
Barium	Camp G and H	1.20E+02	1.75E+02	6.69E+01	4.48E+01	6.06E+00	1.24E+01	7.95E-02
	Downgradient East	1.95E+02	2.08E+02	5.18E+01	8.54E+01	1.55E+01	1.37E+01	7.22E-02
	Downgradient West	2.65E+02	1.58E+02	3.01E+01	4.17E+01	5.12E+00	1.59E+01	1.09E-01
	Grace Panel	6.82E+01	6.66E+01	1.02E+01	1.02E+01	4.94E+00	3.47E+00	6.25E-02
	Ibex Complex	9.02E+01	2.26E+02	1.88E+01	1.91E+01	4.61E+00	1.08E+01	7.25E-02
	North Trail	6.76E+01	5.69E+01	4.62E+00	4.62E+00	8.30E-01	4.01E+00	9.89E-02
	Town Site	1.98E+02	2.08E+02	2.29E+01	2.29E+01	3.90E+00	1.10E+01	1.09E-01
	Woodall	1.44E+02	1.02E+02	1.62E+01	5.96E+01	5.34E+00	1.45E+01	4.73E-02
Cadmium	Camp G and H	7.12E+01	7.17E+01	2.89E+00	3.58E+00	5.71E-01	1.22E+00	3.17E-04
	Downgradient East	9.35E+00	8.14E+00	6.18E-01	1.86E+00	2.94E+00	1.20E+00	4.07E-03
	Downgradient West	1.81E+01	2.11E+01	9.14E-01	1.27E+00	1.17E+00	2.41E-01	1.90E-04
	Grace Panel	5.45E+01	3.59E+01	2.54E+00	2.65E+00	7.33E+00	5.20E-01	1.06E-04
	Ibex Complex	7.40E+01	6.12E+01	1.86E+00	9.61E+00	8.52E+00	5.60E-01	9.56E-03
	North Trail	3.39E+01	9.95E+01	2.01E+00	2.01E+00	2.37E+00	3.49E-01	1.20E-03
	Town Site	5.08E+01	4.68E+01	1.00E-01	9.17E-01	8.96E-01	6.03E-01	1.90E-04
	Woodall	3.58E+01	3.95E+01	1.57E+00	1.53E+00	3.59E+00	5.64E-01	4.87E-03
Chromium	Camp G and H	5.16E+02	5.77E+02	1.55E+00	1.01E+00	6.80E-01	1.75E+00	2.04E-03
	Downgradient East	1.50E+02	1.23E+02	5.66E-01	4.24E-01	2.44E+00	2.47E+00	9.59E-03
	Downgradient West	2.23E+02	1.97E+02	8.55E-01	5.84E-01	2.70E-01	1.65E+00	3.26E-03
	Grace Panel	6.22E+02	5.79E+02	4.00E+00	4.00E+00	2.87E+01	5.20E+00	1.09E-02
	Ibex Complex	7.15E+02	5.71E+02	7.16E+00	5.42E+00	2.08E+00	4.39E+00	4.54E-01
	North Trail	4.18E+02	4.78E+02	9.23E-01	9.23E-01	2.80E-01	3.41E+00	1.40E-02
	Town Site	4.27E+02	3.74E+02	7.80E-01	7.80E-01	3.60E-01	2.21E+00	3.26E-03
	Woodall	4.71E+02	5.26E+02	1.20E+00	1.43E+00	8.07E+00	5.34E+00	4.58E-02
Copper	Camp G and H	9.15E+01	1.37E+02	6.58E+00	5.81E+00	2.17E+01	1.35E+01	2.99E-03
	Downgradient East	4.88E+01	3.65E+01	3.91E+00	5.71E+00	2.25E+01	1.76E+01	5.24E-03
	Downgradient West	6.07E+01	5.12E+01	4.05E+00	5.27E+00	2.59E+01	1.35E+01	3.76E-03
	Grace Panel	1.36E+02	1.15E+02	5.11E+00	6.30E+00	2.87E+01	1.58E+01	1.09E-02
	Ibex Complex	9.29E+01	9.33E+01	3.49E+00	4.40E+00	3.61E+01	1.51E+01	2.97E-02
	North Trail	9.43E+01	1.11E+02	4.60E+00	4.60E+00	1.80E+01	1.05E+01	3.11E-02
	Town Site	7.58E+01	6.46E+01	2.80E+00	5.45E+00	3.17E+01	1.17E+01	3.76E-03
	Woodall	8.98E+01	9.48E+01	3.67E+00	3.85E+00	3.08E+01	1.37E+01	1.03E-02
Lead	Camp G and H	2.24E+01	2.22E+01	1.55E-01	1.40E-01	2.63E-01	4.95E-01	2.99E-03
	Downgradient East	1.77E+01	1.75E+01	1.47E-01	1.22E-01	3.88E-01	1.12E+00	1.22E-03
	Downgradient West	9.19E+01	7.40E+01	9.44E-02	8.27E-02	5.80E-02	4.55E-01	1.06E-03
	Grace Panel	1.18E+01	1.09E+01	1.46E-01	1.81E-01	4.98E-01	3.90E-01	3.90E-03
	Ibex Complex	1.39E+01	1.37E+01	7.20E-02	1.13E-01	7.48E-02	3.00E+00	4.33E-03
	North Trail	1.10E+01	1.00E+01	2.80E-02	2.80E-02	3.00E-02	2.50E-01	3.11E-01
	Town Site	7.71E+02	3.05E+02	4.10E-02	1.80E-01	1.44E-01	1.63E+00	1.06E-03
	Woodall	1.27E+01	1.21E+01	9.18E-02	8.63E-02	3.80E-01	7.61E-01	2.56E-03
Manganese	Camp G and H	2.71E+02	5.83E+02	3.18E+01	4.25E+01	5.94E+01	9.98E+00	3.02E-01
	Downgradient East	1.28E+03	1.58E+03	2.00E+02	1.35E+02	8.06E+01	9.98E+00	1.89E-01
	Downgradient West	7.32E+02	8.52E+02	4.63E+01	4.89E+01	7.43E+01	1.15E+01	1.88E-01
	Grace Panel	1.37E+02	1.94E+02	1.28E+01	1.71E+01	2.13E+01	8.03E+00	1.90E-03
	Ibex Complex	6.77E+02	1.57E+03	1.21E+02	7.24E+01	8.65E+01	1.61E+01	3.05E-01
	North Trail	2.78E+02	2.49E+02	2.32E+01	2.32E+01	1.77E+01	6.97E+00	3.11E-01
	Town Site	8.00E+02	8.92E+02	2.41E+01	4.51E+01	2.10E+01	1.11E+01	1.88E-01
	Woodall	1.12E+03	5.83E+02	4.14E+01	9.05E+01	8.15E+01	1.01E+01	9.83E-01

Table 4.1-1
Tier 1 Exposure Point Concentrations for the Terrestrial Ecological Receptors

ECOPC	Exposure Unit	Surface Soil (mg/kg)	Rooting Zone Soil (mg/kg)	Forage (mg/kg)	Forage and Browse (mg/kg)	Terrestrial Invertebrate (mg/kg)	Small Mammal (mg/kg)	Surface Water (mg/L)
Mercury	Camp G and H	4.67E-01	5.42E-01	2.60E-02	1.82E-02	8.00E-03	4.70E-02	8.10E-05
	Downgradient East	2.06E-01	1.53E-01	1.41E-02	1.30E-02	2.33E-02	3.51E-02	1.88E-02
	Downgradient West	2.96E-01	5.18E-01	1.03E-02	1.17E-02	1.50E-02	1.20E-02	8.52E-03
	Grace Panel	8.80E-01	9.55E-01	1.30E-02	1.80E-02	2.70E-02	3.00E-03	6.40E-05
	Ibex Complex	4.07E-01	3.79E-01	1.13E-02	1.14E-02	1.33E-02	1.88E-02	7.17E-05
	North Trail	5.10E-01	4.07E-01	4.00E-03	4.00E-03	1.10E-02	3.00E-03	6.40E-05
	Town Site	5.71E-01	5.19E-01	7.00E-03	1.50E-02	1.40E-02	1.10E-02	8.52E-03
	Woodall	3.28E-01	4.16E-01	1.30E-02	1.19E-02	1.80E-02	1.17E-02	8.10E-05
Molybdenum	Camp G and H	1.78E+01	2.18E+01	4.68E+00	3.24E+00	1.89E+00	6.50E-01	2.93E-03
	Downgradient East	8.29E+00	6.33E+00	3.15E+00	1.67E+00	2.23E+00	8.16E-01	1.88E-02
	Downgradient West	1.22E+01	1.03E+01	4.84E+00	3.23E+00	2.41E+00	7.60E-01	8.52E-03
	Grace Panel	2.87E+01	2.54E+01	1.10E+01	1.10E+01	3.35E+00	9.80E-01	1.09E-02
	Ibex Complex	4.75E+01	3.71E+01	2.63E+01	2.13E+01	5.80E+00	1.11E+00	7.50E-02
	North Trail	4.33E+01	5.26E+01	1.44E+01	1.44E+01	4.25E+00	1.16E+00	1.02E-02
	Town Site	2.15E+01	1.66E+01	6.50E+00	6.50E+00	6.04E+00	1.00E+00	8.52E-03
	Woodall	1.31E+01	2.15E+01	1.58E+01	1.32E+01	5.68E+00	1.16E+00	1.05E-02
Nickel	Camp G and H	1.67E+02	2.76E+02	6.12E+00	5.51E+00	4.70E-01	2.91E+00	2.26E-03
	Downgradient East	9.33E+01	7.24E+01	9.60E-01	1.42E+00	2.18E+00	2.69E+00	1.05E-01
	Downgradient West	1.30E+02	1.01E+02	2.84E+00	3.90E+00	4.00E+00	2.45E+00	4.88E-03
	Grace Panel	3.02E+02	2.86E+02	9.07E+00	1.20E+01	1.39E+01	3.59E+00	3.70E-03
	Ibex Complex	1.93E+02	1.96E+02	4.65E+00	4.92E+00	1.29E+01	3.40E+00	7.77E-02
	North Trail	2.49E+02	2.72E+02	2.38E+00	2.38E+00	5.09E+00	1.70E+00	9.20E-03
	Town Site	1.33E+02	1.10E+02	1.00E-01	1.02E+00	6.10E-01	3.20E+00	4.88E-03
	Woodall	2.00E+02	2.07E+02	7.38E+00	7.06E+00	5.45E+00	2.48E+00	1.17E-01
Selenium	Camp G and H	2.05E+01	3.33E+01	1.40E+01	1.26E+01	1.33E+00	1.70E-01	1.46E-02
	Downgradient East	4.12E+01	9.58E+01	1.65E+01	1.25E+01	2.11E+01	5.16E+00	1.31E+00
	Downgradient West	2.19E+01	1.69E+01	6.35E+01	3.07E+01	2.06E+00	7.50E-01	1.01E-02
	Grace Panel	4.99E+01	8.57E+01	4.26E+01	3.36E+01	6.16E+01	5.54E+01	2.01E-03
	Ibex Complex	7.74E+01	2.45E+02	4.31E+01	3.75E+01	5.26E+01	2.80E+01	2.80E-01
	North Trail	8.13E+01	7.44E+01	6.68E+01	6.68E+01	1.41E+01	2.24E+01	6.02E-04
	Town Site	1.95E+01	1.43E+01	2.18E+00	1.86E+00	4.98E+00	4.54E+00	1.01E-02
	Woodall	7.06E+01	5.30E+01	2.71E+01	2.64E+01	9.54E+01	4.82E+01	1.32E+00
Vanadium	Camp G and H	1.10E+03	1.42E+03	4.83E+00	4.56E+00	5.90E-01	3.80E-01	4.64E-03
	Downgradient East	1.13E+02	8.46E+01	7.78E-01	5.52E-01	3.35E+00	5.59E-01	1.16E-02
	Downgradient West	1.99E+02	1.98E+02	5.79E-01	4.42E-01	2.60E-01	4.00E-01	3.92E-03
	Grace Panel	4.70E+02	4.00E+02	5.17E+00	6.67E+00	9.67E+00	1.22E+00	1.18E-03
	Ibex Complex	9.29E+02	7.30E+02	1.69E+00	1.36E+00	3.02E+00	1.49E+00	5.25E-01
	North Trail	3.60E+02	6.48E+02	4.64E-01	4.64E-01	3.00E-01	1.49E+00	1.26E-02
	Town Site	6.64E+02	5.60E+02	8.80E-01	8.80E-01	5.90E-01	1.00E+00	3.92E-03
	Woodall	3.07E+02	3.56E+02	8.02E-01	7.75E-01	5.21E+00	1.71E+00	4.64E-02
Zinc	Camp G and H	9.29E+02	1.16E+03	1.34E+02	1.17E+02	1.74E+02	5.75E+02	7.54E-03
	Downgradient East	3.90E+02	2.65E+02	3.42E+01	7.98E+01	1.93E+02	9.47E+02	3.34E-01
	Downgradient West	4.44E+02	4.92E+02	5.57E+01	4.91E+01	1.48E+02	7.64E+02	1.62E-02
	Grace Panel	1.14E+03	9.45E+02	1.27E+02	1.27E+02	1.86E+02	4.05E+02	1.18E-02
	Ibex Complex	1.39E+03	9.99E+02	6.26E+01	1.18E+02	2.18E+02	1.03E+03	7.61E-01
	North Trail	1.03E+03	1.49E+03	9.70E+01	9.70E+01	1.44E+02	3.42E+02	4.62E-02
	Town Site	9.75E+02	6.67E+02	1.49E+01	5.19E+01	1.48E+02	1.11E+03	1.62E-02
	Woodall	8.06E+02	8.73E+02	7.02E+01	6.79E+01	1.68E+02	6.40E+02	2.35E-01

Notes:
ECOPC - Ecological Contaminant of Potential Concern
mg/kg - milligrams per kilogram
mg/L - milligrams per liter

Table 4.1-2
Surface and Rooting Zone Soil Exposure Point Concentrations

ECOPC	Exposure Unit	Surface Soil (mg/kg)	Rooting Zone Soil (mg/kg)
Antimony	Camp G and H	4.45E+00	5.80E+00
	Downgradient East	1.42E+00	1.06E+00
	Downgradient West	1.63E+00	1.27E+00
	Grace Panel	6.79E+00	6.03E+00
	Ibex Complex	4.54E+00	4.15E+00
	North Trail	2.81E+00	3.09E+00
	Town Site	3.09E+00	2.18E+00
	Woodall	2.94E+00	3.71E+00
Arsenic	Camp G and H	2.02E+01	2.77E+01
	Downgradient East	8.97E+00	7.44E+00
	Downgradient West	1.54E+01	1.49E+01
	Grace Panel	3.51E+01	3.83E+01
	Ibex Complex	3.28E+01	2.89E+01
	North Trail	3.64E+01	3.64E+01
	Town Site	2.06E+01	1.79E+01
	Woodall	1.83E+01	2.32E+01
Barium	Camp G and H	1.20E+02	1.75E+02
	Downgradient East	1.95E+02	2.08E+02
	Downgradient West	2.65E+02	1.58E+02
	Grace Panel	6.82E+01	6.66E+01
	Ibex Complex	9.02E+01	2.26E+02
	North Trail	6.76E+01	5.69E+01
	Town Site	1.98E+02	2.08E+02
	Woodall	1.44E+02	1.02E+02
Cadmium	Camp G and H	7.12E+01	7.17E+01
	Downgradient East	9.35E+00	8.14E+00
	Downgradient West	1.81E+01	2.11E+01
	Grace Panel	5.45E+01	3.59E+01
	Ibex Complex	7.40E+01	6.12E+01
	North Trail	3.39E+01	9.95E+01
	Town Site	5.08E+01	4.68E+01
	Woodall	3.58E+01	3.95E+01
Chromium	Camp G and H	5.16E+02	5.77E+02
	Downgradient East	1.50E+02	1.23E+02
	Downgradient West	2.23E+02	1.97E+02
	Grace Panel	6.22E+02	5.79E+02
	Ibex Complex	7.15E+02	5.71E+02
	North Trail	4.18E+02	4.78E+02
	Town Site	4.27E+02	3.74E+02
	Woodall	4.71E+02	5.26E+02
Copper	Camp G and H	9.15E+01	1.37E+02
	Downgradient East	4.88E+01	3.65E+01
	Downgradient West	6.07E+01	5.12E+01
	Grace Panel	1.36E+02	1.15E+02
	Ibex Complex	9.29E+01	9.33E+01
	North Trail	9.43E+01	1.11E+02
	Town Site	7.58E+01	6.46E+01
	Woodall	8.98E+01	9.48E+01

Table 4.1-2
Surface and Rooting Zone Soil Exposure Point Concentrations

ECOPC	Exposure Unit	Surface Soil (mg/kg)	Rooting Zone Soil (mg/kg)
Lead	Camp G and H	2.24E+01	2.22E+01
	Downgradient East	1.77E+01	1.75E+01
	Downgradient West	9.19E+01	7.40E+01
	Grace Panel	1.18E+01	1.09E+01
	Ibex Complex	1.39E+01	1.37E+01
	North Trail	1.10E+01	1.00E+01
	Town Site	7.71E+02	3.05E+02
	Woodall	1.27E+01	1.21E+01
Manganese	Camp G and H	2.71E+02	5.83E+02
	Downgradient East	1.28E+03	1.58E+03
	Downgradient West	7.32E+02	8.52E+02
	Grace Panel	1.37E+02	1.94E+02
	Ibex Complex	6.77E+02	1.57E+03
	North Trail	2.78E+02	2.49E+02
	Town Site	8.00E+02	8.92E+02
	Woodall	1.12E+03	5.83E+02
Mercury	Camp G and H	4.67E-01	5.42E-01
	Downgradient East	2.06E-01	1.53E-01
	Downgradient West	2.96E-01	5.18E-01
	Grace Panel	8.80E-01	9.55E-01
	Ibex Complex	4.07E-01	3.79E-01
	North Trail	5.10E-01	4.07E-01
	Town Site	5.71E-01	5.19E-01
	Woodall	3.28E-01	4.16E-01
Molybdenum	Camp G and H	1.78E+01	2.18E+01
	Downgradient East	8.29E+00	6.33E+00
	Downgradient West	1.22E+01	1.03E+01
	Grace Panel	2.87E+01	2.54E+01
	Ibex Complex	4.75E+01	3.71E+01
	North Trail	4.33E+01	5.26E+01
	Town Site	2.15E+01	1.66E+01
	Woodall	1.31E+01	2.15E+01
Nickel	Camp G and H	1.67E+02	2.76E+02
	Downgradient East	9.33E+01	7.24E+01
	Downgradient West	1.30E+02	1.01E+02
	Grace Panel	3.02E+02	2.86E+02
	Ibex Complex	1.93E+02	1.96E+02
	North Trail	2.49E+02	2.72E+02
	Town Site	1.33E+02	1.10E+02
	Woodall	2.00E+02	2.07E+02
Selenium	Camp G and H	2.05E+01	3.33E+01
	Downgradient East	4.12E+01	9.58E+01
	Downgradient West	2.19E+01	1.69E+01
	Grace Panel	4.99E+01	8.57E+01
	Ibex Complex	7.74E+01	2.45E+02
	North Trail	8.13E+01	7.44E+01
	Town Site	1.95E+01	1.43E+01
	Woodall	7.06E+01	5.30E+01

Table 4.1-2
Surface and Rooting Zone Soil Exposure Point Concentrations

ECOPC	Exposure Unit	Surface Soil (mg/kg)	Rooting Zone Soil (mg/kg)
Vanadium	Camp G and H	1.10E+03	1.42E+03
	Downgradient East	1.13E+02	8.46E+01
	Downgradient West	1.99E+02	1.98E+02
	Grace Panel	4.70E+02	4.00E+02
	Ibex Complex	9.29E+02	7.30E+02
	North Trail	3.60E+02	6.48E+02
	Town Site	6.64E+02	5.60E+02
	Woodall	3.07E+02	3.56E+02
Zinc	Camp G and H	9.29E+02	1.16E+03
	Downgradient East	3.90E+02	2.65E+02
	Downgradient West	4.44E+02	4.92E+02
	Grace Panel	1.14E+03	9.45E+02
	Ibex Complex	1.39E+03	9.99E+02
	North Trail	1.03E+03	1.49E+03
	Town Site	9.75E+02	6.67E+02
	Woodall	8.06E+02	8.73E+02

Notes:
ECOPC = Ecological Chemical of Potential Concern.
mg/kg - milligrams per kilogram

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Antimony				
American Robin	Camp G and H	1.86E-02	1.20E-02	3.06E-02
	Downgradient East	2.96E-02	3.83E-03	3.34E-02
	Downgradient West	4.86E-03	4.41E-03	9.27E-03
	Grace Panel	2.84E-02	1.83E-02	4.67E-02
	Ibex Complex	1.07E-02	1.23E-02	2.29E-02
	North Trail	3.68E-03	7.59E-03	1.13E-02
	Town Site	3.05E-03	8.34E-03	1.14E-02
	Woodall	2.37E-02	7.94E-03	3.17E-02
Coyote	Camp G and H	5.96E-03	1.02E-02	1.62E-02
	Downgradient East	1.05E-02	1.31E-03	1.18E-02
	Downgradient West	8.98E-03	1.49E-03	1.05E-02
	Grace Panel	2.82E-03	6.15E-03	8.98E-03
	Ibex Complex	1.01E-02	4.16E-03	1.42E-02
	North Trail	1.84E-03	1.02E-02	1.21E-02
	Town Site	1.10E-02	2.80E-03	1.38E-02
	Woodall	7.25E-03	2.69E-03	9.94E-03
Deer Mouse	Camp G and H	1.92E-02	1.42E-02	3.34E-02
	Downgradient East	3.31E-02	4.53E-03	3.77E-02
	Downgradient West	5.47E-03	5.22E-03	1.07E-02
	Grace Panel	3.10E-02	2.17E-02	5.27E-02
	Ibex Complex	1.30E-02	1.45E-02	2.75E-02
	North Trail	3.94E-03	9.00E-03	1.29E-02
	Town Site	3.13E-03	9.88E-03	1.30E-02
	Woodall	2.34E-02	9.41E-03	3.28E-02
Eastern Cottontail	Camp G and H	3.48E-03	6.67E-03	1.01E-02
	Downgradient East	9.46E-03	2.13E-03	1.16E-02
	Downgradient West	1.60E-03	2.45E-03	4.05E-03
	Grace Panel	7.93E-03	1.02E-02	1.81E-02
	Ibex Complex	4.99E-03	6.81E-03	1.18E-02
	North Trail	9.15E-04	4.22E-03	5.13E-03
	Town Site	5.49E-04	4.63E-03	5.18E-03
	Woodall	2.81E-03	4.41E-03	7.22E-03

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Mule Deer	Camp G and H	2.28E-03	6.58E-03	8.86E-03
	Downgradient East	6.20E-03	4.53E-04	6.65E-03
	Downgradient West	1.05E-03	5.09E-04	1.56E-03
	Grace Panel	5.20E-03	2.07E-03	7.27E-03
	Ibex Complex	3.27E-03	1.42E-03	4.69E-03
	North Trail	6.00E-04	7.37E-03	7.97E-03
	Town Site	3.60E-04	9.46E-04	1.31E-03
	Woodall	1.84E-03	9.21E-04	2.76E-03
Northern Bobwhite	Camp G and H	6.28E-03	8.45E-03	1.47E-02
	Downgradient East	1.43E-02	2.69E-03	1.70E-02
	Downgradient West	2.41E-03	3.10E-03	5.51E-03
	Grace Panel	1.25E-02	1.29E-02	2.54E-02
	Ibex Complex	6.93E-03	8.63E-03	1.56E-02
	North Trail	1.49E-03	5.34E-03	6.83E-03
	Town Site	1.01E-03	5.87E-03	6.87E-03
	Woodall	6.20E-03	5.59E-03	1.18E-02
Northern Harrier	Camp G and H	1.88E-02	3.11E-03	2.19E-02
	Downgradient East	3.33E-02	9.92E-04	3.43E-02
	Downgradient West	2.93E-02	1.14E-03	3.04E-02
	Grace Panel	8.15E-03	4.75E-03	1.29E-02
	Ibex Complex	3.26E-02	3.18E-03	3.58E-02
	North Trail	5.90E-03	1.97E-03	7.87E-03
	Town Site	3.61E-02	2.16E-03	3.83E-02
	Woodall	2.29E-02	2.06E-03	2.49E-02
Arsenic				
American Robin	Camp G and H	1.09E-01	5.45E-02	1.64E-01
	Downgradient East	8.86E-02	2.42E-02	1.13E-01
	Downgradient West	2.81E-01	4.15E-02	3.22E-01
	Grace Panel	2.48E-01	9.48E-02	3.43E-01
	Ibex Complex	3.17E-01	8.85E-02	4.06E-01
	North Trail	3.99E-02	9.83E-02	1.38E-01
	Town Site	3.47E-02	5.56E-02	9.02E-02
	Woodall	4.01E-01	4.94E-02	4.51E-01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Coyote	Camp G and H	5.06E-03	1.82E-02	2.33E-02
	Downgradient East	8.41E-03	8.89E-03	1.73E-02
	Downgradient West	7.19E-03	1.39E-02	2.11E-02
	Grace Panel	3.89E-02	3.17E-02	7.06E-02
	Ibex Complex	3.48E-02	3.06E-02	6.54E-02
	North Trail	1.52E-02	3.29E-02	4.82E-02
	Town Site	7.11E-03	1.86E-02	2.57E-02
	Woodall	4.00E-02	2.45E-02	6.45E-02
Deer Mouse	Camp G and H	1.33E-01	6.46E-02	1.98E-01
	Downgradient East	9.34E-02	2.87E-02	1.22E-01
	Downgradient West	3.56E-01	4.92E-02	4.06E-01
	Grace Panel	2.57E-01	1.12E-01	3.69E-01
	Ibex Complex	3.58E-01	1.05E-01	4.63E-01
	North Trail	4.07E-02	1.16E-01	1.57E-01
	Town Site	3.59E-02	6.59E-02	1.02E-01
	Woodall	4.34E-01	5.85E-02	4.93E-01
Eastern Cottontail	Camp G and H	5.19E-02	3.03E-02	8.21E-02
	Downgradient East	1.95E-02	1.35E-02	3.30E-02
	Downgradient West	1.54E-01	2.31E-02	1.77E-01
	Grace Panel	4.82E-02	5.27E-02	1.01E-01
	Ibex Complex	1.06E-01	4.91E-02	1.55E-01
	North Trail	6.71E-03	5.46E-02	6.13E-02
	Town Site	6.71E-03	3.09E-02	3.76E-02
	Woodall	1.06E-01	2.74E-02	1.33E-01
Mule Deer	Camp G and H	3.40E-02	6.10E-03	4.01E-02
	Downgradient East	1.28E-02	3.38E-03	1.62E-02
	Downgradient West	1.01E-01	4.70E-03	1.06E-01
	Grace Panel	3.16E-02	1.06E-02	4.22E-02
	Ibex Complex	6.92E-02	1.08E-02	8.00E-02
	North Trail	4.40E-03	1.11E-02	1.55E-02
	Town Site	4.40E-03	6.26E-03	1.07E-02
	Woodall	6.93E-02	1.23E-02	8.16E-02

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Northern Bobwhite	Camp G and H	7.17E-02	3.83E-02	1.10E-01
	Downgradient East	3.32E-02	1.70E-02	5.02E-02
	Downgradient West	2.07E-01	2.92E-02	2.37E-01
	Grace Panel	8.57E-02	6.67E-02	1.52E-01
	Ibex Complex	1.58E-01	6.22E-02	2.21E-01
	North Trail	1.26E-02	6.92E-02	8.18E-02
	Town Site	1.20E-02	3.91E-02	5.11E-02
	Woodall	1.69E-01	3.48E-02	2.04E-01
Northern Harrier	Camp G and H	1.22E-02	1.41E-02	2.63E-02
	Downgradient East	2.41E-02	6.28E-03	3.04E-02
	Downgradient West	1.21E-02	1.08E-02	2.28E-02
	Grace Panel	1.18E-01	2.46E-02	1.43E-01
	Ibex Complex	1.02E-01	2.29E-02	1.25E-01
	North Trail	4.85E-02	2.55E-02	7.39E-02
	Town Site	2.20E-02	1.44E-02	3.64E-02
	Woodall	1.15E-01	1.28E-02	1.28E-01
Barium				
American Robin	Camp G and H	7.66E+00	3.24E-01	7.98E+00
	Downgradient East	7.06E+00	5.27E-01	7.59E+00
	Downgradient West	3.70E+00	7.15E-01	4.42E+00
	Grace Panel	1.59E+00	1.84E-01	1.77E+00
	Ibex Complex	2.46E+00	2.43E-01	2.70E+00
	North Trail	5.72E-01	1.83E-01	7.55E-01
	Town Site	2.81E+00	5.34E-01	3.35E+00
	Woodall	2.26E+00	3.89E-01	2.65E+00
Coyote	Camp G and H	4.69E-01	1.14E-01	5.83E-01
	Downgradient East	5.06E-01	1.81E-01	6.88E-01
	Downgradient West	5.22E-01	2.47E-01	7.69E-01
	Grace Panel	1.26E-01	6.63E-02	1.93E-01
	Ibex Complex	3.56E-01	8.68E-02	4.42E-01
	North Trail	1.27E-01	6.86E-02	1.95E-01
	Town Site	3.65E-01	1.87E-01	5.51E-01
	Woodall	4.63E-01	1.33E-01	5.96E-01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Deer Mouse	Camp G and H	9.64E+00	3.84E-01	1.00E+01
	Downgradient East	8.49E+00	6.24E-01	9.12E+00
	Downgradient West	4.57E+00	8.47E-01	5.42E+00
	Grace Panel	1.85E+00	2.18E-01	2.07E+00
	Ibex Complex	2.99E+00	2.88E-01	3.27E+00
	North Trail	7.05E-01	2.16E-01	9.21E-01
	Town Site	3.47E+00	6.33E-01	4.11E+00
	Woodall	2.71E+00	4.61E-01	3.17E+00
Eastern Cottontail	Camp G and H	4.08E+00	1.80E-01	4.26E+00
	Downgradient East	3.16E+00	2.93E-01	3.45E+00
	Downgradient West	1.84E+00	3.97E-01	2.24E+00
	Grace Panel	6.22E-01	1.02E-01	7.25E-01
	Ibex Complex	1.15E+00	1.35E-01	1.28E+00
	North Trail	2.82E-01	1.01E-01	3.83E-01
	Town Site	1.40E+00	2.97E-01	1.69E+00
	Woodall	9.89E-01	2.16E-01	1.20E+00
Mule Deer	Camp G and H	2.68E+00	4.12E-02	2.72E+00
	Downgradient East	2.07E+00	6.33E-02	2.13E+00
	Downgradient West	1.21E+00	8.66E-02	1.29E+00
	Grace Panel	4.08E-01	2.46E-02	4.33E-01
	Ibex Complex	7.52E-01	3.18E-02	7.83E-01
	North Trail	1.85E-01	2.68E-02	2.12E-01
	Town Site	9.16E-01	6.66E-02	9.83E-01
	Woodall	6.48E-01	4.64E-02	6.95E-01
Northern Bobwhite	Camp G and H	5.52E+00	2.28E-01	5.75E+00
	Downgradient East	4.42E+00	3.71E-01	4.79E+00
	Downgradient West	2.52E+00	5.03E-01	3.02E+00
	Grace Panel	8.97E-01	1.30E-01	1.03E+00
	Ibex Complex	1.59E+00	1.71E-01	1.76E+00
	North Trail	3.87E-01	1.28E-01	5.15E-01
	Town Site	1.92E+00	3.76E-01	2.29E+00
	Woodall	1.39E+00	2.74E-01	1.67E+00

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Northern Harrier	Camp G and H	1.22E+00	8.40E-02	1.31E+00
	Downgradient East	1.38E+00	1.37E-01	1.51E+00
	Downgradient West	1.56E+00	1.85E-01	1.75E+00
	Grace Panel	3.51E-01	4.77E-02	3.98E-01
	Ibex Complex	1.07E+00	6.31E-02	1.13E+00
	North Trail	3.93E-01	4.73E-02	4.40E-01
	Town Site	1.08E+00	1.39E-01	1.22E+00
	Woodall	1.43E+00	1.01E-01	1.53E+00
Cadmium				
American Robin	Camp G and H	3.64E-01	1.92E-01	5.56E-01
	Downgradient East	3.74E-01	2.53E-02	3.99E-01
	Downgradient West	2.19E-01	4.88E-02	2.68E-01
	Grace Panel	1.04E+00	1.47E-01	1.18E+00
	Ibex Complex	1.09E+00	2.00E-01	1.29E+00
	North Trail	4.60E-01	9.15E-02	5.51E-01
	Town Site	1.05E-01	1.37E-01	2.42E-01
	Woodall	5.42E-01	9.66E-02	6.39E-01
Coyote	Camp G and H	4.12E-02	6.41E-02	1.05E-01
	Downgradient East	4.24E-02	8.73E-03	5.11E-02
	Downgradient West	1.07E-02	1.63E-02	2.70E-02
	Grace Panel	3.33E-02	4.91E-02	8.24E-02
	Ibex Complex	3.60E-02	6.74E-02	1.03E-01
	North Trail	1.77E-02	3.06E-02	4.83E-02
	Town Site	1.98E-02	4.57E-02	6.55E-02
	Woodall	2.59E-02	3.26E-02	5.85E-02
Deer Mouse	Camp G and H	4.46E-01	2.28E-01	6.74E-01
	Downgradient East	3.65E-01	2.99E-02	3.95E-01
	Downgradient West	2.36E-01	5.78E-02	2.93E-01
	Grace Panel	1.04E+00	1.75E-01	1.22E+00
	Ibex Complex	1.07E+00	2.37E-01	1.30E+00
	North Trail	4.99E-01	1.08E-01	6.07E-01
	Town Site	9.92E-02	1.62E-01	2.62E-01
	Woodall	5.56E-01	1.14E-01	6.71E-01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Eastern Cottontail	Camp G and H	1.76E-01	1.07E-01	2.83E-01
	Downgradient East	3.77E-02	1.40E-02	5.17E-02
	Downgradient West	5.58E-02	2.71E-02	8.29E-02
	Grace Panel	1.55E-01	8.18E-02	2.37E-01
	Ibex Complex	1.14E-01	1.11E-01	2.25E-01
	North Trail	1.23E-01	5.08E-02	1.73E-01
	Town Site	6.10E-03	7.61E-02	8.22E-02
	Woodall	9.60E-02	5.37E-02	1.50E-01
Mule Deer	Camp G and H	1.16E-01	2.14E-02	1.37E-01
	Downgradient East	2.47E-02	3.07E-03	2.78E-02
	Downgradient West	3.66E-02	5.43E-03	4.20E-02
	Grace Panel	1.02E-01	1.64E-02	1.18E-01
	Ibex Complex	7.45E-02	2.28E-02	9.73E-02
	North Trail	8.04E-02	1.02E-02	9.07E-02
	Town Site	4.00E-03	1.52E-02	1.92E-02
	Woodall	6.30E-02	1.11E-02	7.40E-02
Northern Bobwhite	Camp G and H	2.43E-01	1.35E-01	3.78E-01
	Downgradient East	9.05E-02	1.78E-02	1.08E-01
	Downgradient West	9.03E-02	3.43E-02	1.25E-01
	Grace Panel	3.07E-01	1.04E-01	4.10E-01
	Ibex Complex	2.68E-01	1.41E-01	4.09E-01
	North Trail	1.96E-01	6.44E-02	2.60E-01
	Town Site	2.04E-02	9.64E-02	1.17E-01
	Woodall	1.77E-01	6.80E-02	2.45E-01
Northern Harrier	Camp G and H	1.20E-01	4.99E-02	1.70E-01
	Downgradient East	1.25E-01	6.55E-03	1.31E-01
	Downgradient West	2.64E-02	1.26E-02	3.91E-02
	Grace Panel	6.90E-02	3.82E-02	1.07E-01
	Ibex Complex	7.59E-02	5.18E-02	1.28E-01
	North Trail	4.00E-02	2.37E-02	6.37E-02
	Town Site	6.10E-02	3.55E-02	9.66E-02
	Woodall	6.40E-02	2.50E-02	8.90E-02

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Chromium				
American Robin	Camp G and H	2.34E-01	1.39E+00	1.63E+00
	Downgradient East	3.16E-01	4.05E-01	7.21E-01
	Downgradient West	1.18E-01	6.02E-01	7.20E-01
	Grace Panel	3.43E+00	1.68E+00	5.11E+00
	Ibex Complex	9.70E-01	1.93E+00	2.90E+00
	North Trail	1.26E-01	1.13E+00	1.26E+00
	Town Site	1.20E-01	1.15E+00	1.27E+00
	Woodall	9.73E-01	1.27E+00	2.24E+00
Coyote	Camp G and H	5.54E-02	4.64E-01	5.20E-01
	Downgradient East	7.91E-02	1.36E-01	2.15E-01
	Downgradient West	5.07E-02	2.01E-01	2.52E-01
	Grace Panel	2.17E-01	5.61E-01	7.77E-01
	Ibex Complex	1.44E-01	6.79E-01	8.23E-01
	North Trail	1.03E-01	3.77E-01	4.81E-01
	Town Site	6.74E-02	3.84E-01	4.51E-01
	Woodall	1.76E-01	4.27E-01	6.03E-01
Deer Mouse	Camp G and H	2.74E-01	1.65E+00	1.92E+00
	Downgradient East	3.10E-01	4.80E-01	7.90E-01
	Downgradient West	1.42E-01	7.14E-01	8.55E-01
	Grace Panel	3.28E+00	1.99E+00	5.27E+00
	Ibex Complex	1.17E+00	2.29E+00	3.46E+00
	North Trail	1.52E-01	1.34E+00	1.49E+00
	Town Site	1.40E-01	1.36E+00	1.50E+00
	Woodall	9.34E-01	1.51E+00	2.44E+00
Eastern Cottontail	Camp G and H	9.43E-02	7.73E-01	8.68E-01
	Downgradient East	3.45E-02	2.25E-01	2.60E-01
	Downgradient West	5.22E-02	3.35E-01	3.87E-01
	Grace Panel	2.44E-01	9.33E-01	1.18E+00
	Ibex Complex	4.37E-01	1.07E+00	1.51E+00
	North Trail	5.63E-02	6.27E-01	6.84E-01
	Town Site	4.76E-02	6.40E-01	6.87E-01
	Woodall	7.31E-02	7.06E-01	7.79E-01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Mule Deer	Camp G and H	6.18E-02	1.55E-01	2.17E-01
	Downgradient East	2.26E-02	4.57E-02	6.83E-02
	Downgradient West	3.42E-02	6.71E-02	1.01E-01
	Grace Panel	1.60E-01	1.87E-01	3.47E-01
	Ibex Complex	2.86E-01	2.44E-01	5.31E-01
	North Trail	3.69E-02	1.26E-01	1.63E-01
	Town Site	3.12E-02	1.28E-01	1.59E-01
	Woodall	4.79E-02	1.44E-01	1.92E-01
Northern Bobwhite	Camp G and H	1.35E-01	9.80E-01	1.11E+00
	Downgradient East	7.94E-02	2.85E-01	3.65E-01
	Downgradient West	7.32E-02	4.24E-01	4.97E-01
	Grace Panel	7.18E-01	1.18E+00	1.90E+00
	Ibex Complex	6.11E-01	1.36E+00	1.97E+00
	North Trail	7.89E-02	7.95E-01	8.73E-01
	Town Site	6.84E-02	8.10E-01	8.79E-01
	Woodall	2.08E-01	8.94E-01	1.10E+00
Northern Harrier	Camp G and H	1.72E-01	3.61E-01	5.33E-01
	Downgradient East	2.47E-01	1.05E-01	3.52E-01
	Downgradient West	1.62E-01	1.56E-01	3.18E-01
	Grace Panel	5.79E-01	4.35E-01	1.01E+00
	Ibex Complex	4.33E-01	5.00E-01	9.34E-01
	North Trail	3.33E-01	2.93E-01	6.26E-01
	Town Site	2.16E-01	2.99E-01	5.15E-01
	Woodall	5.40E-01	3.29E-01	8.70E-01
Copper				
American Robin	Camp G and H	2.97E+00	2.47E-01	3.22E+00
	Downgradient East	2.77E+00	1.32E-01	2.91E+00
	Downgradient West	3.14E+00	1.64E-01	3.31E+00
	Grace Panel	3.55E+00	3.67E-01	3.92E+00
	Ibex Complex	4.16E+00	2.51E-01	4.41E+00
	North Trail	2.37E+00	2.55E-01	2.63E+00
	Town Site	3.62E+00	2.05E-01	3.83E+00
	Woodall	3.61E+00	2.43E-01	3.86E+00

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Coyote	Camp G and H	4.53E-01	8.26E-02	5.35E-01
	Downgradient East	5.72E-01	4.44E-02	6.16E-01
	Downgradient West	4.58E-01	5.49E-02	5.13E-01
	Grace Panel	5.33E-01	1.23E-01	6.56E-01
	Ibex Complex	5.25E-01	8.59E-02	6.11E-01
	North Trail	3.54E-01	8.73E-02	4.41E-01
	Town Site	4.14E-01	6.85E-02	4.82E-01
	Woodall	4.74E-01	8.17E-02	5.55E-01
Deer Mouse	Camp G and H	2.96E+00	2.93E-01	3.26E+00
	Downgradient East	2.68E+00	1.56E-01	2.84E+00
	Downgradient West	3.02E+00	1.94E-01	3.22E+00
	Grace Panel	3.43E+00	4.35E-01	3.87E+00
	Ibex Complex	3.92E+00	2.97E-01	4.22E+00
	North Trail	2.34E+00	3.02E-01	2.64E+00
	Town Site	3.41E+00	2.42E-01	3.65E+00
	Woodall	3.43E+00	2.87E-01	3.72E+00
Eastern Cottontail	Camp G and H	4.01E-01	1.37E-01	5.38E-01
	Downgradient East	2.38E-01	7.33E-02	3.11E-01
	Downgradient West	2.47E-01	9.11E-02	3.38E-01
	Grace Panel	3.12E-01	2.04E-01	5.16E-01
	Ibex Complex	2.13E-01	1.39E-01	3.52E-01
	North Trail	2.81E-01	1.41E-01	4.22E-01
	Town Site	1.71E-01	1.14E-01	2.84E-01
	Woodall	2.24E-01	1.35E-01	3.58E-01
Mule Deer	Camp G and H	2.63E-01	2.76E-02	2.91E-01
	Downgradient East	1.56E-01	1.50E-02	1.71E-01
	Downgradient West	1.62E-01	1.85E-02	1.81E-01
	Grace Panel	2.04E-01	4.15E-02	2.46E-01
	Ibex Complex	1.39E-01	2.98E-02	1.69E-01
	North Trail	1.84E-01	3.03E-02	2.14E-01
	Town Site	1.12E-01	2.30E-02	1.35E-01
	Woodall	1.47E-01	2.76E-02	1.74E-01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Northern Bobwhite	Camp G and H	8.32E-01	1.74E-01	1.01E+00
	Downgradient East	6.26E-01	9.28E-02	7.18E-01
	Downgradient West	6.84E-01	1.15E-01	7.99E-01
	Grace Panel	8.08E-01	2.58E-01	1.07E+00
	Ibex Complex	7.78E-01	1.76E-01	9.54E-01
	North Trail	6.20E-01	1.79E-01	7.99E-01
	Town Site	6.61E-01	1.44E-01	8.05E-01
	Woodall	7.19E-01	1.71E-01	8.89E-01
Northern Harrier	Camp G and H	1.37E+00	6.40E-02	1.43E+00
	Downgradient East	1.77E+00	3.42E-02	1.80E+00
	Downgradient West	1.38E+00	4.25E-02	1.42E+00
	Grace Panel	1.61E+00	9.52E-02	1.71E+00
	Ibex Complex	1.56E+00	6.50E-02	1.63E+00
	North Trail	1.07E+00	6.60E-02	1.13E+00
	Town Site	1.22E+00	5.30E-02	1.27E+00
	Woodall	1.42E+00	6.29E-02	1.48E+00
Lead				
American Robin	Camp G and H	4.39E-02	6.06E-02	1.04E-01
	Downgradient East	5.62E-02	4.77E-02	1.04E-01
	Downgradient West	1.60E-02	2.48E-01	2.64E-01
	Grace Panel	6.76E-02	3.19E-02	9.95E-02
	Ibex Complex	1.54E-02	3.76E-02	5.30E-02
	North Trail	6.09E-03	2.98E-02	3.59E-02
	Town Site	1.94E-02	2.08E+00	2.10E+00
	Woodall	4.95E-02	3.44E-02	8.39E-02
Coyote	Camp G and H	1.54E-02	2.04E-02	3.59E-02
	Downgradient East	3.41E-02	1.60E-02	5.01E-02
	Downgradient West	1.38E-02	8.28E-02	9.66E-02
	Grace Panel	1.28E-02	1.09E-02	2.37E-02
	Ibex Complex	8.92E-02	1.29E-02	1.02E-01
	North Trail	7.52E-03	3.42E-02	4.17E-02
	Town Site	4.88E-02	6.94E-01	7.43E-01
	Woodall	2.35E-02	1.17E-02	3.51E-02

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Deer Mouse	Camp G and H	4.61E-02	7.18E-02	1.18E-01
	Downgradient East	5.70E-02	5.65E-02	1.13E-01
	Downgradient West	1.83E-02	2.94E-01	3.13E-01
	Grace Panel	6.74E-02	3.78E-02	1.05E-01
	Ibex Complex	1.69E-02	4.45E-02	6.14E-02
	North Trail	6.66E-03	3.53E-02	4.20E-02
	Town Site	1.93E-02	2.47E+00	2.49E+00
	Woodall	4.87E-02	4.07E-02	8.95E-02
Eastern Cottontail	Camp G and H	9.46E-03	3.37E-02	4.31E-02
	Downgradient East	8.97E-03	2.65E-02	3.54E-02
	Downgradient West	5.76E-03	1.38E-01	1.44E-01
	Grace Panel	8.91E-03	1.77E-02	2.66E-02
	Ibex Complex	4.39E-03	2.09E-02	2.53E-02
	North Trail	1.71E-03	1.65E-02	1.83E-02
	Town Site	2.50E-03	1.16E+00	1.16E+00
	Woodall	5.60E-03	1.91E-02	2.47E-02
Mule Deer	Camp G and H	6.20E-03	6.93E-03	1.31E-02
	Downgradient East	5.88E-03	5.38E-03	1.13E-02
	Downgradient West	3.78E-03	2.77E-02	3.14E-02
	Grace Panel	5.84E-03	3.80E-03	9.64E-03
	Ibex Complex	2.88E-03	4.46E-03	7.34E-03
	North Trail	1.12E-03	2.38E-02	2.50E-02
	Town Site	1.64E-03	2.31E-01	2.33E-01
	Woodall	3.67E-03	3.99E-03	7.66E-03
Northern Bobwhite	Camp G and H	1.62E-02	4.26E-02	5.88E-02
	Downgradient East	1.73E-02	3.35E-02	5.08E-02
	Downgradient West	8.47E-03	1.75E-01	1.83E-01
	Grace Panel	1.87E-02	2.24E-02	4.11E-02
	Ibex Complex	6.88E-03	2.64E-02	3.33E-02
	North Trail	2.69E-03	2.10E-02	2.36E-02
	Town Site	5.30E-03	1.47E+00	1.47E+00
	Woodall	1.27E-02	2.42E-02	3.69E-02

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Northern Harrier	Camp G and H	4.89E-02	1.57E-02	6.46E-02
	Downgradient East	1.10E-01	1.24E-02	1.22E-01
	Downgradient West	4.45E-02	6.44E-02	1.09E-01
	Grace Panel	3.93E-02	8.26E-03	4.75E-02
	Ibex Complex	2.92E-01	9.74E-03	3.02E-01
	North Trail	2.45E-02	7.72E-03	3.22E-02
	Town Site	1.59E-01	5.40E-01	6.99E-01
	Woodall	7.51E-02	8.91E-03	8.41E-02
Manganese				
American Robin	Camp G and H	9.58E+00	7.32E-01	1.03E+01
	Downgradient East	2.94E+01	3.45E+00	3.29E+01
	Downgradient West	1.27E+01	1.98E+00	1.46E+01
	Grace Panel	3.58E+00	3.70E-01	3.95E+00
	Ibex Complex	2.18E+01	1.83E+00	2.37E+01
	North Trail	4.29E+00	7.52E-01	5.05E+00
	Town Site	4.74E+00	2.16E+00	6.90E+00
	Woodall	1.29E+01	3.01E+00	1.59E+01
Coyote	Camp G and H	4.56E-01	2.68E-01	7.24E-01
	Downgradient East	7.19E-01	1.17E+00	1.89E+00
	Downgradient West	5.50E-01	6.73E-01	1.22E+00
	Grace Panel	2.98E-01	1.23E-01	4.21E-01
	Ibex Complex	8.08E-01	6.33E-01	1.44E+00
	North Trail	2.73E-01	2.75E-01	5.47E-01
	Town Site	4.03E-01	7.35E-01	1.14E+00
	Woodall	5.17E-01	1.08E+00	1.60E+00
Deer Mouse	Camp G and H	9.98E+00	8.68E-01	1.09E+01
	Downgradient East	3.47E+01	4.09E+00	3.88E+01
	Downgradient West	1.34E+01	2.34E+00	1.57E+01
	Grace Panel	3.77E+00	4.38E-01	4.21E+00
	Ibex Complex	2.47E+01	2.17E+00	2.69E+01
	North Trail	4.83E+00	8.91E-01	5.72E+00
	Town Site	5.27E+00	2.56E+00	7.83E+00
	Woodall	1.34E+01	3.57E+00	1.70E+01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Eastern Cottontail	Camp G and H	1.94E+00	4.07E-01	2.35E+00
	Downgradient East	1.22E+01	1.92E+00	1.41E+01
	Downgradient West	2.82E+00	1.10E+00	3.92E+00
	Grace Panel	7.81E-01	2.06E-01	9.86E-01
	Ibex Complex	7.41E+00	1.02E+00	8.42E+00
	North Trail	1.42E+00	4.18E-01	1.83E+00
	Town Site	1.47E+00	1.20E+00	2.67E+00
	Woodall	2.53E+00	1.67E+00	4.20E+00
Mule Deer	Camp G and H	1.27E+00	1.01E-01	1.37E+00
	Downgradient East	7.98E+00	3.96E-01	8.38E+00
	Downgradient West	1.85E+00	2.32E-01	2.08E+00
	Grace Panel	5.12E-01	4.12E-02	5.53E-01
	Ibex Complex	4.86E+00	2.23E-01	5.08E+00
	North Trail	9.28E-01	1.04E-01	1.03E+00
	Town Site	9.64E-01	2.52E-01	1.22E+00
	Woodall	1.66E+00	3.99E-01	2.06E+00
Northern Bobwhite	Camp G and H	3.40E+00	5.15E-01	3.91E+00
	Downgradient East	1.73E+01	2.43E+00	1.98E+01
	Downgradient West	4.78E+00	1.39E+00	6.17E+00
	Grace Panel	1.33E+00	2.60E-01	1.59E+00
	Ibex Complex	1.11E+01	1.29E+00	1.23E+01
	North Trail	2.13E+00	5.29E-01	2.66E+00
	Town Site	2.25E+00	1.52E+00	3.77E+00
	Woodall	4.48E+00	2.12E+00	6.60E+00
Northern Harrier	Camp G and H	1.12E+00	1.90E-01	1.31E+00
	Downgradient East	1.17E+00	8.95E-01	2.07E+00
	Downgradient West	1.31E+00	5.12E-01	1.82E+00
	Grace Panel	8.36E-01	9.59E-02	9.32E-01
	Ibex Complex	1.78E+00	4.74E-01	2.26E+00
	North Trail	7.24E-01	1.95E-01	9.19E-01
	Town Site	1.13E+00	5.60E-01	1.69E+00
	Woodall	1.19E+00	7.81E-01	1.97E+00

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Mercury				
American Robin	Camp G and H	3.57E-03	1.26E-03	4.83E-03
	Downgradient East	3.93E-03	5.56E-04	4.48E-03
	Downgradient West	2.66E-03	7.99E-04	3.46E-03
	Grace Panel	4.20E-03	2.38E-03	6.58E-03
	Ibex Complex	2.58E-03	1.10E-03	3.68E-03
	North Trail	1.58E-03	1.38E-03	2.95E-03
	Town Site	2.21E-03	1.54E-03	3.75E-03
	Woodall	3.26E-03	8.86E-04	4.14E-03
Coyote	Camp G and H	1.45E-03	4.27E-04	1.87E-03
	Downgradient East	1.11E-03	1.65E-03	2.76E-03
	Downgradient West	4.00E-04	9.31E-04	1.33E-03
	Grace Panel	1.60E-04	7.97E-04	9.57E-04
	Ibex Complex	6.00E-04	3.72E-04	9.72E-04
	North Trail	1.16E-04	4.64E-04	5.80E-04
	Town Site	3.64E-04	1.18E-03	1.54E-03
	Woodall	4.00E-04	3.02E-04	7.02E-04
Deer Mouse	Camp G and H	4.29E-03	1.49E-03	5.78E-03
	Downgradient East	4.14E-03	6.59E-04	4.80E-03
	Downgradient West	2.83E-03	9.47E-04	3.78E-03
	Grace Panel	4.34E-03	2.82E-03	7.16E-03
	Ibex Complex	2.80E-03	1.30E-03	4.10E-03
	North Trail	1.59E-03	1.63E-03	3.22E-03
	Town Site	2.29E-03	1.83E-03	4.11E-03
	Woodall	3.48E-03	1.05E-03	4.53E-03
Eastern Cottontail	Camp G and H	1.59E-03	7.01E-04	2.29E-03
	Downgradient East	8.60E-04	3.09E-04	1.17E-03
	Downgradient West	6.28E-04	4.44E-04	1.07E-03
	Grace Panel	7.93E-04	1.32E-03	2.11E-03
	Ibex Complex	6.89E-04	6.11E-04	1.30E-03
	North Trail	2.44E-04	7.65E-04	1.01E-03
	Town Site	4.27E-04	8.57E-04	1.28E-03
	Woodall	7.93E-04	4.92E-04	1.29E-03

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Mule Deer	Camp G and H	1.04E-03	1.45E-04	1.19E-03
	Downgradient East	5.64E-04	1.30E-03	1.87E-03
	Downgradient West	4.12E-04	6.51E-04	1.06E-03
	Grace Panel	5.20E-04	2.68E-04	7.88E-04
	Ibex Complex	4.52E-04	1.27E-04	5.79E-04
	North Trail	1.60E-04	1.57E-04	3.17E-04
	Town Site	2.80E-04	7.34E-04	1.01E-03
	Woodall	5.20E-04	1.04E-04	6.24E-04
Northern Bobwhite	Camp G and H	2.22E-03	8.87E-04	3.11E-03
	Downgradient East	1.47E-03	3.91E-04	1.86E-03
	Downgradient West	1.04E-03	5.62E-04	1.61E-03
	Grace Panel	1.43E-03	1.67E-03	3.10E-03
	Ibex Complex	1.10E-03	7.73E-04	1.87E-03
	North Trail	4.76E-04	9.69E-04	1.44E-03
	Town Site	7.61E-04	1.08E-03	1.85E-03
	Woodall	1.30E-03	6.23E-04	1.93E-03
Northern Harrier	Camp G and H	4.60E-03	3.27E-04	4.93E-03
	Downgradient East	3.48E-03	1.44E-04	3.62E-03
	Downgradient West	1.21E-03	2.07E-04	1.41E-03
	Grace Panel	3.60E-04	6.16E-04	9.76E-04
	Ibex Complex	1.87E-03	2.85E-04	2.15E-03
	North Trail	3.20E-04	3.57E-04	6.77E-04
	Town Site	1.11E-03	4.00E-04	1.51E-03
	Woodall	1.19E-03	2.30E-04	1.42E-03
Molybdenum				
American Robin	Camp G and H	6.90E-01	4.81E-02	7.38E-01
	Downgradient East	5.64E-01	2.24E-02	5.87E-01
	Downgradient West	7.61E-01	3.29E-02	7.94E-01
	Grace Panel	1.51E+00	7.75E-02	1.58E+00
	Ibex Complex	3.37E+00	1.28E-01	3.50E+00
	North Trail	1.96E+00	1.17E-01	2.08E+00
	Town Site	1.32E+00	5.80E-02	1.37E+00
	Woodall	2.25E+00	3.53E-02	2.29E+00

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Coyote	Camp G and H	2.92E-02	1.62E-02	4.55E-02
	Downgradient East	3.28E-02	8.93E-03	4.17E-02
	Downgradient West	3.37E-02	1.16E-02	4.53E-02
	Grace Panel	5.03E-02	2.67E-02	7.69E-02
	Ibex Complex	7.92E-02	4.86E-02	1.28E-01
	North Trail	6.19E-02	3.98E-02	1.02E-01
	Town Site	5.02E-02	2.00E-02	7.02E-02
	Woodall	6.66E-02	1.26E-02	7.92E-02
Deer Mouse	Camp G and H	8.14E-01	5.70E-02	8.71E-01
	Downgradient East	6.39E-01	2.65E-02	6.66E-01
	Downgradient West	8.85E-01	3.89E-02	9.24E-01
	Grace Panel	1.81E+00	9.18E-02	1.90E+00
	Ibex Complex	4.12E+00	1.52E-01	4.27E+00
	North Trail	2.36E+00	1.39E-01	2.50E+00
	Town Site	1.46E+00	6.87E-02	1.53E+00
	Woodall	2.68E+00	4.19E-02	2.72E+00
Eastern Cottontail	Camp G and H	2.85E-01	2.67E-02	3.12E-01
	Downgradient East	1.92E-01	1.24E-02	2.04E-01
	Downgradient West	2.95E-01	1.83E-02	3.13E-01
	Grace Panel	6.71E-01	4.31E-02	7.14E-01
	Ibex Complex	1.60E+00	7.13E-02	1.68E+00
	North Trail	8.78E-01	6.50E-02	9.43E-01
	Town Site	3.97E-01	3.22E-02	4.29E-01
	Woodall	9.62E-01	1.96E-02	9.82E-01
Mule Deer	Camp G and H	1.87E-01	5.53E-03	1.93E-01
	Downgradient East	1.26E-01	3.73E-03	1.30E-01
	Downgradient West	1.93E-01	4.21E-03	1.98E-01
	Grace Panel	4.40E-01	9.33E-03	4.49E-01
	Ibex Complex	1.05E+00	1.92E-02	1.07E+00
	North Trail	5.76E-01	1.37E-02	5.90E-01
	Town Site	2.60E-01	7.00E-03	2.67E-01
	Woodall	6.31E-01	4.62E-03	6.35E-01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Northern Bobwhite	Camp G and H	4.06E-01	3.38E-02	4.40E-01
	Downgradient East	2.86E-01	1.57E-02	3.02E-01
	Downgradient West	4.26E-01	2.31E-02	4.49E-01
	Grace Panel	9.40E-01	5.45E-02	9.95E-01
	Ibex Complex	2.22E+00	9.03E-02	2.31E+00
	North Trail	1.23E+00	8.23E-02	1.31E+00
	Town Site	6.11E-01	4.08E-02	6.52E-01
	Woodall	1.36E+00	2.49E-02	1.38E+00
Northern Harrier	Camp G and H	6.81E-02	1.25E-02	8.06E-02
	Downgradient East	8.51E-02	5.80E-03	9.09E-02
	Downgradient West	8.01E-02	8.52E-03	8.86E-02
	Grace Panel	1.04E-01	2.01E-02	1.24E-01
	Ibex Complex	1.23E-01	3.33E-02	1.56E-01
	North Trail	1.24E-01	3.03E-02	1.54E-01
	Town Site	1.13E-01	1.50E-02	1.28E-01
	Woodall	1.27E-01	9.16E-03	1.37E-01
Nickel				
American Robin	Camp G and H	6.92E-01	4.51E-01	1.14E+00
	Downgradient East	3.30E-01	2.52E-01	5.82E-01
	Downgradient West	7.19E-01	3.52E-01	1.07E+00
	Grace Panel	2.41E+00	8.15E-01	3.23E+00
	Ibex Complex	1.84E+00	5.22E-01	2.37E+00
	North Trail	7.84E-01	6.72E-01	1.46E+00
	Town Site	7.46E-02	3.59E-01	4.33E-01
	Woodall	1.35E+00	5.39E-01	1.89E+00
Coyote	Camp G and H	9.54E-02	1.50E-01	2.46E-01
	Downgradient East	8.55E-02	9.22E-02	1.78E-01
	Downgradient West	8.44E-02	1.18E-01	2.02E-01
	Grace Panel	1.46E-01	2.72E-01	4.18E-01
	Ibex Complex	1.33E-01	1.80E-01	3.13E-01
	North Trail	6.37E-02	2.25E-01	2.88E-01
	Town Site	9.64E-02	1.20E-01	2.16E-01
	Woodall	9.42E-02	1.89E-01	2.83E-01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Deer Mouse	Camp G and H	8.74E-01	5.34E-01	1.41E+00
	Downgradient East	3.39E-01	2.99E-01	6.37E-01
	Downgradient West	7.67E-01	4.17E-01	1.18E+00
	Grace Panel	2.56E+00	9.66E-01	3.52E+00
	Ibex Complex	1.86E+00	6.19E-01	2.48E+00
	North Trail	8.08E-01	7.96E-01	1.60E+00
	Town Site	7.18E-02	4.25E-01	4.97E-01
	Woodall	1.52E+00	6.39E-01	2.16E+00
Eastern Cottontail	Camp G and H	3.73E-01	2.51E-01	6.24E-01
	Downgradient East	5.86E-02	1.40E-01	1.99E-01
	Downgradient West	1.73E-01	1.96E-01	3.69E-01
	Grace Panel	5.53E-01	4.53E-01	1.01E+00
	Ibex Complex	2.83E-01	2.90E-01	5.74E-01
	North Trail	1.45E-01	3.73E-01	5.18E-01
	Town Site	6.10E-03	1.99E-01	2.05E-01
	Woodall	4.50E-01	3.00E-01	7.50E-01
Mule Deer	Camp G and H	2.45E-01	5.02E-02	2.95E-01
	Downgradient East	3.84E-02	3.49E-02	7.33E-02
	Downgradient West	1.14E-01	3.94E-02	1.53E-01
	Grace Panel	3.63E-01	9.08E-02	4.54E-01
	Ibex Complex	1.86E-01	6.31E-02	2.49E-01
	North Trail	9.51E-02	7.53E-02	1.70E-01
	Town Site	4.00E-03	4.02E-02	4.42E-02
	Woodall	2.95E-01	6.77E-02	3.63E-01
Northern Bobwhite	Camp G and H	5.04E-01	3.17E-01	8.22E-01
	Downgradient East	1.08E-01	1.77E-01	2.85E-01
	Downgradient West	2.86E-01	2.48E-01	5.34E-01
	Grace Panel	9.28E-01	5.74E-01	1.50E+00
	Ibex Complex	5.55E-01	3.67E-01	9.22E-01
	North Trail	2.63E-01	4.73E-01	7.36E-01
	Town Site	1.65E-02	2.52E-01	2.69E-01
	Woodall	6.75E-01	3.80E-01	1.05E+00

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Northern Harrier	Camp G and H	2.85E-01	1.17E-01	4.02E-01
	Downgradient East	2.68E-01	6.53E-02	3.33E-01
	Downgradient West	2.49E-01	9.13E-02	3.40E-01
	Grace Panel	3.85E-01	2.11E-01	5.96E-01
	Ibex Complex	3.64E-01	1.35E-01	5.00E-01
	North Trail	1.78E-01	1.74E-01	3.53E-01
	Town Site	3.14E-01	9.30E-02	4.06E-01
	Woodall	2.55E-01	1.40E-01	3.95E-01
Selenium				
American Robin	Camp G and H	1.61E+00	5.54E-02	1.67E+00
	Downgradient East	3.94E+00	1.11E-01	4.06E+00
	Downgradient West	6.89E+00	5.92E-02	6.95E+00
	Grace Panel	1.09E+01	1.35E-01	1.11E+01
	Ibex Complex	1.00E+01	2.09E-01	1.03E+01
	North Trail	8.50E+00	2.19E-01	8.72E+00
	Town Site	7.52E-01	5.27E-02	8.05E-01
	Woodall	1.29E+01	1.91E-01	1.30E+01
Coyote	Camp G and H	2.62E-02	1.96E-02	4.58E-02
	Downgradient East	2.17E-01	1.39E-01	3.56E-01
	Downgradient West	1.10E-01	2.05E-02	1.31E-01
	Grace Panel	1.82E+00	4.51E-02	1.87E+00
	Ibex Complex	9.93E-01	9.15E-02	1.08E+00
	North Trail	7.81E-01	7.32E-02	8.55E-01
	Town Site	1.48E-01	1.84E-02	1.66E-01
	Woodall	1.66E+00	1.66E-01	1.82E+00
Deer Mouse	Camp G and H	2.03E+00	1.06E-01	2.13E+00
	Downgradient East	4.25E+00	3.07E-01	4.55E+00
	Downgradient West	8.80E+00	5.41E-02	8.86E+00
	Grace Panel	1.17E+01	2.74E-01	1.19E+01
	Ibex Complex	1.09E+01	7.85E-01	1.16E+01
	North Trail	1.04E+01	2.38E-01	1.06E+01
	Town Site	7.71E-01	4.59E-02	8.17E-01
	Woodall	1.28E+01	1.70E-01	1.29E+01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Eastern Cottontail	Camp G and H	8.55E-01	4.99E-02	9.05E-01
	Downgradient East	1.00E+00	1.44E-01	1.15E+00
	Downgradient West	3.88E+00	2.54E-02	3.90E+00
	Grace Panel	2.60E+00	1.28E-01	2.73E+00
	Ibex Complex	2.63E+00	3.68E-01	3.00E+00
	North Trail	4.08E+00	1.12E-01	4.19E+00
	Town Site	1.33E-01	2.15E-02	1.54E-01
	Woodall	1.65E+00	7.95E-02	1.73E+00
Mule Deer	Camp G and H	5.04E-01	7.12E-03	5.11E-01
	Downgradient East	5.02E-01	9.87E-02	6.00E-01
	Downgradient West	1.23E+00	7.25E-03	1.24E+00
	Grace Panel	1.34E+00	1.51E-02	1.36E+00
	Ibex Complex	1.50E+00	4.17E-02	1.54E+00
	North Trail	2.67E+00	2.44E-02	2.70E+00
	Town Site	7.44E-02	6.52E-03	8.09E-02
	Woodall	1.06E+00	1.08E-01	1.16E+00
Northern Bobwhite	Camp G and H	1.16E+00	3.90E-02	1.20E+00
	Downgradient East	1.63E+00	7.82E-02	1.71E+00
	Downgradient West	5.20E+00	4.17E-02	5.24E+00
	Grace Panel	4.31E+00	9.48E-02	4.40E+00
	Ibex Complex	4.23E+00	1.47E-01	4.37E+00
	North Trail	5.63E+00	1.54E-01	5.78E+00
	Town Site	2.45E-01	3.71E-02	2.82E-01
	Woodall	3.50E+00	1.34E-01	3.64E+00
Northern Harrier	Camp G and H	1.99E-02	1.44E-02	3.43E-02
	Downgradient East	5.56E-01	2.88E-02	5.85E-01
	Downgradient West	7.83E-02	1.54E-02	9.36E-02
	Grace Panel	5.56E+00	3.49E-02	5.59E+00
	Ibex Complex	2.86E+00	5.42E-02	2.92E+00
	North Trail	2.22E+00	5.69E-02	2.28E+00
	Town Site	4.55E-01	1.37E-02	4.69E-01
	Woodall	4.94E+00	4.94E-02	4.99E+00

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Vanadium				
American Robin	Camp G and H	5.69E-01	2.98E+00	3.55E+00
	Downgradient East	4.33E-01	3.05E-01	7.38E-01
	Downgradient West	8.81E-02	5.38E-01	6.26E-01
	Grace Panel	1.56E+00	1.27E+00	2.83E+00
	Ibex Complex	4.94E-01	2.51E+00	3.00E+00
	North Trail	8.02E-02	9.71E-01	1.05E+00
	Town Site	1.54E-01	1.79E+00	1.95E+00
	Woodall	6.32E-01	8.29E-01	1.46E+00
Coyote	Camp G and H	1.88E-02	9.94E-01	1.01E+00
	Downgradient East	2.43E-02	1.03E-01	1.27E-01
	Downgradient West	1.32E-02	1.80E-01	1.93E-01
	Grace Panel	6.22E-02	4.23E-01	4.85E-01
	Ibex Complex	5.23E-02	8.77E-01	9.29E-01
	North Trail	4.55E-02	3.25E-01	3.70E-01
	Town Site	3.20E-02	5.98E-01	6.30E-01
	Woodall	6.21E-02	2.80E-01	3.42E-01
Deer Mouse	Camp G and H	7.10E-01	3.53E+00	4.24E+00
	Downgradient East	4.25E-01	3.61E-01	7.87E-01
	Downgradient West	1.03E-01	6.37E-01	7.41E-01
	Grace Panel	1.62E+00	1.50E+00	3.13E+00
	Ibex Complex	5.17E-01	2.97E+00	3.49E+00
	North Trail	9.15E-02	1.15E+00	1.24E+00
	Town Site	1.76E-01	2.12E+00	2.30E+00
	Woodall	6.07E-01	9.83E-01	1.59E+00
Eastern Cottontail	Camp G and H	2.94E-01	1.66E+00	1.95E+00
	Downgradient East	4.75E-02	1.69E-01	2.17E-01
	Downgradient West	3.53E-02	2.99E-01	3.34E-01
	Grace Panel	3.15E-01	7.05E-01	1.02E+00
	Ibex Complex	1.03E-01	1.39E+00	1.50E+00
	North Trail	2.83E-02	5.40E-01	5.68E-01
	Town Site	5.37E-02	9.96E-01	1.05E+00
	Woodall	4.89E-02	4.61E-01	5.10E-01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Mule Deer	Camp G and H	1.93E-01	3.32E-01	5.25E-01
	Downgradient East	3.11E-02	3.46E-02	6.58E-02
	Downgradient West	2.32E-02	6.00E-02	8.32E-02
	Grace Panel	2.07E-01	1.41E-01	3.48E-01
	Ibex Complex	6.76E-02	3.13E-01	3.81E-01
	North Trail	1.86E-02	1.09E-01	1.27E-01
	Town Site	3.52E-02	1.99E-01	2.35E-01
	Woodall	3.21E-02	9.52E-02	1.27E-01
Northern Bobwhite	Camp G and H	4.01E-01	2.10E+00	2.50E+00
	Downgradient East	1.09E-01	2.15E-01	3.24E-01
	Downgradient West	5.06E-02	3.78E-01	4.29E-01
	Grace Panel	5.53E-01	8.93E-01	1.45E+00
	Ibex Complex	1.79E-01	1.77E+00	1.94E+00
	North Trail	4.18E-02	6.83E-01	7.25E-01
	Town Site	7.96E-02	1.26E+00	1.34E+00
	Woodall	1.37E-01	5.83E-01	7.20E-01
Northern Harrier	Camp G and H	3.85E-02	7.73E-01	8.11E-01
	Downgradient East	6.29E-02	7.90E-02	1.42E-01
	Downgradient West	3.97E-02	1.39E-01	1.79E-01
	Grace Panel	1.43E-01	3.29E-01	4.72E-01
	Ibex Complex	1.52E-01	6.50E-01	8.03E-01
	North Trail	1.46E-01	2.52E-01	3.98E-01
	Town Site	9.90E-02	4.65E-01	5.64E-01
	Woodall	1.79E-01	2.15E-01	3.94E-01
Zinc				
American Robin	Camp G and H	3.23E+01	2.51E+00	3.48E+01
	Downgradient East	2.39E+01	1.05E+00	2.49E+01
	Downgradient West	2.14E+01	1.20E+00	2.26E+01
	Grace Panel	3.29E+01	3.09E+00	3.60E+01
	Ibex Complex	2.94E+01	3.75E+00	3.32E+01
	North Trail	2.53E+01	2.79E+00	2.81E+01
	Town Site	1.71E+01	2.63E+00	1.97E+01
	Woodall	2.50E+01	2.18E+00	2.72E+01

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Coyote	Camp G and H	1.76E+01	8.36E-01	1.84E+01
	Downgradient East	2.86E+01	3.77E-01	2.89E+01
	Downgradient West	2.31E+01	4.01E-01	2.35E+01
	Grace Panel	1.26E+01	1.03E+00	1.36E+01
	Ibex Complex	3.10E+01	1.31E+00	3.24E+01
	North Trail	1.06E+01	9.32E-01	1.15E+01
	Town Site	3.33E+01	8.79E-01	3.42E+01
	Woodall	1.94E+01	7.43E-01	2.02E+01
Deer Mouse	Camp G and H	3.47E+01	2.97E+00	3.77E+01
	Downgradient East	2.31E+01	1.25E+00	2.43E+01
	Downgradient West	2.17E+01	1.42E+00	2.31E+01
	Grace Panel	3.50E+01	3.66E+00	3.86E+01
	Ibex Complex	2.93E+01	4.44E+00	3.37E+01
	North Trail	2.69E+01	3.30E+00	3.02E+01
	Town Site	1.62E+01	3.12E+00	1.93E+01
	Woodall	2.56E+01	2.58E+00	2.81E+01
Eastern Cottontail	Camp G and H	8.15E+00	1.39E+00	9.54E+00
	Downgradient East	2.09E+00	5.85E-01	2.67E+00
	Downgradient West	3.40E+00	6.67E-01	4.06E+00
	Grace Panel	7.75E+00	1.72E+00	9.46E+00
	Ibex Complex	3.82E+00	2.08E+00	5.90E+00
	North Trail	5.92E+00	1.55E+00	7.46E+00
	Town Site	9.09E-01	1.46E+00	2.37E+00
	Woodall	4.28E+00	1.21E+00	5.49E+00
Mule Deer	Camp G and H	5.34E+00	2.79E-01	5.62E+00
	Downgradient East	1.37E+00	1.39E-01	1.51E+00
	Downgradient West	2.23E+00	1.34E-01	2.36E+00
	Grace Panel	5.08E+00	3.44E-01	5.42E+00
	Ibex Complex	2.51E+00	4.67E-01	2.97E+00
	North Trail	3.88E+00	3.13E-01	4.19E+00
	Town Site	5.96E-01	2.94E-01	8.90E-01
	Woodall	2.81E+00	2.57E-01	3.07E+00

Table 4.1-3
Tier 1 Exposure Calculations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)		
		Food	Abiotic	Total
Northern Bobwhite	Camp G and H	1.32E+01	1.76E+00	1.50E+01
	Downgradient East	5.43E+00	7.41E-01	6.17E+00
	Downgradient West	6.55E+00	8.44E-01	7.40E+00
	Grace Panel	1.29E+01	2.17E+00	1.50E+01
	Ibex Complex	8.07E+00	2.64E+00	1.07E+01
	North Trail	9.86E+00	1.96E+00	1.18E+01
	Town Site	3.24E+00	1.85E+00	5.09E+00
	Woodall	8.01E+00	1.53E+00	9.54E+00
Northern Harrier	Camp G and H	5.65E+01	6.50E-01	5.71E+01
	Downgradient East	9.28E+01	2.73E-01	9.31E+01
	Downgradient West	7.49E+01	3.11E-01	7.52E+01
	Grace Panel	4.00E+01	8.01E-01	4.08E+01
	Ibex Complex	1.01E+02	9.72E-01	1.02E+02
	North Trail	3.37E+01	7.22E-01	3.44E+01
	Town Site	1.09E+02	6.83E-01	1.09E+02
	Woodall	6.28E+01	5.64E-01	6.34E+01

Notes:

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

TABLE 4.2-1
LOAEL TRVs for Wildlife ECOPCs

COPC	Endpoint	TRV	Units	TRV Type	TRV Type Definition	Test Species	Source
Mammals							
Cadmium	Body weight	0.909	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Sheep	EcoSSL
Chromium	Body weight	12	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Mouse	EcoSSL
Copper	Progeny number	6.79	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Mink	EcoSSL
Molybdenum	Reproduction	2.6	mg/kg bw/d	LOAEL	Chronic LOAEL	Mouse	AWERA/ Sample et al. (1996)
Nickel	Sperm cell counts	2.71	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Mouse	EcoSSL
Selenium	Progeny weight	0.145	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Mouse	EcoSSL
Vanadium	Body weight	5.11	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Rat	EcoSSL
Zinc	Progeny weight	75.9	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Cattle	EcoSSL
Birds							
Cadmium	Reproduction, growth and survival	2.37	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Chicken	EcoSSL
Chromium	Reproductive success; mortality	2.78	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Black Duck	EcoSSL
Copper	Body weight	4.68	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Turkey	EcoSSL
Molybdenum	Reproduction	35.3	mg/kg bw/d	LOAEL	Chronic LOAEL	Chicken	AWERA/ Sample et al. (1996)
Nickel	Body weight	11.5	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Chicken	EcoSSL
Selenium	Egg weight	0.368	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Chicken	EcoSSL
Vanadium	Egg quality	0.413	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Chicken	EcoSSL
Zinc	Progeny count	66.5	mg/kg bw/d	LOAEL	Lowest bounded LOAEL for reproduction, growth and survival	Chicken	EcoSSL

Notes:
COPC - Chemical of Potential Concern
TRV - Toxicity Reference Value
LOAEL - Lowest-Observable Adverse Effects Levels
NOAEL - No-Observed Adverse Effects Levels
dw - dry weight
bw - body weight
EcoSSL - U.S. Environmental Protection Agency (USEPA). 2005. Guidance for Developing Ecological Soil Screening Levels (EcoSSLs). EPA Office of Solid Waste and Emergency
AWERA - Unadjusted values from AWERA Work Plan 2002 - TetraTech EM, Inc. (TTEMI). 2002. Final Area Wide Human Health and Ecological Risk Assessment Work Plan, Selenium Project, Southeast Idaho Phosphate Mining Resource Area. Prepared for Idaho Department of Environmental Quality by TetraTech EM, Inc., April, 2002.

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Antimony							
American Robin	Camp G and H	1.86E-02	1.20E-02	3.06E-02	N/A	N/A	**Yes**
	Downgradient East	2.96E-02	3.83E-03	3.34E-02	N/A	N/A	**Yes**
	Downgradient West	4.86E-03	4.41E-03	9.27E-03	N/A	N/A	**Yes**
	Grace Panel	2.84E-02	1.83E-02	4.67E-02	N/A	N/A	**Yes**
	Ibex Complex	1.07E-02	1.23E-02	2.29E-02	N/A	N/A	**Yes**
	North Trail	3.68E-03	7.59E-03	1.13E-02	N/A	N/A	**Yes**
	Town Site	3.05E-03	8.34E-03	1.14E-02	N/A	N/A	**Yes**
	Woodall	2.37E-02	7.94E-03	3.17E-02	N/A	N/A	**Yes**
Coyote	Camp G and H	5.96E-03	1.02E-02	1.62E-02	0.059	0.27	No
	Downgradient East	1.05E-02	1.31E-03	1.18E-02	0.059	0.20	No
	Downgradient West	8.98E-03	1.49E-03	1.05E-02	0.059	0.18	No
	Grace Panel	2.82E-03	6.15E-03	8.98E-03	0.059	0.15	No
	Ibex Complex	1.01E-02	4.16E-03	1.42E-02	0.059	0.24	No
	North Trail	1.84E-03	1.02E-02	1.21E-02	0.059	0.20	No
	Town Site	1.10E-02	2.80E-03	1.38E-02	0.059	0.23	No
	Woodall	7.25E-03	2.69E-03	9.94E-03	0.059	0.17	No
Deer Mouse	Camp G and H	1.92E-02	1.42E-02	3.34E-02	0.059	0.57	No
	Downgradient East	3.31E-02	4.53E-03	3.77E-02	0.059	0.64	No
	Downgradient West	5.47E-03	5.22E-03	1.07E-02	0.059	0.18	No
	Grace Panel	3.10E-02	2.17E-02	5.27E-02	0.059	0.89	No
	Ibex Complex	1.30E-02	1.45E-02	2.75E-02	0.059	0.47	No
	North Trail	3.94E-03	9.00E-03	1.29E-02	0.059	0.22	No
	Town Site	3.13E-03	9.88E-03	1.30E-02	0.059	0.22	No
	Woodall	2.34E-02	9.41E-03	3.28E-02	0.059	0.56	No
Eastern Cottontail	Camp G and H	3.48E-03	6.67E-03	1.01E-02	0.059	0.17	No
	Downgradient East	9.46E-03	2.13E-03	1.16E-02	0.059	0.20	No
	Downgradient West	1.60E-03	2.45E-03	4.05E-03	0.059	0.07	No
	Grace Panel	7.93E-03	1.02E-02	1.81E-02	0.059	0.31	No
	Ibex Complex	4.99E-03	6.81E-03	1.18E-02	0.059	0.20	No
	North Trail	9.15E-04	4.22E-03	5.13E-03	0.059	0.09	No
	Town Site	5.49E-04	4.63E-03	5.18E-03	0.059	0.09	No
	Woodall	2.81E-03	4.41E-03	7.22E-03	0.059	0.12	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Mule Deer	Camp G and H	2.28E-03	6.58E-03	8.86E-03	0.059	0.15	No
	Downgradient East	6.20E-03	4.53E-04	6.65E-03	0.059	0.11	No
	Downgradient West	1.05E-03	5.09E-04	1.56E-03	0.059	0.03	No
	Grace Panel	5.20E-03	2.07E-03	7.27E-03	0.059	0.12	No
	Ibex Complex	3.27E-03	1.42E-03	4.69E-03	0.059	0.08	No
	North Trail	6.00E-04	7.37E-03	7.97E-03	0.059	0.14	No
	Town Site	3.60E-04	9.46E-04	1.31E-03	0.059	0.02	No
	Woodall	1.84E-03	9.21E-04	2.76E-03	0.059	0.05	No
Northern Bobwhite	Camp G and H	6.28E-03	8.45E-03	1.47E-02	N/A	N/A	**Yes**
	Downgradient East	1.43E-02	2.69E-03	1.70E-02	N/A	N/A	**Yes**
	Downgradient West	2.41E-03	3.10E-03	5.51E-03	N/A	N/A	**Yes**
	Grace Panel	1.25E-02	1.29E-02	2.54E-02	N/A	N/A	**Yes**
	Ibex Complex	6.93E-03	8.63E-03	1.56E-02	N/A	N/A	**Yes**
	North Trail	1.49E-03	5.34E-03	6.83E-03	N/A	N/A	**Yes**
	Town Site	1.01E-03	5.87E-03	6.87E-03	N/A	N/A	**Yes**
	Woodall	6.20E-03	5.59E-03	1.18E-02	N/A	N/A	**Yes**
Northern Harrier	Camp G and H	1.88E-02	3.11E-03	2.19E-02	N/A	N/A	**Yes**
	Downgradient East	3.33E-02	9.92E-04	3.43E-02	N/A	N/A	**Yes**
	Downgradient West	2.93E-02	1.14E-03	3.04E-02	N/A	N/A	**Yes**
	Grace Panel	8.15E-03	4.75E-03	1.29E-02	N/A	N/A	**Yes**
	Ibex Complex	3.26E-02	3.18E-03	3.58E-02	N/A	N/A	**Yes**
	North Trail	5.90E-03	1.97E-03	7.87E-03	N/A	N/A	**Yes**
	Town Site	3.61E-02	2.16E-03	3.83E-02	N/A	N/A	**Yes**
	Woodall	2.29E-02	2.06E-03	2.49E-02	N/A	N/A	**Yes**
Arsenic							
American Robin	Camp G and H	1.09E-01	5.45E-02	1.64E-01	7.38	0.02	No
	Downgradient East	8.86E-02	2.42E-02	1.13E-01	7.38	0.02	No
	Downgradient West	2.81E-01	4.15E-02	3.22E-01	7.38	0.04	No
	Grace Panel	2.48E-01	9.48E-02	3.43E-01	7.38	0.05	No
	Ibex Complex	3.17E-01	8.85E-02	4.06E-01	7.38	0.05	No
	North Trail	3.99E-02	9.83E-02	1.38E-01	7.38	0.02	No
	Town Site	3.47E-02	5.56E-02	9.02E-02	7.38	0.01	No
	Woodall	4.01E-01	4.94E-02	4.51E-01	7.38	0.06	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Coyote	Camp G and H	5.06E-03	1.82E-02	2.33E-02	1.26	0.02	No
	Downgradient East	8.41E-03	8.89E-03	1.73E-02	1.26	0.01	No
	Downgradient West	7.19E-03	1.39E-02	2.11E-02	1.26	0.02	No
	Grace Panel	3.89E-02	3.17E-02	7.06E-02	1.26	0.06	No
	Ibex Complex	3.48E-02	3.06E-02	6.54E-02	1.26	0.05	No
	North Trail	1.52E-02	3.29E-02	4.82E-02	1.26	0.04	No
	Town Site	7.11E-03	1.86E-02	2.57E-02	1.26	0.02	No
	Woodall	4.00E-02	2.45E-02	6.45E-02	1.26	0.05	No
Deer Mouse	Camp G and H	1.33E-01	6.46E-02	1.98E-01	1.26	0.16	No
	Downgradient East	9.34E-02	2.87E-02	1.22E-01	1.26	0.10	No
	Downgradient West	3.56E-01	4.92E-02	4.06E-01	1.26	0.32	No
	Grace Panel	2.57E-01	1.12E-01	3.69E-01	1.26	0.29	No
	Ibex Complex	3.58E-01	1.05E-01	4.63E-01	1.26	0.37	No
	North Trail	4.07E-02	1.16E-01	1.57E-01	1.26	0.12	No
	Town Site	3.59E-02	6.59E-02	1.02E-01	1.26	0.08	No
	Woodall	4.34E-01	5.85E-02	4.93E-01	1.26	0.39	No
Eastern Cottontail	Camp G and H	5.19E-02	3.03E-02	8.21E-02	1.26	0.07	No
	Camp G and H	5.19E-02	3.03E-02	8.21E-02	1.26	0.07	No
	Downgradient East	1.95E-02	1.35E-02	3.30E-02	1.26	0.03	No
	Downgradient East	1.95E-02	1.35E-02	3.30E-02	1.26	0.03	No
	Downgradient West	1.54E-01	2.31E-02	1.77E-01	1.26	0.14	No
	Downgradient West	1.54E-01	2.31E-02	1.77E-01	1.26	0.14	No
	Grace Panel	4.82E-02	5.27E-02	1.01E-01	1.26	0.08	No
	Grace Panel	4.82E-02	5.27E-02	1.01E-01	1.26	0.08	No
	Ibex Complex	1.06E-01	4.91E-02	1.55E-01	1.26	0.12	No
	Ibex Complex	1.06E-01	4.91E-02	1.55E-01	1.26	0.12	No
	North Trail	6.71E-03	5.46E-02	6.13E-02	1.26	0.05	No
	North Trail	6.71E-03	5.46E-02	6.13E-02	1.26	0.05	No
	Town Site	6.71E-03	3.09E-02	3.76E-02	1.26	0.03	No
	Town Site	6.71E-03	3.09E-02	3.76E-02	1.26	0.03	No
	Woodall	1.06E-01	2.74E-02	1.33E-01	1.26	0.11	No
	Woodall	1.06E-01	2.74E-02	1.33E-01	1.26	0.11	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Mule Deer	Camp G and H	3.40E-02	6.10E-03	4.01E-02	1.26	0.03	No
	Downgradient East	1.28E-02	3.38E-03	1.62E-02	1.26	0.01	No
	Downgradient West	1.01E-01	4.70E-03	1.06E-01	1.26	0.08	No
	Grace Panel	3.16E-02	1.06E-02	4.22E-02	1.26	0.03	No
	Ibex Complex	6.92E-02	1.08E-02	8.00E-02	1.26	0.06	No
	North Trail	4.40E-03	1.11E-02	1.55E-02	1.26	0.01	No
	Town Site	4.40E-03	6.26E-03	1.07E-02	1.26	0.01	No
	Woodall	6.93E-02	1.23E-02	8.16E-02	1.26	0.06	No
Northern Bobwhite	Camp G and H	7.17E-02	3.83E-02	1.10E-01	7.38	0.01	No
	Downgradient East	3.32E-02	1.70E-02	5.02E-02	7.38	0.01	No
	Downgradient West	2.07E-01	2.92E-02	2.37E-01	7.38	0.03	No
	Grace Panel	8.57E-02	6.67E-02	1.52E-01	7.38	0.02	No
	Ibex Complex	1.58E-01	6.22E-02	2.21E-01	7.38	0.03	No
	North Trail	1.26E-02	6.92E-02	8.18E-02	7.38	0.01	No
	Town Site	1.20E-02	3.91E-02	5.11E-02	7.38	0.01	No
	Woodall	1.69E-01	3.48E-02	2.04E-01	7.38	0.03	No
Northern Harrier	Camp G and H	1.22E-02	1.41E-02	2.63E-02	7.38	0.00	No
	Downgradient East	2.41E-02	6.28E-03	3.04E-02	7.38	0.00	No
	Downgradient West	1.21E-02	1.08E-02	2.28E-02	7.38	0.00	No
	Grace Panel	1.18E-01	2.46E-02	1.43E-01	7.38	0.02	No
	Ibex Complex	1.02E-01	2.29E-02	1.25E-01	7.38	0.02	No
	North Trail	4.85E-02	2.55E-02	7.39E-02	7.38	0.01	No
	Town Site	2.20E-02	1.44E-02	3.64E-02	7.38	0.00	No
	Woodall	1.15E-01	1.28E-02	1.28E-01	7.38	0.02	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Barium							
American Robin	Camp G and H	7.66E+00	3.24E-01	7.98E+00	20.8	0.38	No
	Downgradient East	7.06E+00	5.27E-01	7.59E+00	20.8	0.36	No
	Downgradient West	3.70E+00	7.15E-01	4.42E+00	20.8	0.21	No
	Grace Panel	1.59E+00	1.84E-01	1.77E+00	20.8	0.09	No
	Ibex Complex	2.46E+00	2.43E-01	2.70E+00	20.8	0.13	No
	North Trail	5.72E-01	1.83E-01	7.55E-01	20.8	0.04	No
	Town Site	2.81E+00	5.34E-01	3.35E+00	20.8	0.16	No
	Woodall	2.26E+00	3.89E-01	2.65E+00	20.8	0.13	No
Coyote	Camp G and H	4.69E-01	1.14E-01	5.83E-01	51.8	0.01	No
	Downgradient East	5.06E-01	1.81E-01	6.88E-01	51.8	0.01	No
	Downgradient West	5.22E-01	2.47E-01	7.69E-01	51.8	0.01	No
	Grace Panel	1.26E-01	6.63E-02	1.93E-01	51.8	0.00	No
	Ibex Complex	3.56E-01	8.68E-02	4.42E-01	51.8	0.01	No
	North Trail	1.27E-01	6.86E-02	1.95E-01	51.8	0.00	No
	Town Site	3.65E-01	1.87E-01	5.51E-01	51.8	0.01	No
	Woodall	4.63E-01	1.33E-01	5.96E-01	51.8	0.01	No
Deer Mouse	Camp G and H	9.64E+00	3.84E-01	1.00E+01	51.8	0.19	No
	Downgradient East	8.49E+00	6.24E-01	9.12E+00	51.8	0.18	No
	Downgradient West	4.57E+00	8.47E-01	5.42E+00	51.8	0.10	No
	Grace Panel	1.85E+00	2.18E-01	2.07E+00	51.8	0.04	No
	Ibex Complex	2.99E+00	2.88E-01	3.27E+00	51.8	0.06	No
	North Trail	7.05E-01	2.16E-01	9.21E-01	51.8	0.02	No
	Town Site	3.47E+00	6.33E-01	4.11E+00	51.8	0.08	No
	Woodall	2.71E+00	4.61E-01	3.17E+00	51.8	0.06	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Eastern Cottontail	Camp G and H	4.08E+00	1.80E-01	4.26E+00	51.8	0.08	No
	Camp G and H	4.08E+00	1.80E-01	4.26E+00	51.8	0.08	No
	Downgradient East	3.16E+00	2.93E-01	3.45E+00	51.8	0.07	No
	Downgradient East	3.16E+00	2.93E-01	3.45E+00	51.8	0.07	No
	Downgradient West	1.84E+00	3.97E-01	2.24E+00	51.8	0.04	No
	Downgradient West	1.84E+00	3.97E-01	2.24E+00	51.8	0.04	No
	Grace Panel	6.22E-01	1.02E-01	7.25E-01	51.8	0.01	No
	Grace Panel	6.22E-01	1.02E-01	7.25E-01	51.8	0.01	No
	Ibex Complex	1.15E+00	1.35E-01	1.28E+00	51.8	0.02	No
	Ibex Complex	1.15E+00	1.35E-01	1.28E+00	51.8	0.02	No
	North Trail	2.82E-01	1.01E-01	3.83E-01	51.8	0.01	No
	North Trail	2.82E-01	1.01E-01	3.83E-01	51.8	0.01	No
	Town Site	1.40E+00	2.97E-01	1.69E+00	51.8	0.03	No
	Town Site	1.40E+00	2.97E-01	1.69E+00	51.8	0.03	No
	Woodall	9.89E-01	2.16E-01	1.20E+00	51.8	0.02	No
	Woodall	9.89E-01	2.16E-01	1.20E+00	51.8	0.02	No
Mule Deer	Camp G and H	2.68E+00	4.12E-02	2.72E+00	51.8	0.05	No
	Downgradient East	2.07E+00	6.33E-02	2.13E+00	51.8	0.04	No
	Downgradient West	1.21E+00	8.66E-02	1.29E+00	51.8	0.02	No
	Grace Panel	4.08E-01	2.46E-02	4.33E-01	51.8	0.01	No
	Ibex Complex	7.52E-01	3.18E-02	7.83E-01	51.8	0.02	No
	North Trail	1.85E-01	2.68E-02	2.12E-01	51.8	0.00	No
	Town Site	9.16E-01	6.66E-02	9.83E-01	51.8	0.02	No
	Woodall	6.48E-01	4.64E-02	6.95E-01	51.8	0.01	No
Northern Bobwhite	Camp G and H	5.52E+00	2.28E-01	5.75E+00	20.8	0.28	No
	Downgradient East	4.42E+00	3.71E-01	4.79E+00	20.8	0.23	No
	Downgradient West	2.52E+00	5.03E-01	3.02E+00	20.8	0.15	No
	Grace Panel	8.97E-01	1.30E-01	1.03E+00	20.8	0.05	No
	Ibex Complex	1.59E+00	1.71E-01	1.76E+00	20.8	0.08	No
	North Trail	3.87E-01	1.28E-01	5.15E-01	20.8	0.02	No
	Town Site	1.92E+00	3.76E-01	2.29E+00	20.8	0.11	No
	Woodall	1.39E+00	2.74E-01	1.67E+00	20.8	0.08	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Northern Harrier	Camp G and H	1.22E+00	8.40E-02	1.31E+00	20.8	0.06	No
	Downgradient East	1.38E+00	1.37E-01	1.51E+00	20.8	0.07	No
	Downgradient West	1.56E+00	1.85E-01	1.75E+00	20.8	0.08	No
	Grace Panel	3.51E-01	4.77E-02	3.98E-01	20.8	0.02	No
	Ibex Complex	1.07E+00	6.31E-02	1.13E+00	20.8	0.05	No
	North Trail	3.93E-01	4.73E-02	4.40E-01	20.8	0.02	No
	Town Site	1.08E+00	1.39E-01	1.22E+00	20.8	0.06	No
	Woodall	1.43E+00	1.01E-01	1.53E+00	20.8	0.07	No
Cadmium							
American Robin	Camp G and H	3.64E-01	1.92E-01	5.56E-01	1.47	0.38	No
	Downgradient East	3.74E-01	2.53E-02	3.99E-01	1.47	0.27	No
	Downgradient West	2.19E-01	4.88E-02	2.68E-01	1.47	0.18	No
	Grace Panel	1.04E+00	1.47E-01	1.18E+00	1.47	0.81	No
	Ibex Complex	1.09E+00	2.00E-01	1.29E+00	1.47	0.88	No
	North Trail	4.60E-01	9.15E-02	5.51E-01	1.47	0.38	No
	Town Site	1.05E-01	1.37E-01	2.42E-01	1.47	0.16	No
	Woodall	5.42E-01	9.66E-02	6.39E-01	1.47	0.43	No
Coyote	Camp G and H	4.12E-02	6.41E-02	1.05E-01	0.77	0.14	No
	Downgradient East	4.24E-02	8.73E-03	5.11E-02	0.77	0.07	No
	Downgradient West	1.07E-02	1.63E-02	2.70E-02	0.77	0.04	No
	Grace Panel	3.33E-02	4.91E-02	8.24E-02	0.77	0.11	No
	Ibex Complex	3.60E-02	6.74E-02	1.03E-01	0.77	0.13	No
	North Trail	1.77E-02	3.06E-02	4.83E-02	0.77	0.06	No
	Town Site	1.98E-02	4.57E-02	6.55E-02	0.77	0.09	No
	Woodall	2.59E-02	3.26E-02	5.85E-02	0.77	0.08	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Deer Mouse	Camp G and H	4.46E-01	2.28E-01	6.74E-01	0.77	0.88	No
	Downgradient East	3.65E-01	2.99E-02	3.95E-01	0.77	0.51	No
	Downgradient West	2.36E-01	5.78E-02	2.93E-01	0.77	0.38	No
	Grace Panel	1.04E+00	1.75E-01	1.22E+00	0.77	1.58	**Yes**
	Ibex Complex	1.07E+00	2.37E-01	1.30E+00	0.77	1.69	**Yes**
	North Trail	4.99E-01	1.08E-01	6.07E-01	0.77	0.79	No
	Town Site	9.92E-02	1.62E-01	2.62E-01	0.77	0.34	No
	Woodall	5.56E-01	1.14E-01	6.71E-01	0.77	0.87	No
Eastern Cottontail	Camp G and H	1.76E-01	1.07E-01	2.83E-01	0.77	0.37	No
	Camp G and H	1.76E-01	1.07E-01	2.83E-01	0.77	0.37	No
	Downgradient East	3.77E-02	1.40E-02	5.17E-02	0.77	0.07	No
	Downgradient East	3.77E-02	1.40E-02	5.17E-02	0.77	0.07	No
	Downgradient West	5.58E-02	2.71E-02	8.29E-02	0.77	0.11	No
	Downgradient West	5.58E-02	2.71E-02	8.29E-02	0.77	0.11	No
	Grace Panel	1.55E-01	8.18E-02	2.37E-01	0.77	0.31	No
	Grace Panel	1.55E-01	8.18E-02	2.37E-01	0.77	0.31	No
	Ibex Complex	1.14E-01	1.11E-01	2.25E-01	0.77	0.29	No
	Ibex Complex	1.14E-01	1.11E-01	2.25E-01	0.77	0.29	No
	North Trail	1.23E-01	5.08E-02	1.73E-01	0.77	0.23	No
	North Trail	1.23E-01	5.08E-02	1.73E-01	0.77	0.23	No
	Town Site	6.10E-03	7.61E-02	8.22E-02	0.77	0.11	No
	Town Site	6.10E-03	7.61E-02	8.22E-02	0.77	0.11	No
	Woodall	9.60E-02	5.37E-02	1.50E-01	0.77	0.19	No
	Woodall	9.60E-02	5.37E-02	1.50E-01	0.77	0.19	No
Mule Deer	Camp G and H	1.16E-01	2.14E-02	1.37E-01	0.77	0.18	No
	Downgradient East	2.47E-02	3.07E-03	2.78E-02	0.77	0.04	No
	Downgradient West	3.66E-02	5.43E-03	4.20E-02	0.77	0.05	No
	Grace Panel	1.02E-01	1.64E-02	1.18E-01	0.77	0.15	No
	Ibex Complex	7.45E-02	2.28E-02	9.73E-02	0.77	0.13	No
	North Trail	8.04E-02	1.02E-02	9.07E-02	0.77	0.12	No
	Town Site	4.00E-03	1.52E-02	1.92E-02	0.77	0.02	No
	Woodall	6.30E-02	1.11E-02	7.40E-02	0.77	0.10	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Northern Bobwhite	Camp G and H	2.43E-01	1.35E-01	3.78E-01	1.47	0.26	No
	Downgradient East	9.05E-02	1.78E-02	1.08E-01	1.47	0.07	No
	Downgradient West	9.03E-02	3.43E-02	1.25E-01	1.47	0.08	No
	Grace Panel	3.07E-01	1.04E-01	4.10E-01	1.47	0.28	No
	Ibex Complex	2.68E-01	1.41E-01	4.09E-01	1.47	0.28	No
	North Trail	1.96E-01	6.44E-02	2.60E-01	1.47	0.18	No
	Town Site	2.04E-02	9.64E-02	1.17E-01	1.47	0.08	No
	Woodall	1.77E-01	6.80E-02	2.45E-01	1.47	0.17	No
Northern Harrier	Camp G and H	1.20E-01	4.99E-02	1.70E-01	1.47	0.12	No
	Downgradient East	1.25E-01	6.55E-03	1.31E-01	1.47	0.09	No
	Downgradient West	2.64E-02	1.26E-02	3.91E-02	1.47	0.03	No
	Grace Panel	6.90E-02	3.82E-02	1.07E-01	1.47	0.07	No
	Ibex Complex	7.59E-02	5.18E-02	1.28E-01	1.47	0.09	No
	North Trail	4.00E-02	2.37E-02	6.37E-02	1.47	0.04	No
	Town Site	6.10E-02	3.55E-02	9.66E-02	1.47	0.07	No
	Woodall	6.40E-02	2.50E-02	8.90E-02	1.47	0.06	No
Chromium							
American Robin	Camp G and H	2.34E-01	1.39E+00	1.63E+00	2.66	0.61	No
	Downgradient East	3.16E-01	4.05E-01	7.21E-01	2.66	0.27	No
	Downgradient West	1.18E-01	6.02E-01	7.20E-01	2.66	0.27	No
	Grace Panel	3.43E+00	1.68E+00	5.11E+00	2.66	1.92	**Yes**
	Ibex Complex	9.70E-01	1.93E+00	2.90E+00	2.66	1.09	**Yes**
	North Trail	1.26E-01	1.13E+00	1.26E+00	2.66	0.47	No
	Town Site	1.20E-01	1.15E+00	1.27E+00	2.66	0.48	No
	Woodall	9.73E-01	1.27E+00	2.24E+00	2.66	0.84	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Coyote	Camp G and H	5.54E-02	4.64E-01	5.20E-01	9.24	0.06	No
	Downgradient East	7.91E-02	1.36E-01	2.15E-01	9.24	0.02	No
	Downgradient West	5.07E-02	2.01E-01	2.52E-01	9.24	0.03	No
	Grace Panel	2.17E-01	5.61E-01	7.77E-01	9.24	0.08	No
	Ibex Complex	1.44E-01	6.79E-01	8.23E-01	9.24	0.09	No
	North Trail	1.03E-01	3.77E-01	4.81E-01	9.24	0.05	No
	Town Site	6.74E-02	3.84E-01	4.51E-01	9.24	0.05	No
	Woodall	1.76E-01	4.27E-01	6.03E-01	9.24	0.07	No
Deer Mouse	Camp G and H	2.74E-01	1.65E+00	1.92E+00	9.24	0.21	No
	Downgradient East	3.10E-01	4.80E-01	7.90E-01	9.24	0.09	No
	Downgradient West	1.42E-01	7.14E-01	8.55E-01	9.24	0.09	No
	Grace Panel	3.28E+00	1.99E+00	5.27E+00	9.24	0.57	No
	Ibex Complex	1.17E+00	2.29E+00	3.46E+00	9.24	0.37	No
	North Trail	1.52E-01	1.34E+00	1.49E+00	9.24	0.16	No
	Town Site	1.40E-01	1.36E+00	1.50E+00	9.24	0.16	No
	Woodall	9.34E-01	1.51E+00	2.44E+00	9.24	0.26	No
Eastern Cottontail	Camp G and H	9.43E-02	7.73E-01	8.68E-01	9.24	0.09	No
	Camp G and H	9.43E-02	7.73E-01	8.68E-01	9.24	0.09	No
	Downgradient East	3.45E-02	2.25E-01	2.60E-01	9.24	0.03	No
	Downgradient East	3.45E-02	2.25E-01	2.60E-01	9.24	0.03	No
	Downgradient West	5.22E-02	3.35E-01	3.87E-01	9.24	0.04	No
	Downgradient West	5.22E-02	3.35E-01	3.87E-01	9.24	0.04	No
	Grace Panel	2.44E-01	9.33E-01	1.18E+00	9.24	0.13	No
	Grace Panel	2.44E-01	9.33E-01	1.18E+00	9.24	0.13	No
	Ibex Complex	4.37E-01	1.07E+00	1.51E+00	9.24	0.16	No
	Ibex Complex	4.37E-01	1.07E+00	1.51E+00	9.24	0.16	No
	North Trail	5.63E-02	6.27E-01	6.84E-01	9.24	0.07	No
	North Trail	5.63E-02	6.27E-01	6.84E-01	9.24	0.07	No
	Town Site	4.76E-02	6.40E-01	6.87E-01	9.24	0.07	No
	Town Site	4.76E-02	6.40E-01	6.87E-01	9.24	0.07	No
	Woodall	7.31E-02	7.06E-01	7.79E-01	9.24	0.08	No
	Woodall	7.31E-02	7.06E-01	7.79E-01	9.24	0.08	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Mule Deer	Camp G and H	6.18E-02	1.55E-01	2.17E-01	9.24	0.02	No
	Downgradient East	2.26E-02	4.57E-02	6.83E-02	9.24	0.01	No
	Downgradient West	3.42E-02	6.71E-02	1.01E-01	9.24	0.01	No
	Grace Panel	1.60E-01	1.87E-01	3.47E-01	9.24	0.04	No
	Ibex Complex	2.86E-01	2.44E-01	5.31E-01	9.24	0.06	No
	North Trail	3.69E-02	1.26E-01	1.63E-01	9.24	0.02	No
	Town Site	3.12E-02	1.28E-01	1.59E-01	9.24	0.02	No
	Woodall	4.79E-02	1.44E-01	1.92E-01	9.24	0.02	No
Northern Bobwhite	Camp G and H	1.35E-01	9.80E-01	1.11E+00	2.66	0.42	No
	Downgradient East	7.94E-02	2.85E-01	3.65E-01	2.66	0.14	No
	Downgradient West	7.32E-02	4.24E-01	4.97E-01	2.66	0.19	No
	Grace Panel	7.18E-01	1.18E+00	1.90E+00	2.66	0.71	No
	Ibex Complex	6.11E-01	1.36E+00	1.97E+00	2.66	0.74	No
	North Trail	7.89E-02	7.95E-01	8.73E-01	2.66	0.33	No
	Town Site	6.84E-02	8.10E-01	8.79E-01	2.66	0.33	No
	Woodall	2.08E-01	8.94E-01	1.10E+00	2.66	0.41	No
Northern Harrier	Camp G and H	1.72E-01	3.61E-01	5.33E-01	2.66	0.20	No
	Downgradient East	2.47E-01	1.05E-01	3.52E-01	2.66	0.13	No
	Downgradient West	1.62E-01	1.56E-01	3.18E-01	2.66	0.12	No
	Grace Panel	5.79E-01	4.35E-01	1.01E+00	2.66	0.38	No
	Ibex Complex	4.33E-01	5.00E-01	9.34E-01	2.66	0.35	No
	North Trail	3.33E-01	2.93E-01	6.26E-01	2.66	0.24	No
	Town Site	2.16E-01	2.99E-01	5.15E-01	2.66	0.19	No
	Woodall	5.40E-01	3.29E-01	8.70E-01	2.66	0.33	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Copper							
American Robin	Camp G and H	2.97E+00	2.47E-01	3.22E+00	4.04	0.80	No
	Downgradient East	2.77E+00	1.32E-01	2.91E+00	4.04	0.72	No
	Downgradient West	3.14E+00	1.64E-01	3.31E+00	4.04	0.82	No
	Grace Panel	3.55E+00	3.67E-01	3.92E+00	4.04	0.97	No
	Ibex Complex	4.16E+00	2.51E-01	4.41E+00	4.04	1.09	**Yes**
	North Trail	2.37E+00	2.55E-01	2.63E+00	4.04	0.65	No
	Town Site	3.62E+00	2.05E-01	3.83E+00	4.04	0.95	No
	Woodall	3.61E+00	2.43E-01	3.86E+00	4.04	0.95	No
Coyote	Camp G and H	4.53E-01	8.26E-02	5.35E-01	5.6	0.10	No
	Downgradient East	5.72E-01	4.44E-02	6.16E-01	5.6	0.11	No
	Downgradient West	4.58E-01	5.49E-02	5.13E-01	5.6	0.09	No
	Grace Panel	5.33E-01	1.23E-01	6.56E-01	5.6	0.12	No
	Ibex Complex	5.25E-01	8.59E-02	6.11E-01	5.6	0.11	No
	North Trail	3.54E-01	8.73E-02	4.41E-01	5.6	0.08	No
	Town Site	4.14E-01	6.85E-02	4.82E-01	5.6	0.09	No
	Woodall	4.74E-01	8.17E-02	5.55E-01	5.6	0.10	No
Deer Mouse	Camp G and H	2.96E+00	2.93E-01	3.26E+00	5.6	0.58	No
	Downgradient East	2.68E+00	1.56E-01	2.84E+00	5.6	0.51	No
	Downgradient West	3.02E+00	1.94E-01	3.22E+00	5.6	0.57	No
	Grace Panel	3.43E+00	4.35E-01	3.87E+00	5.6	0.69	No
	Ibex Complex	3.92E+00	2.97E-01	4.22E+00	5.6	0.75	No
	North Trail	2.34E+00	3.02E-01	2.64E+00	5.6	0.47	No
	Town Site	3.41E+00	2.42E-01	3.65E+00	5.6	0.65	No
	Woodall	3.43E+00	2.87E-01	3.72E+00	5.6	0.66	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Eastern Cottontail	Camp G and H	4.01E-01	1.37E-01	5.38E-01	5.6	0.10	No
	Camp G and H	4.01E-01	1.37E-01	5.38E-01	5.6	0.10	No
	Downgradient East	2.38E-01	7.33E-02	3.11E-01	5.6	0.06	No
	Downgradient East	2.38E-01	7.33E-02	3.11E-01	5.6	0.06	No
	Downgradient West	2.47E-01	9.11E-02	3.38E-01	5.6	0.06	No
	Downgradient West	2.47E-01	9.11E-02	3.38E-01	5.6	0.06	No
	Grace Panel	3.12E-01	2.04E-01	5.16E-01	5.6	0.09	No
	Grace Panel	3.12E-01	2.04E-01	5.16E-01	5.6	0.09	No
	Ibex Complex	2.13E-01	1.39E-01	3.52E-01	5.6	0.06	No
	Ibex Complex	2.13E-01	1.39E-01	3.52E-01	5.6	0.06	No
	North Trail	2.81E-01	1.41E-01	4.22E-01	5.6	0.08	No
	North Trail	2.81E-01	1.41E-01	4.22E-01	5.6	0.08	No
	Town Site	1.71E-01	1.14E-01	2.84E-01	5.6	0.05	No
	Town Site	1.71E-01	1.14E-01	2.84E-01	5.6	0.05	No
	Woodall	2.24E-01	1.35E-01	3.58E-01	5.6	0.06	No
	Woodall	2.24E-01	1.35E-01	3.58E-01	5.6	0.06	No
Mule Deer	Camp G and H	2.63E-01	2.76E-02	2.91E-01	5.6	0.05	No
	Downgradient East	1.56E-01	1.50E-02	1.71E-01	5.6	0.03	No
	Downgradient West	1.62E-01	1.85E-02	1.81E-01	5.6	0.03	No
	Grace Panel	2.04E-01	4.15E-02	2.46E-01	5.6	0.04	No
	Ibex Complex	1.39E-01	2.98E-02	1.69E-01	5.6	0.03	No
	North Trail	1.84E-01	3.03E-02	2.14E-01	5.6	0.04	No
	Town Site	1.12E-01	2.30E-02	1.35E-01	5.6	0.02	No
	Woodall	1.47E-01	2.76E-02	1.74E-01	5.6	0.03	No
Northern Bobwhite	Camp G and H	8.32E-01	1.74E-01	1.01E+00	4.04	0.25	No
	Downgradient East	6.26E-01	9.28E-02	7.18E-01	4.04	0.18	No
	Downgradient West	6.84E-01	1.15E-01	7.99E-01	4.04	0.20	No
	Grace Panel	8.08E-01	2.58E-01	1.07E+00	4.04	0.26	No
	Ibex Complex	7.78E-01	1.76E-01	9.54E-01	4.04	0.24	No
	North Trail	6.20E-01	1.79E-01	7.99E-01	4.04	0.20	No
	Town Site	6.61E-01	1.44E-01	8.05E-01	4.04	0.20	No
	Woodall	7.19E-01	1.71E-01	8.89E-01	4.04	0.22	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Northern Harrier	Camp G and H	1.37E+00	6.40E-02	1.43E+00	4.04	0.36	No
	Downgradient East	1.77E+00	3.42E-02	1.80E+00	4.04	0.45	No
	Downgradient West	1.38E+00	4.25E-02	1.42E+00	4.04	0.35	No
	Grace Panel	1.61E+00	9.52E-02	1.71E+00	4.04	0.42	No
	Ibex Complex	1.56E+00	6.50E-02	1.63E+00	4.04	0.40	No
	North Trail	1.07E+00	6.60E-02	1.13E+00	4.04	0.28	No
	Town Site	1.22E+00	5.30E-02	1.27E+00	4.04	0.32	No
	Woodall	1.42E+00	6.29E-02	1.48E+00	4.04	0.37	No
Lead							
American Robin	Camp G and H	4.39E-02	6.06E-02	1.04E-01	1.63	0.06	No
	Downgradient East	5.62E-02	4.77E-02	1.04E-01	1.63	0.06	No
	Downgradient West	1.60E-02	2.48E-01	2.64E-01	1.63	0.16	No
	Grace Panel	6.76E-02	3.19E-02	9.95E-02	1.63	0.06	No
	Ibex Complex	1.54E-02	3.76E-02	5.30E-02	1.63	0.03	No
	North Trail	6.09E-03	2.98E-02	3.59E-02	1.63	0.02	No
	Town Site	1.94E-02	2.08E+00	2.10E+00	1.63	1.29	**Yes**
	Woodall	4.95E-02	3.44E-02	8.39E-02	1.63	0.05	No
Coyote	Camp G and H	1.54E-02	2.04E-02	3.59E-02	4.7	0.01	No
	Downgradient East	3.41E-02	1.60E-02	5.01E-02	4.7	0.01	No
	Downgradient West	1.38E-02	8.28E-02	9.66E-02	4.7	0.02	No
	Grace Panel	1.28E-02	1.09E-02	2.37E-02	4.7	0.01	No
	Ibex Complex	8.92E-02	1.29E-02	1.02E-01	4.7	0.02	No
	North Trail	7.52E-03	3.42E-02	4.17E-02	4.7	0.01	No
	Town Site	4.88E-02	6.94E-01	7.43E-01	4.7	0.16	No
	Woodall	2.35E-02	1.17E-02	3.51E-02	4.7	0.01	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Deer Mouse	Camp G and H	4.61E-02	7.18E-02	1.18E-01	4.7	0.03	No
	Downgradient East	5.70E-02	5.65E-02	1.13E-01	4.7	0.02	No
	Downgradient West	1.83E-02	2.94E-01	3.13E-01	4.7	0.07	No
	Grace Panel	6.74E-02	3.78E-02	1.05E-01	4.7	0.02	No
	Ibex Complex	1.69E-02	4.45E-02	6.14E-02	4.7	0.01	No
	North Trail	6.66E-03	3.53E-02	4.20E-02	4.7	0.01	No
	Town Site	1.93E-02	2.47E+00	2.49E+00	4.7	0.53	No
	Woodall	4.87E-02	4.07E-02	8.95E-02	4.7	0.02	No
Eastern Cottontail	Camp G and H	9.46E-03	3.37E-02	4.31E-02	4.7	0.01	No
	Camp G and H	9.46E-03	3.37E-02	4.31E-02	4.7	0.01	No
	Downgradient East	8.97E-03	2.65E-02	3.54E-02	4.7	0.01	No
	Downgradient East	8.97E-03	2.65E-02	3.54E-02	4.7	0.01	No
	Downgradient West	5.76E-03	1.38E-01	1.44E-01	4.7	0.03	No
	Downgradient West	5.76E-03	1.38E-01	1.44E-01	4.7	0.03	No
	Grace Panel	8.91E-03	1.77E-02	2.66E-02	4.7	0.01	No
	Grace Panel	8.91E-03	1.77E-02	2.66E-02	4.7	0.01	No
	Ibex Complex	4.39E-03	2.09E-02	2.53E-02	4.7	0.01	No
	Ibex Complex	4.39E-03	2.09E-02	2.53E-02	4.7	0.01	No
	North Trail	1.71E-03	1.65E-02	1.83E-02	4.7	0.00	No
	North Trail	1.71E-03	1.65E-02	1.83E-02	4.7	0.00	No
	Town Site	2.50E-03	1.16E+00	1.16E+00	4.7	0.25	No
	Town Site	2.50E-03	1.16E+00	1.16E+00	4.7	0.25	No
	Woodall	5.60E-03	1.91E-02	2.47E-02	4.7	0.01	No
	Woodall	5.60E-03	1.91E-02	2.47E-02	4.7	0.01	No
Mule Deer	Camp G and H	6.20E-03	6.93E-03	1.31E-02	4.7	0.00	No
	Downgradient East	5.88E-03	5.38E-03	1.13E-02	4.7	0.00	No
	Downgradient West	3.78E-03	2.77E-02	3.14E-02	4.7	0.01	No
	Grace Panel	5.84E-03	3.80E-03	9.64E-03	4.7	0.00	No
	Ibex Complex	2.88E-03	4.46E-03	7.34E-03	4.7	0.00	No
	North Trail	1.12E-03	2.38E-02	2.50E-02	4.7	0.01	No
	Town Site	1.64E-03	2.31E-01	2.33E-01	4.7	0.05	No
	Woodall	3.67E-03	3.99E-03	7.66E-03	4.7	0.00	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Northern Bobwhite	Camp G and H	1.62E-02	4.26E-02	5.88E-02	1.63	0.04	No
	Downgradient East	1.73E-02	3.35E-02	5.08E-02	1.63	0.03	No
	Downgradient West	8.47E-03	1.75E-01	1.83E-01	1.63	0.11	No
	Grace Panel	1.87E-02	2.24E-02	4.11E-02	1.63	0.03	No
	Ibex Complex	6.88E-03	2.64E-02	3.33E-02	1.63	0.02	No
	North Trail	2.69E-03	2.10E-02	2.36E-02	1.63	0.01	No
	Town Site	5.30E-03	1.47E+00	1.47E+00	1.63	0.90	No
	Woodall	1.27E-02	2.42E-02	3.69E-02	1.63	0.02	No
Northern Harrier	Camp G and H	4.89E-02	1.57E-02	6.46E-02	1.63	0.04	No
	Downgradient East	1.10E-01	1.24E-02	1.22E-01	1.63	0.07	No
	Downgradient West	4.45E-02	6.44E-02	1.09E-01	1.63	0.07	No
	Grace Panel	3.93E-02	8.26E-03	4.75E-02	1.63	0.03	No
	Ibex Complex	2.92E-01	9.74E-03	3.02E-01	1.63	0.19	No
	North Trail	2.45E-02	7.72E-03	3.22E-02	1.63	0.02	No
	Town Site	1.59E-01	5.40E-01	6.99E-01	1.63	0.43	No
	Woodall	7.51E-02	8.91E-03	8.41E-02	1.63	0.05	No
Manganese							
American Robin	Camp G and H	9.58E+00	7.32E-01	1.03E+01	179	0.06	No
	Downgradient East	2.94E+01	3.45E+00	3.29E+01	179	0.18	No
	Downgradient West	1.27E+01	1.98E+00	1.46E+01	179	0.08	No
	Grace Panel	3.58E+00	3.70E-01	3.95E+00	179	0.02	No
	Ibex Complex	2.18E+01	1.83E+00	2.37E+01	179	0.13	No
	North Trail	4.29E+00	7.52E-01	5.05E+00	179	0.03	No
	Town Site	4.74E+00	2.16E+00	6.90E+00	179	0.04	No
	Woodall	1.29E+01	3.01E+00	1.59E+01	179	0.09	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Coyote	Camp G and H	4.56E-01	2.68E-01	7.24E-01	51.5	0.01	No
	Downgradient East	7.19E-01	1.17E+00	1.89E+00	51.5	0.04	No
	Downgradient West	5.50E-01	6.73E-01	1.22E+00	51.5	0.02	No
	Grace Panel	2.98E-01	1.23E-01	4.21E-01	51.5	0.01	No
	Ibex Complex	8.08E-01	6.33E-01	1.44E+00	51.5	0.03	No
	North Trail	2.73E-01	2.75E-01	5.47E-01	51.5	0.01	No
	Town Site	4.03E-01	7.35E-01	1.14E+00	51.5	0.02	No
	Woodall	5.17E-01	1.08E+00	1.60E+00	51.5	0.03	No
Deer Mouse	Camp G and H	9.98E+00	8.68E-01	1.09E+01	51.5	0.21	No
	Downgradient East	3.47E+01	4.09E+00	3.88E+01	51.5	0.75	No
	Downgradient West	1.34E+01	2.34E+00	1.57E+01	51.5	0.31	No
	Grace Panel	3.77E+00	4.38E-01	4.21E+00	51.5	0.08	No
	Ibex Complex	2.47E+01	2.17E+00	2.69E+01	51.5	0.52	No
	North Trail	4.83E+00	8.91E-01	5.72E+00	51.5	0.11	No
	Town Site	5.27E+00	2.56E+00	7.83E+00	51.5	0.15	No
	Woodall	1.34E+01	3.57E+00	1.70E+01	51.5	0.33	No
Eastern Cottontail	Camp G and H	1.94E+00	4.07E-01	2.35E+00	51.5	0.05	No
	Camp G and H	1.94E+00	4.07E-01	2.35E+00	51.5	0.05	No
	Downgradient East	1.22E+01	1.92E+00	1.41E+01	51.5	0.27	No
	Downgradient East	1.22E+01	1.92E+00	1.41E+01	51.5	0.27	No
	Downgradient West	2.82E+00	1.10E+00	3.92E+00	51.5	0.08	No
	Downgradient West	2.82E+00	1.10E+00	3.92E+00	51.5	0.08	No
	Grace Panel	7.81E-01	2.06E-01	9.86E-01	51.5	0.02	No
	Grace Panel	7.81E-01	2.06E-01	9.86E-01	51.5	0.02	No
	Ibex Complex	7.41E+00	1.02E+00	8.42E+00	51.5	0.16	No
	Ibex Complex	7.41E+00	1.02E+00	8.42E+00	51.5	0.16	No
	North Trail	1.42E+00	4.18E-01	1.83E+00	51.5	0.04	No
	North Trail	1.42E+00	4.18E-01	1.83E+00	51.5	0.04	No
	Town Site	1.47E+00	1.20E+00	2.67E+00	51.5	0.05	No
	Town Site	1.47E+00	1.20E+00	2.67E+00	51.5	0.05	No
	Woodall	2.53E+00	1.67E+00	4.20E+00	51.5	0.08	No
	Woodall	2.53E+00	1.67E+00	4.20E+00	51.5	0.08	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Mule Deer	Camp G and H	1.27E+00	1.01E-01	1.37E+00	51.5	0.03	No
	Downgradient East	7.98E+00	3.96E-01	8.38E+00	51.5	0.16	No
	Downgradient West	1.85E+00	2.32E-01	2.08E+00	51.5	0.04	No
	Grace Panel	5.12E-01	4.12E-02	5.53E-01	51.5	0.01	No
	Ibex Complex	4.86E+00	2.23E-01	5.08E+00	51.5	0.10	No
	North Trail	9.28E-01	1.04E-01	1.03E+00	51.5	0.02	No
	Town Site	9.64E-01	2.52E-01	1.22E+00	51.5	0.02	No
	Woodall	1.66E+00	3.99E-01	2.06E+00	51.5	0.04	No
Northern Bobwhite	Camp G and H	3.40E+00	5.15E-01	3.91E+00	179	0.02	No
	Downgradient East	1.73E+01	2.43E+00	1.98E+01	179	0.11	No
	Downgradient West	4.78E+00	1.39E+00	6.17E+00	179	0.03	No
	Grace Panel	1.33E+00	2.60E-01	1.59E+00	179	0.01	No
	Ibex Complex	1.11E+01	1.29E+00	1.23E+01	179	0.07	No
	North Trail	2.13E+00	5.29E-01	2.66E+00	179	0.01	No
	Town Site	2.25E+00	1.52E+00	3.77E+00	179	0.02	No
	Woodall	4.48E+00	2.12E+00	6.60E+00	179	0.04	No
Northern Harrier	Camp G and H	1.12E+00	1.90E-01	1.31E+00	179	0.01	No
	Downgradient East	1.17E+00	8.95E-01	2.07E+00	179	0.01	No
	Downgradient West	1.31E+00	5.12E-01	1.82E+00	179	0.01	No
	Grace Panel	8.36E-01	9.59E-02	9.32E-01	179	0.01	No
	Ibex Complex	1.78E+00	4.74E-01	2.26E+00	179	0.01	No
	North Trail	7.24E-01	1.95E-01	9.19E-01	179	0.01	No
	Town Site	1.13E+00	5.60E-01	1.69E+00	179	0.01	No
	Woodall	1.19E+00	7.81E-01	1.97E+00	179	0.01	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Mercury							
American Robin	Camp G and H	3.57E-03	1.26E-03	4.83E-03	0.039	0.12	No
	Downgradient East	3.93E-03	5.56E-04	4.48E-03	0.039	0.11	No
	Downgradient West	2.66E-03	7.99E-04	3.46E-03	0.039	0.09	No
	Grace Panel	4.20E-03	2.38E-03	6.58E-03	0.039	0.17	No
	Ibex Complex	2.58E-03	1.10E-03	3.68E-03	0.039	0.09	No
	North Trail	1.58E-03	1.38E-03	2.95E-03	0.039	0.08	No
	Town Site	2.21E-03	1.54E-03	3.75E-03	0.039	0.10	No
	Woodall	3.26E-03	8.86E-04	4.14E-03	0.039	0.11	No
Coyote	Camp G and H	1.45E-03	4.27E-04	1.87E-03	0.032	0.06	No
	Downgradient East	1.11E-03	1.65E-03	2.76E-03	0.032	0.09	No
	Downgradient West	4.00E-04	9.31E-04	1.33E-03	0.032	0.04	No
	Grace Panel	1.60E-04	7.97E-04	9.57E-04	0.032	0.03	No
	Ibex Complex	6.00E-04	3.72E-04	9.72E-04	0.032	0.03	No
	North Trail	1.16E-04	4.64E-04	5.80E-04	0.032	0.02	No
	Town Site	3.64E-04	1.18E-03	1.54E-03	0.032	0.05	No
	Woodall	4.00E-04	3.02E-04	7.02E-04	0.032	0.02	No
Deer Mouse	Camp G and H	4.29E-03	1.49E-03	5.78E-03	0.032	0.18	No
	Downgradient East	4.14E-03	6.59E-04	4.80E-03	0.032	0.15	No
	Downgradient West	2.83E-03	9.47E-04	3.78E-03	0.032	0.12	No
	Grace Panel	4.34E-03	2.82E-03	7.16E-03	0.032	0.22	No
	Ibex Complex	2.80E-03	1.30E-03	4.10E-03	0.032	0.13	No
	North Trail	1.59E-03	1.63E-03	3.22E-03	0.032	0.10	No
	Town Site	2.29E-03	1.83E-03	4.11E-03	0.032	0.13	No
	Woodall	3.48E-03	1.05E-03	4.53E-03	0.032	0.14	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Eastern Cottontail	Camp G and H	1.59E-03	7.01E-04	2.29E-03	0.032	0.07	No
	Camp G and H	1.59E-03	7.01E-04	2.29E-03	0.032	0.07	No
	Downgradient East	8.60E-04	3.09E-04	1.17E-03	0.032	0.04	No
	Downgradient East	8.60E-04	3.09E-04	1.17E-03	0.032	0.04	No
	Downgradient West	6.28E-04	4.44E-04	1.07E-03	0.032	0.03	No
	Downgradient West	6.28E-04	4.44E-04	1.07E-03	0.032	0.03	No
	Grace Panel	7.93E-04	1.32E-03	2.11E-03	0.032	0.07	No
	Grace Panel	7.93E-04	1.32E-03	2.11E-03	0.032	0.07	No
	Ibex Complex	6.89E-04	6.11E-04	1.30E-03	0.032	0.04	No
	Ibex Complex	6.89E-04	6.11E-04	1.30E-03	0.032	0.04	No
	North Trail	2.44E-04	7.65E-04	1.01E-03	0.032	0.03	No
	North Trail	2.44E-04	7.65E-04	1.01E-03	0.032	0.03	No
	Town Site	4.27E-04	8.57E-04	1.28E-03	0.032	0.04	No
	Town Site	4.27E-04	8.57E-04	1.28E-03	0.032	0.04	No
	Woodall	7.93E-04	4.92E-04	1.29E-03	0.032	0.04	No
	Woodall	7.93E-04	4.92E-04	1.29E-03	0.032	0.04	No
Mule Deer	Camp G and H	1.04E-03	1.45E-04	1.19E-03	0.032	0.04	No
	Downgradient East	5.64E-04	1.30E-03	1.87E-03	0.032	0.06	No
	Downgradient West	4.12E-04	6.51E-04	1.06E-03	0.032	0.03	No
	Grace Panel	5.20E-04	2.68E-04	7.88E-04	0.032	0.02	No
	Ibex Complex	4.52E-04	1.27E-04	5.79E-04	0.032	0.02	No
	North Trail	1.60E-04	1.57E-04	3.17E-04	0.032	0.01	No
	Town Site	2.80E-04	7.34E-04	1.01E-03	0.032	0.03	No
	Woodall	5.20E-04	1.04E-04	6.24E-04	0.032	0.02	No
Northern Bobwhite	Camp G and H	2.22E-03	8.87E-04	3.11E-03	0.039	0.08	No
	Downgradient East	1.47E-03	3.91E-04	1.86E-03	0.039	0.05	No
	Downgradient West	1.04E-03	5.62E-04	1.61E-03	0.039	0.04	No
	Grace Panel	1.43E-03	1.67E-03	3.10E-03	0.039	0.08	No
	Ibex Complex	1.10E-03	7.73E-04	1.87E-03	0.039	0.05	No
	North Trail	4.76E-04	9.69E-04	1.44E-03	0.039	0.04	No
	Town Site	7.61E-04	1.08E-03	1.85E-03	0.039	0.05	No
	Woodall	1.30E-03	6.23E-04	1.93E-03	0.039	0.05	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Northern Harrier	Camp G and H	4.60E-03	3.27E-04	4.93E-03	0.039	0.13	No
	Downgradient East	3.48E-03	1.44E-04	3.62E-03	0.039	0.09	No
	Downgradient West	1.21E-03	2.07E-04	1.41E-03	0.039	0.04	No
	Grace Panel	3.60E-04	6.16E-04	9.76E-04	0.039	0.03	No
	Ibex Complex	1.87E-03	2.85E-04	2.15E-03	0.039	0.06	No
	North Trail	3.20E-04	3.57E-04	6.77E-04	0.039	0.02	No
	Town Site	1.11E-03	4.00E-04	1.51E-03	0.039	0.04	No
	Woodall	1.19E-03	2.30E-04	1.42E-03	0.039	0.04	No
Molybdenum							
American Robin	Camp G and H	6.90E-01	4.81E-02	7.38E-01	3.5	0.21	No
	Downgradient East	5.64E-01	2.24E-02	5.87E-01	3.5	0.17	No
	Downgradient West	7.61E-01	3.29E-02	7.94E-01	3.5	0.23	No
	Grace Panel	1.51E+00	7.75E-02	1.58E+00	3.5	0.45	No
	Ibex Complex	3.37E+00	1.28E-01	3.50E+00	3.5	1.00	**Yes**
	North Trail	1.96E+00	1.17E-01	2.08E+00	3.5	0.59	No
	Town Site	1.32E+00	5.80E-02	1.37E+00	3.5	0.39	No
	Woodall	2.25E+00	3.53E-02	2.29E+00	3.5	0.65	No
Coyote	Camp G and H	2.92E-02	1.62E-02	4.55E-02	0.26	0.17	No
	Downgradient East	3.28E-02	8.93E-03	4.17E-02	0.26	0.16	No
	Downgradient West	3.37E-02	1.16E-02	4.53E-02	0.26	0.17	No
	Grace Panel	5.03E-02	2.67E-02	7.69E-02	0.26	0.30	No
	Ibex Complex	7.92E-02	4.86E-02	1.28E-01	0.26	0.49	No
	North Trail	6.19E-02	3.98E-02	1.02E-01	0.26	0.39	No
	Town Site	5.02E-02	2.00E-02	7.02E-02	0.26	0.27	No
	Woodall	6.66E-02	1.26E-02	7.92E-02	0.26	0.30	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Deer Mouse	Camp G and H	8.14E-01	5.70E-02	8.71E-01	0.26	3.35	**Yes**
	Downgradient East	6.39E-01	2.65E-02	6.66E-01	0.26	2.56	**Yes**
	Downgradient West	8.85E-01	3.89E-02	9.24E-01	0.26	3.56	**Yes**
	Grace Panel	1.81E+00	9.18E-02	1.90E+00	0.26	7.31	**Yes**
	Ibex Complex	4.12E+00	1.52E-01	4.27E+00	0.26	16.42	**Yes**
	North Trail	2.36E+00	1.39E-01	2.50E+00	0.26	9.60	**Yes**
	Town Site	1.46E+00	6.87E-02	1.53E+00	0.26	5.87	**Yes**
	Woodall	2.68E+00	4.19E-02	2.72E+00	0.26	10.46	**Yes**
Eastern Cottontail	Camp G and H	2.85E-01	2.67E-02	3.12E-01	0.26	1.20	**Yes**
	Camp G and H	2.85E-01	2.67E-02	3.12E-01	0.26	1.20	**Yes**
	Downgradient East	1.92E-01	1.24E-02	2.04E-01	0.26	0.79	No
	Downgradient East	1.92E-01	1.24E-02	2.04E-01	0.26	0.79	No
	Downgradient West	2.95E-01	1.83E-02	3.13E-01	0.26	1.21	**Yes**
	Downgradient West	2.95E-01	1.83E-02	3.13E-01	0.26	1.21	**Yes**
	Grace Panel	6.71E-01	4.31E-02	7.14E-01	0.26	2.75	**Yes**
	Grace Panel	6.71E-01	4.31E-02	7.14E-01	0.26	2.75	**Yes**
	Ibex Complex	1.60E+00	7.13E-02	1.68E+00	0.26	6.45	**Yes**
	Ibex Complex	1.60E+00	7.13E-02	1.68E+00	0.26	6.45	**Yes**
	North Trail	8.78E-01	6.50E-02	9.43E-01	0.26	3.63	**Yes**
	North Trail	8.78E-01	6.50E-02	9.43E-01	0.26	3.63	**Yes**
	Town Site	3.97E-01	3.22E-02	4.29E-01	0.26	1.65	**Yes**
	Town Site	3.97E-01	3.22E-02	4.29E-01	0.26	1.65	**Yes**
	Woodall	9.62E-01	1.96E-02	9.82E-01	0.26	3.78	**Yes**
	Woodall	9.62E-01	1.96E-02	9.82E-01	0.26	3.78	**Yes**
Mule Deer	Camp G and H	1.87E-01	5.53E-03	1.93E-01	0.26	0.74	No
	Downgradient East	1.26E-01	3.73E-03	1.30E-01	0.26	0.50	No
	Downgradient West	1.93E-01	4.21E-03	1.98E-01	0.26	0.76	No
	Grace Panel	4.40E-01	9.33E-03	4.49E-01	0.26	1.73	**Yes**
	Ibex Complex	1.05E+00	1.92E-02	1.07E+00	0.26	4.12	**Yes**
	North Trail	5.76E-01	1.37E-02	5.90E-01	0.26	2.27	**Yes**
	Town Site	2.60E-01	7.00E-03	2.67E-01	0.26	1.03	**Yes**
	Woodall	6.31E-01	4.62E-03	6.35E-01	0.26	2.44	**Yes**

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Northern Bobwhite	Camp G and H	4.06E-01	3.38E-02	4.40E-01	3.5	0.13	No
	Downgradient East	2.86E-01	1.57E-02	3.02E-01	3.5	0.09	No
	Downgradient West	4.26E-01	2.31E-02	4.49E-01	3.5	0.13	No
	Grace Panel	9.40E-01	5.45E-02	9.95E-01	3.5	0.28	No
	Ibex Complex	2.22E+00	9.03E-02	2.31E+00	3.5	0.66	No
	North Trail	1.23E+00	8.23E-02	1.31E+00	3.5	0.37	No
	Town Site	6.11E-01	4.08E-02	6.52E-01	3.5	0.19	No
	Woodall	1.36E+00	2.49E-02	1.38E+00	3.5	0.40	No
Northern Harrier	Camp G and H	6.81E-02	1.25E-02	8.06E-02	3.5	0.02	No
	Downgradient East	8.51E-02	5.80E-03	9.09E-02	3.5	0.03	No
	Downgradient West	8.01E-02	8.52E-03	8.86E-02	3.5	0.03	No
	Grace Panel	1.04E-01	2.01E-02	1.24E-01	3.5	0.04	No
	Ibex Complex	1.23E-01	3.33E-02	1.56E-01	3.5	0.04	No
	North Trail	1.24E-01	3.03E-02	1.54E-01	3.5	0.04	No
	Town Site	1.13E-01	1.50E-02	1.28E-01	3.5	0.04	No
	Woodall	1.27E-01	9.16E-03	1.37E-01	3.5	0.04	No
Nickel							
American Robin	Camp G and H	6.92E-01	4.51E-01	1.14E+00	6.71	0.17	No
	Downgradient East	3.30E-01	2.52E-01	5.82E-01	6.71	0.09	No
	Downgradient West	7.19E-01	3.52E-01	1.07E+00	6.71	0.16	No
	Grace Panel	2.41E+00	8.15E-01	3.23E+00	6.71	0.48	No
	Ibex Complex	1.84E+00	5.22E-01	2.37E+00	6.71	0.35	No
	North Trail	7.84E-01	6.72E-01	1.46E+00	6.71	0.22	No
	Town Site	7.46E-02	3.59E-01	4.33E-01	6.71	0.06	No
	Woodall	1.35E+00	5.39E-01	1.89E+00	6.71	0.28	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Coyote	Camp G and H	9.54E-02	1.50E-01	2.46E-01	1.7	0.14	No
	Downgradient East	8.55E-02	9.22E-02	1.78E-01	1.7	0.10	No
	Downgradient West	8.44E-02	1.18E-01	2.02E-01	1.7	0.12	No
	Grace Panel	1.46E-01	2.72E-01	4.18E-01	1.7	0.25	No
	Ibex Complex	1.33E-01	1.80E-01	3.13E-01	1.7	0.18	No
	North Trail	6.37E-02	2.25E-01	2.88E-01	1.7	0.17	No
	Town Site	9.64E-02	1.20E-01	2.16E-01	1.7	0.13	No
	Woodall	9.42E-02	1.89E-01	2.83E-01	1.7	0.17	No
Deer Mouse	Camp G and H	8.74E-01	5.34E-01	1.41E+00	1.7	0.83	No
	Downgradient East	3.39E-01	2.99E-01	6.37E-01	1.7	0.37	No
	Downgradient West	7.67E-01	4.17E-01	1.18E+00	1.7	0.70	No
	Grace Panel	2.56E+00	9.66E-01	3.52E+00	1.7	2.07	**Yes**
	Ibex Complex	1.86E+00	6.19E-01	2.48E+00	1.7	1.46	**Yes**
	North Trail	8.08E-01	7.96E-01	1.60E+00	1.7	0.94	No
	Town Site	7.18E-02	4.25E-01	4.97E-01	1.7	0.29	No
	Woodall	1.52E+00	6.39E-01	2.16E+00	1.7	1.27	**Yes**
Eastern Cottontail	Camp G and H	3.73E-01	2.51E-01	6.24E-01	1.7	0.37	No
	Camp G and H	3.73E-01	2.51E-01	6.24E-01	1.7	0.37	No
	Downgradient East	5.86E-02	1.40E-01	1.99E-01	1.7	0.12	No
	Downgradient East	5.86E-02	1.40E-01	1.99E-01	1.7	0.12	No
	Downgradient West	1.73E-01	1.96E-01	3.69E-01	1.7	0.22	No
	Downgradient West	1.73E-01	1.96E-01	3.69E-01	1.7	0.22	No
	Grace Panel	5.53E-01	4.53E-01	1.01E+00	1.7	0.59	No
	Grace Panel	5.53E-01	4.53E-01	1.01E+00	1.7	0.59	No
	Ibex Complex	2.83E-01	2.90E-01	5.74E-01	1.7	0.34	No
	Ibex Complex	2.83E-01	2.90E-01	5.74E-01	1.7	0.34	No
	North Trail	1.45E-01	3.73E-01	5.18E-01	1.7	0.30	No
	North Trail	1.45E-01	3.73E-01	5.18E-01	1.7	0.30	No
	Town Site	6.10E-03	1.99E-01	2.05E-01	1.7	0.12	No
	Town Site	6.10E-03	1.99E-01	2.05E-01	1.7	0.12	No
	Woodall	4.50E-01	3.00E-01	7.50E-01	1.7	0.44	No
	Woodall	4.50E-01	3.00E-01	7.50E-01	1.7	0.44	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Mule Deer	Camp G and H	2.45E-01	5.02E-02	2.95E-01	1.7	0.17	No
	Downgradient East	3.84E-02	3.49E-02	7.33E-02	1.7	0.04	No
	Downgradient West	1.14E-01	3.94E-02	1.53E-01	1.7	0.09	No
	Grace Panel	3.63E-01	9.08E-02	4.54E-01	1.7	0.27	No
	Ibex Complex	1.86E-01	6.31E-02	2.49E-01	1.7	0.15	No
	North Trail	9.51E-02	7.53E-02	1.70E-01	1.7	0.10	No
	Town Site	4.00E-03	4.02E-02	4.42E-02	1.7	0.03	No
	Woodall	2.95E-01	6.77E-02	3.63E-01	1.7	0.21	No
Northern Bobwhite	Camp G and H	5.04E-01	3.17E-01	8.22E-01	6.71	0.12	No
	Downgradient East	1.08E-01	1.77E-01	2.85E-01	6.71	0.04	No
	Downgradient West	2.86E-01	2.48E-01	5.34E-01	6.71	0.08	No
	Grace Panel	9.28E-01	5.74E-01	1.50E+00	6.71	0.22	No
	Ibex Complex	5.55E-01	3.67E-01	9.22E-01	6.71	0.14	No
	North Trail	2.63E-01	4.73E-01	7.36E-01	6.71	0.11	No
	Town Site	1.65E-02	2.52E-01	2.69E-01	6.71	0.04	No
	Woodall	6.75E-01	3.80E-01	1.05E+00	6.71	0.16	No
Northern Harrier	Camp G and H	2.85E-01	1.17E-01	4.02E-01	6.71	0.06	No
	Downgradient East	2.68E-01	6.53E-02	3.33E-01	6.71	0.05	No
	Downgradient West	2.49E-01	9.13E-02	3.40E-01	6.71	0.05	No
	Grace Panel	3.85E-01	2.11E-01	5.96E-01	6.71	0.09	No
	Ibex Complex	3.64E-01	1.35E-01	5.00E-01	6.71	0.07	No
	North Trail	1.78E-01	1.74E-01	3.53E-01	6.71	0.05	No
	Town Site	3.14E-01	9.30E-02	4.06E-01	6.71	0.06	No
	Woodall	2.55E-01	1.40E-01	3.95E-01	6.71	0.06	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Selenium							
American Robin	Camp G and H	1.61E+00	5.54E-02	1.67E+00	0.29	5.75	**Yes**
	Downgradient East	3.94E+00	1.11E-01	4.06E+00	0.29	13.99	**Yes**
	Downgradient West	6.89E+00	5.92E-02	6.95E+00	0.29	23.96	**Yes**
	Grace Panel	1.09E+01	1.35E-01	1.11E+01	0.29	38.19	**Yes**
	Ibex Complex	1.00E+01	2.09E-01	1.03E+01	0.29	35.37	**Yes**
	North Trail	8.50E+00	2.19E-01	8.72E+00	0.29	30.06	**Yes**
	Town Site	7.52E-01	5.27E-02	8.05E-01	0.29	2.77	**Yes**
	Woodall	1.29E+01	1.91E-01	1.30E+01	0.29	44.99	**Yes**
Coyote	Camp G and H	2.62E-02	1.96E-02	4.58E-02	0.143	0.32	No
	Downgradient East	2.17E-01	1.39E-01	3.56E-01	0.143	2.49	**Yes**
	Downgradient West	1.10E-01	2.05E-02	1.31E-01	0.143	0.91	No
	Grace Panel	1.82E+00	4.51E-02	1.87E+00	0.143	13.07	**Yes**
	Ibex Complex	9.93E-01	9.15E-02	1.08E+00	0.143	7.59	**Yes**
	North Trail	7.81E-01	7.32E-02	8.55E-01	0.143	5.98	**Yes**
	Town Site	1.48E-01	1.84E-02	1.66E-01	0.143	1.16	**Yes**
	Woodall	1.66E+00	1.66E-01	1.82E+00	0.143	12.74	**Yes**
Deer Mouse	Camp G and H	2.03E+00	1.06E-01	2.13E+00	0.143	14.91	**Yes**
	Downgradient East	4.25E+00	3.07E-01	4.55E+00	0.143	31.84	**Yes**
	Downgradient West	8.80E+00	5.41E-02	8.86E+00	0.143	61.94	**Yes**
	Grace Panel	1.17E+01	2.74E-01	1.19E+01	0.143	83.43	**Yes**
	Ibex Complex	1.09E+01	7.85E-01	1.16E+01	0.143	81.46	**Yes**
	North Trail	1.04E+01	2.38E-01	1.06E+01	0.143	74.39	**Yes**
	Town Site	7.71E-01	4.59E-02	8.17E-01	0.143	5.71	**Yes**
	Woodall	1.28E+01	1.70E-01	1.29E+01	0.143	90.55	**Yes**

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Eastern Cottontail	Camp G and H	8.55E-01	4.99E-02	9.05E-01	0.143	6.33	**Yes**
	Downgradient East	1.00E+00	1.44E-01	1.15E+00	0.143	8.03	**Yes**
	Downgradient West	3.88E+00	2.54E-02	3.90E+00	0.143	27.28	**Yes**
	Grace Panel	2.60E+00	1.28E-01	2.73E+00	0.143	19.07	**Yes**
	Ibex Complex	2.63E+00	3.68E-01	3.00E+00	0.143	20.97	**Yes**
	North Trail	4.08E+00	1.12E-01	4.19E+00	0.143	29.29	**Yes**
	Town Site	1.33E-01	2.15E-02	1.54E-01	0.143	1.08	**Yes**
	Woodall	1.65E+00	7.95E-02	1.73E+00	0.143	12.09	**Yes**
Mule Deer	Camp G and H	5.04E-01	7.12E-03	5.11E-01	0.143	3.57	**Yes**
	Downgradient East	5.02E-01	9.87E-02	6.00E-01	0.143	4.20	**Yes**
	Downgradient West	1.23E+00	7.25E-03	1.24E+00	0.143	8.65	**Yes**
	Grace Panel	1.34E+00	1.51E-02	1.36E+00	0.143	9.50	**Yes**
	Ibex Complex	1.50E+00	4.17E-02	1.54E+00	0.143	10.78	**Yes**
	North Trail	2.67E+00	2.44E-02	2.70E+00	0.143	18.86	**Yes**
	Town Site	7.44E-02	6.52E-03	8.09E-02	0.143	0.57	No
	Woodall	1.06E+00	1.08E-01	1.16E+00	0.143	8.14	**Yes**
Northern Bobwhite	Camp G and H	1.16E+00	3.90E-02	1.20E+00	0.29	4.13	**Yes**
	Downgradient East	1.63E+00	7.82E-02	1.71E+00	0.29	5.88	**Yes**
	Downgradient West	5.20E+00	4.17E-02	5.24E+00	0.29	18.06	**Yes**
	Grace Panel	4.31E+00	9.48E-02	4.40E+00	0.29	15.18	**Yes**
	Ibex Complex	4.23E+00	1.47E-01	4.37E+00	0.29	15.08	**Yes**
	North Trail	5.63E+00	1.54E-01	5.78E+00	0.29	19.94	**Yes**
	Town Site	2.45E-01	3.71E-02	2.82E-01	0.29	0.97	No
	Woodall	3.50E+00	1.34E-01	3.64E+00	0.29	12.55	**Yes**
Northern Harrier	Camp G and H	1.99E-02	1.44E-02	3.43E-02	0.29	0.12	No
	Downgradient East	5.56E-01	2.88E-02	5.85E-01	0.29	2.02	**Yes**
	Downgradient West	7.83E-02	1.54E-02	9.36E-02	0.29	0.32	No
	Grace Panel	5.56E+00	3.49E-02	5.59E+00	0.29	19.28	**Yes**
	Ibex Complex	2.86E+00	5.42E-02	2.92E+00	0.29	10.06	**Yes**
	North Trail	2.22E+00	5.69E-02	2.28E+00	0.29	7.85	**Yes**
	Town Site	4.55E-01	1.37E-02	4.69E-01	0.29	1.62	**Yes**
	Woodall	4.94E+00	4.94E-02	4.99E+00	0.29	17.20	**Yes**

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Vanadium							
American Robin	Camp G and H	5.69E-01	2.98E+00	3.55E+00	0.344	10.32	**Yes**
	Downgradient East	4.33E-01	3.05E-01	7.38E-01	0.344	2.15	**Yes**
	Downgradient West	8.81E-02	5.38E-01	6.26E-01	0.344	1.82	**Yes**
	Grace Panel	1.56E+00	1.27E+00	2.83E+00	0.344	8.22	**Yes**
	Ibex Complex	4.94E-01	2.51E+00	3.00E+00	0.344	8.73	**Yes**
	North Trail	8.02E-02	9.71E-01	1.05E+00	0.344	3.06	**Yes**
	Town Site	1.54E-01	1.79E+00	1.95E+00	0.344	5.66	**Yes**
	Woodall	6.32E-01	8.29E-01	1.46E+00	0.344	4.25	**Yes**
Coyote	Camp G and H	1.88E-02	9.94E-01	1.01E+00	4.16	0.24	No
	Downgradient East	2.43E-02	1.03E-01	1.27E-01	4.16	0.03	No
	Downgradient West	1.32E-02	1.80E-01	1.93E-01	4.16	0.05	No
	Grace Panel	6.22E-02	4.23E-01	4.85E-01	4.16	0.12	No
	Ibex Complex	5.23E-02	8.77E-01	9.29E-01	4.16	0.22	No
	North Trail	4.55E-02	3.25E-01	3.70E-01	4.16	0.09	No
	Town Site	3.20E-02	5.98E-01	6.30E-01	4.16	0.15	No
	Woodall	6.21E-02	2.80E-01	3.42E-01	4.16	0.08	No
Deer Mouse	Camp G and H	7.10E-01	3.53E+00	4.24E+00	4.16	1.02	**Yes**
	Downgradient East	4.25E-01	3.61E-01	7.87E-01	4.16	0.19	No
	Downgradient West	1.03E-01	6.37E-01	7.41E-01	4.16	0.18	No
	Grace Panel	1.62E+00	1.50E+00	3.13E+00	4.16	0.75	No
	Ibex Complex	5.17E-01	2.97E+00	3.49E+00	4.16	0.84	No
	North Trail	9.15E-02	1.15E+00	1.24E+00	4.16	0.30	No
	Town Site	1.76E-01	2.12E+00	2.30E+00	4.16	0.55	No
	Woodall	6.07E-01	9.83E-01	1.59E+00	4.16	0.38	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Eastern Cottontail	Camp G and H	2.94E-01	1.66E+00	1.95E+00	4.16	0.47	No
	Camp G and H	2.94E-01	1.66E+00	1.95E+00	4.16	0.47	No
	Downgradient East	4.75E-02	1.69E-01	2.17E-01	4.16	0.05	No
	Downgradient East	4.75E-02	1.69E-01	2.17E-01	4.16	0.05	No
	Downgradient West	3.53E-02	2.99E-01	3.34E-01	4.16	0.08	No
	Downgradient West	3.53E-02	2.99E-01	3.34E-01	4.16	0.08	No
	Grace Panel	3.15E-01	7.05E-01	1.02E+00	4.16	0.25	No
	Grace Panel	3.15E-01	7.05E-01	1.02E+00	4.16	0.25	No
	Ibex Complex	1.03E-01	1.39E+00	1.50E+00	4.16	0.36	No
	Ibex Complex	1.03E-01	1.39E+00	1.50E+00	4.16	0.36	No
	North Trail	2.83E-02	5.40E-01	5.68E-01	4.16	0.14	No
	North Trail	2.83E-02	5.40E-01	5.68E-01	4.16	0.14	No
	Town Site	5.37E-02	9.96E-01	1.05E+00	4.16	0.25	No
	Town Site	5.37E-02	9.96E-01	1.05E+00	4.16	0.25	No
	Woodall	4.89E-02	4.61E-01	5.10E-01	4.16	0.12	No
	Woodall	4.89E-02	4.61E-01	5.10E-01	4.16	0.12	No
Mule Deer	Camp G and H	1.93E-01	3.32E-01	5.25E-01	4.16	0.13	No
	Downgradient East	3.11E-02	3.46E-02	6.58E-02	4.16	0.02	No
	Downgradient West	2.32E-02	6.00E-02	8.32E-02	4.16	0.02	No
	Grace Panel	2.07E-01	1.41E-01	3.48E-01	4.16	0.08	No
	Ibex Complex	6.76E-02	3.13E-01	3.81E-01	4.16	0.09	No
	North Trail	1.86E-02	1.09E-01	1.27E-01	4.16	0.03	No
	Town Site	3.52E-02	1.99E-01	2.35E-01	4.16	0.06	No
	Woodall	3.21E-02	9.52E-02	1.27E-01	4.16	0.03	No
Northern Bobwhite	Camp G and H	4.01E-01	2.10E+00	2.50E+00	0.344	7.26	**Yes**
	Downgradient East	1.09E-01	2.15E-01	3.24E-01	0.344	0.94	No
	Downgradient West	5.06E-02	3.78E-01	4.29E-01	0.344	1.25	**Yes**
	Grace Panel	5.53E-01	8.93E-01	1.45E+00	0.344	4.20	**Yes**
	Ibex Complex	1.79E-01	1.77E+00	1.94E+00	0.344	5.65	**Yes**
	North Trail	4.18E-02	6.83E-01	7.25E-01	0.344	2.11	**Yes**
	Town Site	7.96E-02	1.26E+00	1.34E+00	0.344	3.90	**Yes**
	Woodall	1.37E-01	5.83E-01	7.20E-01	0.344	2.09	**Yes**

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Northern Harrier	Camp G and H	3.85E-02	7.73E-01	8.11E-01	0.344	2.36	**Yes**
	Downgradient East	6.29E-02	7.90E-02	1.42E-01	0.344	0.41	No
	Downgradient West	3.97E-02	1.39E-01	1.79E-01	0.344	0.52	No
	Grace Panel	1.43E-01	3.29E-01	4.72E-01	0.344	1.37	**Yes**
	Ibex Complex	1.52E-01	6.50E-01	8.03E-01	0.344	2.33	**Yes**
	North Trail	1.46E-01	2.52E-01	3.98E-01	0.344	1.16	**Yes**
	Town Site	9.90E-02	4.65E-01	5.64E-01	0.344	1.64	**Yes**
	Woodall	1.79E-01	2.15E-01	3.94E-01	0.344	1.15	**Yes**
Zinc							
American Robin	Camp G and H	3.23E+01	2.51E+00	3.48E+01	66.1	0.53	No
	Downgradient East	2.39E+01	1.05E+00	2.49E+01	66.1	0.38	No
	Downgradient West	2.14E+01	1.20E+00	2.26E+01	66.1	0.34	No
	Grace Panel	3.29E+01	3.09E+00	3.60E+01	66.1	0.54	No
	Ibex Complex	2.94E+01	3.75E+00	3.32E+01	66.1	0.50	No
	North Trail	2.53E+01	2.79E+00	2.81E+01	66.1	0.42	No
	Town Site	1.71E+01	2.63E+00	1.97E+01	66.1	0.30	No
	Woodall	2.50E+01	2.18E+00	2.72E+01	66.1	0.41	No
Coyote	Camp G and H	1.76E+01	8.36E-01	1.84E+01	75.4	0.24	No
	Downgradient East	2.86E+01	3.77E-01	2.89E+01	75.4	0.38	No
	Downgradient West	2.31E+01	4.01E-01	2.35E+01	75.4	0.31	No
	Grace Panel	1.26E+01	1.03E+00	1.36E+01	75.4	0.18	No
	Ibex Complex	3.10E+01	1.31E+00	3.24E+01	75.4	0.43	No
	North Trail	1.06E+01	9.32E-01	1.15E+01	75.4	0.15	No
	Town Site	3.33E+01	8.79E-01	3.42E+01	75.4	0.45	No
	Woodall	1.94E+01	7.43E-01	2.02E+01	75.4	0.27	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Deer Mouse	Camp G and H	3.47E+01	2.97E+00	3.77E+01	75.4	0.50	No
	Downgradient East	2.31E+01	1.25E+00	2.43E+01	75.4	0.32	No
	Downgradient West	2.17E+01	1.42E+00	2.31E+01	75.4	0.31	No
	Grace Panel	3.50E+01	3.66E+00	3.86E+01	75.4	0.51	No
	Ibex Complex	2.93E+01	4.44E+00	3.37E+01	75.4	0.45	No
	North Trail	2.69E+01	3.30E+00	3.02E+01	75.4	0.40	No
	Town Site	1.62E+01	3.12E+00	1.93E+01	75.4	0.26	No
	Woodall	2.56E+01	2.58E+00	2.81E+01	75.4	0.37	No
Eastern Cottontail	Camp G and H	8.15E+00	1.39E+00	9.54E+00	75.4	0.13	No
	Camp G and H	8.15E+00	1.39E+00	9.54E+00	75.4	0.13	No
	Downgradient East	2.09E+00	5.85E-01	2.67E+00	75.4	0.04	No
	Downgradient East	2.09E+00	5.85E-01	2.67E+00	75.4	0.04	No
	Downgradient West	3.40E+00	6.67E-01	4.06E+00	75.4	0.05	No
	Downgradient West	3.40E+00	6.67E-01	4.06E+00	75.4	0.05	No
	Grace Panel	7.75E+00	1.72E+00	9.46E+00	75.4	0.13	No
	Grace Panel	7.75E+00	1.72E+00	9.46E+00	75.4	0.13	No
	Ibex Complex	3.82E+00	2.08E+00	5.90E+00	75.4	0.08	No
	Ibex Complex	3.82E+00	2.08E+00	5.90E+00	75.4	0.08	No
	North Trail	5.92E+00	1.55E+00	7.46E+00	75.4	0.10	No
	North Trail	5.92E+00	1.55E+00	7.46E+00	75.4	0.10	No
	Town Site	9.09E-01	1.46E+00	2.37E+00	75.4	0.03	No
	Town Site	9.09E-01	1.46E+00	2.37E+00	75.4	0.03	No
	Woodall	4.28E+00	1.21E+00	5.49E+00	75.4	0.07	No
	Woodall	4.28E+00	1.21E+00	5.49E+00	75.4	0.07	No
Mule Deer	Camp G and H	5.34E+00	2.79E-01	5.62E+00	75.4	0.07	No
	Downgradient East	1.37E+00	1.39E-01	1.51E+00	75.4	0.02	No
	Downgradient West	2.23E+00	1.34E-01	2.36E+00	75.4	0.03	No
	Grace Panel	5.08E+00	3.44E-01	5.42E+00	75.4	0.07	No
	Ibex Complex	2.51E+00	4.67E-01	2.97E+00	75.4	0.04	No
	North Trail	3.88E+00	3.13E-01	4.19E+00	75.4	0.06	No
	Town Site	5.96E-01	2.94E-01	8.90E-01	75.4	0.01	No
	Woodall	2.81E+00	2.57E-01	3.07E+00	75.4	0.04	No

TABLE 4.3-1
HQs Based on NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)	Carry Forward?
		Food	Abiotic	Total			
Northern Bobwhite	Camp G and H	1.32E+01	1.76E+00	1.50E+01	66.1	0.23	No
	Downgradient East	5.43E+00	7.41E-01	6.17E+00	66.1	0.09	No
	Downgradient West	6.55E+00	8.44E-01	7.40E+00	66.1	0.11	No
	Grace Panel	1.29E+01	2.17E+00	1.50E+01	66.1	0.23	No
	Ibex Complex	8.07E+00	2.64E+00	1.07E+01	66.1	0.16	No
	North Trail	9.86E+00	1.96E+00	1.18E+01	66.1	0.18	No
	Town Site	3.24E+00	1.85E+00	5.09E+00	66.1	0.08	No
	Woodall	8.01E+00	1.53E+00	9.54E+00	66.1	0.14	No
Northern Harrier	Camp G and H	5.65E+01	6.50E-01	5.71E+01	66.1	0.86	No
	Downgradient East	9.28E+01	2.73E-01	9.31E+01	66.1	1.41	**Yes**
	Downgradient West	7.49E+01	3.11E-01	7.52E+01	66.1	1.14	**Yes**
	Grace Panel	4.00E+01	8.01E-01	4.08E+01	66.1	0.62	No
	Ibex Complex	1.01E+02	9.72E-01	1.02E+02	66.1	1.54	**Yes**
	North Trail	3.37E+01	7.22E-01	3.44E+01	66.1	0.52	No
	Town Site	1.09E+02	6.83E-01	1.09E+02	66.1	1.65	**Yes**
	Woodall	6.28E+01	5.64E-01	6.34E+01	66.1	0.96	No

Notes:
Results carried forward are bold.
NOAEL TRV - No Observed Adverse Effects Level Toxicity Reference Value
mg/kg-BW/day - milligrams per kilogram body weight per day
HQ - Hazard Quotient

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Cadmium						
American Robin	Camp G and H	3.64E-01	1.92E-01	5.56E-01	2.37	0.23
	Downgradient East	3.74E-01	2.53E-02	3.99E-01	2.37	0.17
	Downgradient West	2.19E-01	4.88E-02	2.68E-01	2.37	0.11
	Grace Panel	1.04E+00	1.47E-01	1.18E+00	2.37	0.50
	Ibex Complex	1.09E+00	2.00E-01	1.29E+00	2.37	0.54
	North Trail	4.60E-01	9.15E-02	5.51E-01	2.37	0.23
	Town Site	1.05E-01	1.37E-01	2.42E-01	2.37	0.10
	Woodall	5.42E-01	9.66E-02	6.39E-01	2.37	0.27
Coyote	Camp G and H	4.12E-02	6.41E-02	1.05E-01	0.909	0.12
	Downgradient East	4.24E-02	8.73E-03	5.11E-02	0.909	0.06
	Downgradient West	1.07E-02	1.63E-02	2.70E-02	0.909	0.03
	Grace Panel	3.33E-02	4.91E-02	8.24E-02	0.909	0.09
	Ibex Complex	3.60E-02	6.74E-02	1.03E-01	0.909	0.11
	North Trail	1.77E-02	3.06E-02	4.83E-02	0.909	0.05
	Town Site	1.98E-02	4.57E-02	6.55E-02	0.909	0.07
	Woodall	2.59E-02	3.26E-02	5.85E-02	0.909	0.06
Deer Mouse	Camp G and H	4.46E-01	2.28E-01	6.74E-01	0.909	0.74
	Downgradient East	3.65E-01	2.99E-02	3.95E-01	0.909	0.43
	Downgradient West	2.36E-01	5.78E-02	2.93E-01	0.909	0.32
	Grace Panel	1.04E+00	1.75E-01	1.22E+00	0.909	**1.34**
	Ibex Complex	1.07E+00	2.37E-01	1.30E+00	0.909	**1.43**
	North Trail	4.99E-01	1.08E-01	6.07E-01	0.909	0.67
	Town Site	9.92E-02	1.62E-01	2.62E-01	0.909	0.29
	Woodall	5.56E-01	1.14E-01	6.71E-01	0.909	0.74
Eastern Cottontail	Camp G and H	1.76E-01	1.07E-01	2.83E-01	0.909	0.31
	Downgradient East	3.77E-02	1.40E-02	5.17E-02	0.909	0.06
	Downgradient West	5.58E-02	2.71E-02	8.29E-02	0.909	0.09
	Grace Panel	1.55E-01	8.18E-02	2.37E-01	0.909	0.26
	Ibex Complex	1.14E-01	1.11E-01	2.25E-01	0.909	0.25
	North Trail	1.23E-01	5.08E-02	1.73E-01	0.909	0.19
	Town Site	6.10E-03	7.61E-02	8.22E-02	0.909	0.09
	Woodall	9.60E-02	5.37E-02	1.50E-01	0.909	0.16
Mule Deer	Camp G and H	1.16E-01	2.14E-02	1.37E-01	0.909	0.15
	Downgradient East	2.47E-02	3.07E-03	2.78E-02	0.909	0.03
	Downgradient West	3.66E-02	5.43E-03	4.20E-02	0.909	0.05
	Grace Panel	1.02E-01	1.64E-02	1.18E-01	0.909	0.13
	Ibex Complex	7.45E-02	2.28E-02	9.73E-02	0.909	0.11
	North Trail	8.04E-02	1.02E-02	9.07E-02	0.909	0.10
	Town Site	4.00E-03	1.52E-02	1.92E-02	0.909	0.02
	Woodall	6.30E-02	1.11E-02	7.40E-02	0.909	0.08

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Northern Bobwhite	Camp G and H	2.43E-01	1.35E-01	3.78E-01	2.37	0.16
	Downgradient East	9.05E-02	1.78E-02	1.08E-01	2.37	0.05
	Downgradient West	9.03E-02	3.43E-02	1.25E-01	2.37	0.05
	Grace Panel	3.07E-01	1.04E-01	4.10E-01	2.37	0.17
	Ibex Complex	2.68E-01	1.41E-01	4.09E-01	2.37	0.17
	North Trail	1.96E-01	6.44E-02	2.60E-01	2.37	0.11
	Town Site	2.04E-02	9.64E-02	1.17E-01	2.37	0.05
	Woodall	1.77E-01	6.80E-02	2.45E-01	2.37	0.10
Northern Harrier	Camp G and H	1.20E-01	4.99E-02	1.70E-01	2.37	0.07
	Downgradient East	1.25E-01	6.55E-03	1.31E-01	2.37	0.06
	Downgradient West	2.64E-02	1.26E-02	3.91E-02	2.37	0.02
	Grace Panel	6.90E-02	3.82E-02	1.07E-01	2.37	0.05
	Ibex Complex	7.59E-02	5.18E-02	1.28E-01	2.37	0.05
	North Trail	4.00E-02	2.37E-02	6.37E-02	2.37	0.03
	Town Site	6.10E-02	3.55E-02	9.66E-02	2.37	0.04
	Woodall	6.40E-02	2.50E-02	8.90E-02	2.37	0.04
Chromium						
American Robin	Camp G and H	2.34E-01	1.39E+00	1.63E+00	2.78	0.58
	Downgradient East	3.16E-01	4.05E-01	7.21E-01	2.78	0.26
	Downgradient West	1.18E-01	6.02E-01	7.20E-01	2.78	0.26
	Grace Panel	3.43E+00	1.68E+00	5.11E+00	2.78	**1.84**
	Ibex Complex	9.70E-01	1.93E+00	2.90E+00	2.78	**1.04**
	North Trail	1.26E-01	1.13E+00	1.26E+00	2.78	0.45
	Town Site	1.20E-01	1.15E+00	1.27E+00	2.78	0.46
	Woodall	9.73E-01	1.27E+00	2.24E+00	2.78	0.81
Coyote	Camp G and H	5.54E-02	4.64E-01	5.20E-01	12	0.04
	Downgradient East	7.91E-02	1.36E-01	2.15E-01	12	0.02
	Downgradient West	5.07E-02	2.01E-01	2.52E-01	12	0.02
	Grace Panel	2.17E-01	5.61E-01	7.77E-01	12	0.06
	Ibex Complex	1.44E-01	6.79E-01	8.23E-01	12	0.07
	North Trail	1.03E-01	3.77E-01	4.81E-01	12	0.04
	Town Site	6.74E-02	3.84E-01	4.51E-01	12	0.04
	Woodall	1.76E-01	4.27E-01	6.03E-01	12	0.05
Deer Mouse	Camp G and H	2.74E-01	1.65E+00	1.92E+00	12	0.16
	Downgradient East	3.10E-01	4.80E-01	7.90E-01	12	0.07
	Downgradient West	1.42E-01	7.14E-01	8.55E-01	12	0.07
	Grace Panel	3.28E+00	1.99E+00	5.27E+00	12	0.44
	Ibex Complex	1.17E+00	2.29E+00	3.46E+00	12	0.29
	North Trail	1.52E-01	1.34E+00	1.49E+00	12	0.12
	Town Site	1.40E-01	1.36E+00	1.50E+00	12	0.13
	Woodall	9.34E-01	1.51E+00	2.44E+00	12	0.20

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Eastern Cottontail	Camp G and H	9.43E-02	7.73E-01	8.68E-01	12	0.07
	Downgradient East	3.45E-02	2.25E-01	2.60E-01	12	0.02
	Downgradient West	5.22E-02	3.35E-01	3.87E-01	12	0.03
	Grace Panel	2.44E-01	9.33E-01	1.18E+00	12	0.10
	Ibex Complex	4.37E-01	1.07E+00	1.51E+00	12	0.13
	North Trail	5.63E-02	6.27E-01	6.84E-01	12	0.06
	Town Site	4.76E-02	6.40E-01	6.87E-01	12	0.06
	Woodall	7.31E-02	7.06E-01	7.79E-01	12	0.06
Mule Deer	Camp G and H	6.18E-02	1.55E-01	2.17E-01	12	0.02
	Downgradient East	2.26E-02	4.57E-02	6.83E-02	12	0.01
	Downgradient West	3.42E-02	6.71E-02	1.01E-01	12	0.01
	Grace Panel	1.60E-01	1.87E-01	3.47E-01	12	0.03
	Ibex Complex	2.86E-01	2.44E-01	5.31E-01	12	0.04
	North Trail	3.69E-02	1.26E-01	1.63E-01	12	0.01
	Town Site	3.12E-02	1.28E-01	1.59E-01	12	0.01
	Woodall	4.79E-02	1.44E-01	1.92E-01	12	0.02
Northern Bobwhite	Camp G and H	1.35E-01	9.80E-01	1.11E+00	2.78	0.40
	Downgradient East	7.94E-02	2.85E-01	3.65E-01	2.78	0.13
	Downgradient West	7.32E-02	4.24E-01	4.97E-01	2.78	0.18
	Grace Panel	7.18E-01	1.18E+00	1.90E+00	2.78	0.68
	Ibex Complex	6.11E-01	1.36E+00	1.97E+00	2.78	0.71
	North Trail	7.89E-02	7.95E-01	8.73E-01	2.78	0.31
	Town Site	6.84E-02	8.10E-01	8.79E-01	2.78	0.32
	Woodall	2.08E-01	8.94E-01	1.10E+00	2.78	0.40
Northern Harrier	Camp G and H	1.72E-01	3.61E-01	5.33E-01	2.78	0.19
	Downgradient East	2.47E-01	1.05E-01	3.52E-01	2.78	0.13
	Downgradient West	1.62E-01	1.56E-01	3.18E-01	2.78	0.11
	Grace Panel	5.79E-01	4.35E-01	1.01E+00	2.78	0.36
	Ibex Complex	4.33E-01	5.00E-01	9.34E-01	2.78	0.34
	North Trail	3.33E-01	2.93E-01	6.26E-01	2.78	0.23
	Town Site	2.16E-01	2.99E-01	5.15E-01	2.78	0.19
	Woodall	5.40E-01	3.29E-01	8.70E-01	2.78	0.31
Copper						
American Robin	Camp G and H	2.97E+00	2.47E-01	3.22E+00	4.68	0.69
	Downgradient East	2.77E+00	1.32E-01	2.91E+00	4.68	0.62
	Downgradient West	3.14E+00	1.64E-01	3.31E+00	4.68	0.71
	Grace Panel	3.55E+00	3.67E-01	3.92E+00	4.68	0.84
	Ibex Complex	4.16E+00	2.51E-01	4.41E+00	4.68	0.94
	North Trail	2.37E+00	2.55E-01	2.63E+00	4.68	0.56
	Town Site	3.62E+00	2.05E-01	3.83E+00	4.68	0.82
	Woodall	3.61E+00	2.43E-01	3.86E+00	4.68	0.82

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Coyote	Camp G and H	4.53E-01	8.26E-02	5.35E-01	6.79	0.08
	Downgradient East	5.72E-01	4.44E-02	6.16E-01	6.79	0.09
	Downgradient West	4.58E-01	5.49E-02	5.13E-01	6.79	0.08
	Grace Panel	5.33E-01	1.23E-01	6.56E-01	6.79	0.10
	Ibex Complex	5.25E-01	8.59E-02	6.11E-01	6.79	0.09
	North Trail	3.54E-01	8.73E-02	4.41E-01	6.79	0.06
	Town Site	4.14E-01	6.85E-02	4.82E-01	6.79	0.07
	Woodall	4.74E-01	8.17E-02	5.55E-01	6.79	0.08
Deer Mouse	Camp G and H	2.96E+00	2.93E-01	3.26E+00	6.79	0.48
	Downgradient East	2.68E+00	1.56E-01	2.84E+00	6.79	0.42
	Downgradient West	3.02E+00	1.94E-01	3.22E+00	6.79	0.47
	Grace Panel	3.43E+00	4.35E-01	3.87E+00	6.79	0.57
	Ibex Complex	3.92E+00	2.97E-01	4.22E+00	6.79	0.62
	North Trail	2.34E+00	3.02E-01	2.64E+00	6.79	0.39
	Town Site	3.41E+00	2.42E-01	3.65E+00	6.79	0.54
	Woodall	3.43E+00	2.87E-01	3.72E+00	6.79	0.55
Eastern Cottontail	Camp G and H	4.01E-01	1.37E-01	5.38E-01	6.79	0.08
	Downgradient East	2.38E-01	7.33E-02	3.11E-01	6.79	0.05
	Downgradient West	2.47E-01	9.11E-02	3.38E-01	6.79	0.05
	Grace Panel	3.12E-01	2.04E-01	5.16E-01	6.79	0.08
	Ibex Complex	2.13E-01	1.39E-01	3.52E-01	6.79	0.05
	North Trail	2.81E-01	1.41E-01	4.22E-01	6.79	0.06
	Town Site	1.71E-01	1.14E-01	2.84E-01	6.79	0.04
	Woodall	2.24E-01	1.35E-01	3.58E-01	6.79	0.05
Mule Deer	Camp G and H	2.63E-01	2.76E-02	2.91E-01	6.79	0.04
	Downgradient East	1.56E-01	1.50E-02	1.71E-01	6.79	0.03
	Downgradient West	1.62E-01	1.85E-02	1.81E-01	6.79	0.03
	Grace Panel	2.04E-01	4.15E-02	2.46E-01	6.79	0.04
	Ibex Complex	1.39E-01	2.98E-02	1.69E-01	6.79	0.02
	North Trail	1.84E-01	3.03E-02	2.14E-01	6.79	0.03
	Town Site	1.12E-01	2.30E-02	1.35E-01	6.79	0.02
	Woodall	1.47E-01	2.76E-02	1.74E-01	6.79	0.03
Northern Bobwhite	Camp G and H	8.32E-01	1.74E-01	1.01E+00	4.68	0.21
	Downgradient East	6.26E-01	9.28E-02	7.18E-01	4.68	0.15
	Downgradient West	6.84E-01	1.15E-01	7.99E-01	4.68	0.17
	Grace Panel	8.08E-01	2.58E-01	1.07E+00	4.68	0.23
	Ibex Complex	7.78E-01	1.76E-01	9.54E-01	4.68	0.20
	North Trail	6.20E-01	1.79E-01	7.99E-01	4.68	0.17
	Town Site	6.61E-01	1.44E-01	8.05E-01	4.68	0.17
	Woodall	7.19E-01	1.71E-01	8.89E-01	4.68	0.19

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Northern Harrier	Camp G and H	1.37E+00	6.40E-02	1.43E+00	4.68	0.31
	Downgradient East	1.77E+00	3.42E-02	1.80E+00	4.68	0.39
	Downgradient West	1.38E+00	4.25E-02	1.42E+00	4.68	0.30
	Grace Panel	1.61E+00	9.52E-02	1.71E+00	4.68	0.36
	Ibex Complex	1.56E+00	6.50E-02	1.63E+00	4.68	0.35
	North Trail	1.07E+00	6.60E-02	1.13E+00	4.68	0.24
	Town Site	1.22E+00	5.30E-02	1.27E+00	4.68	0.27
	Woodall	1.42E+00	6.29E-02	1.48E+00	4.68	0.32
Lead						
American Robin	Camp G and H	4.39E-02	6.06E-02	1.04E-01	1.94	0.05
	Downgradient East	5.62E-02	4.77E-02	1.04E-01	1.94	0.05
	Downgradient West	1.60E-02	2.48E-01	2.64E-01	1.94	0.14
	Grace Panel	6.76E-02	3.19E-02	9.95E-02	1.94	0.05
	Ibex Complex	1.54E-02	3.76E-02	5.30E-02	1.94	0.03
	North Trail	6.09E-03	2.98E-02	3.59E-02	1.94	0.02
	Town Site	1.94E-02	2.08E+00	2.10E+00	1.94	**1.08**
	Woodall	4.95E-02	3.44E-02	8.39E-02	1.94	0.04
Coyote	Camp G and H	1.54E-02	2.04E-02	3.59E-02	5	0.01
	Downgradient East	3.41E-02	1.60E-02	5.01E-02	5	0.01
	Downgradient West	1.38E-02	8.28E-02	9.66E-02	5	0.02
	Grace Panel	1.28E-02	1.09E-02	2.37E-02	5	0.00
	Ibex Complex	8.92E-02	1.29E-02	1.02E-01	5	0.02
	North Trail	7.52E-03	3.42E-02	4.17E-02	5	0.01
	Town Site	4.88E-02	6.94E-01	7.43E-01	5	0.15
	Woodall	2.35E-02	1.17E-02	3.51E-02	5	0.01
Deer Mouse	Camp G and H	4.61E-02	7.18E-02	1.18E-01	5	0.02
	Downgradient East	5.70E-02	5.65E-02	1.13E-01	5	0.02
	Downgradient West	1.83E-02	2.94E-01	3.13E-01	5	0.06
	Grace Panel	6.74E-02	3.78E-02	1.05E-01	5	0.02
	Ibex Complex	1.69E-02	4.45E-02	6.14E-02	5	0.01
	North Trail	6.66E-03	3.53E-02	4.20E-02	5	0.01
	Town Site	1.93E-02	2.47E+00	2.49E+00	5	0.50
	Woodall	4.87E-02	4.07E-02	8.95E-02	5	0.02
Eastern Cottontail	Camp G and H	9.46E-03	3.37E-02	4.31E-02	5	0.01
	Downgradient East	8.97E-03	2.65E-02	3.54E-02	5	0.01
	Downgradient West	5.76E-03	1.38E-01	1.44E-01	5	0.03
	Grace Panel	8.91E-03	1.77E-02	2.66E-02	5	0.01
	Ibex Complex	4.39E-03	2.09E-02	2.53E-02	5	0.01
	North Trail	1.71E-03	1.65E-02	1.83E-02	5	0.00
	Town Site	2.50E-03	1.16E+00	1.16E+00	5	0.23
	Woodall	5.60E-03	1.91E-02	2.47E-02	5	0.00

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Mule Deer	Camp G and H	6.20E-03	6.93E-03	1.31E-02	5	0.00
	Downgradient East	5.88E-03	5.38E-03	1.13E-02	5	0.00
	Downgradient West	3.78E-03	2.77E-02	3.14E-02	5	0.01
	Grace Panel	5.84E-03	3.80E-03	9.64E-03	5	0.00
	Ibex Complex	2.88E-03	4.46E-03	7.34E-03	5	0.00
	North Trail	1.12E-03	2.38E-02	2.50E-02	5	0.00
	Town Site	1.64E-03	2.31E-01	2.33E-01	5	0.05
	Woodall	3.67E-03	3.99E-03	7.66E-03	5	0.00
Northern Bobwhite	Camp G and H	1.62E-02	4.26E-02	5.88E-02	1.94	0.03
	Downgradient East	1.73E-02	3.35E-02	5.08E-02	1.94	0.03
	Downgradient West	8.47E-03	1.75E-01	1.83E-01	1.94	0.09
	Grace Panel	1.87E-02	2.24E-02	4.11E-02	1.94	0.02
	Ibex Complex	6.88E-03	2.64E-02	3.33E-02	1.94	0.02
	North Trail	2.69E-03	2.10E-02	2.36E-02	1.94	0.01
	Town Site	5.30E-03	1.47E+00	1.47E+00	1.94	0.76
	Woodall	1.27E-02	2.42E-02	3.69E-02	1.94	0.02
Northern Harrier	Camp G and H	4.89E-02	1.57E-02	6.46E-02	1.94	0.03
	Downgradient East	1.10E-01	1.24E-02	1.22E-01	1.94	0.06
	Downgradient West	4.45E-02	6.44E-02	1.09E-01	1.94	0.06
	Grace Panel	3.93E-02	8.26E-03	4.75E-02	1.94	0.02
	Ibex Complex	2.92E-01	9.74E-03	3.02E-01	1.94	0.16
	North Trail	2.45E-02	7.72E-03	3.22E-02	1.94	0.02
	Town Site	1.59E-01	5.40E-01	6.99E-01	1.94	0.36
	Woodall	7.51E-02	8.91E-03	8.41E-02	1.94	0.04
Molybdenum						
American Robin	Camp G and H	6.90E-01	4.81E-02	7.38E-01	35.3	0.02
	Downgradient East	5.64E-01	2.24E-02	5.87E-01	35.3	0.02
	Downgradient West	7.61E-01	3.29E-02	7.94E-01	35.3	0.02
	Grace Panel	1.51E+00	7.75E-02	1.58E+00	35.3	0.04
	Ibex Complex	3.37E+00	1.28E-01	3.50E+00	35.3	0.10
	North Trail	1.96E+00	1.17E-01	2.08E+00	35.3	0.06
	Town Site	1.32E+00	5.80E-02	1.37E+00	35.3	0.04
	Woodall	2.25E+00	3.53E-02	2.29E+00	35.3	0.06
Coyote	Camp G and H	2.92E-02	1.62E-02	4.55E-02	2.6	0.02
	Downgradient East	3.28E-02	8.93E-03	4.17E-02	2.6	0.02
	Downgradient West	3.37E-02	1.16E-02	4.53E-02	2.6	0.02
	Grace Panel	5.03E-02	2.67E-02	7.69E-02	2.6	0.03
	Ibex Complex	7.92E-02	4.86E-02	1.28E-01	2.6	0.05
	North Trail	6.19E-02	3.98E-02	1.02E-01	2.6	0.04
	Town Site	5.02E-02	2.00E-02	7.02E-02	2.6	0.03
	Woodall	6.66E-02	1.26E-02	7.92E-02	2.6	0.03

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Deer Mouse	Camp G and H	8.14E-01	5.70E-02	8.71E-01	2.6	0.34
	Downgradient East	6.39E-01	2.65E-02	6.66E-01	2.6	0.26
	Downgradient West	8.85E-01	3.89E-02	9.24E-01	2.6	0.36
	Grace Panel	1.81E+00	9.18E-02	1.90E+00	2.6	0.73
	Ibex Complex	4.12E+00	1.52E-01	4.27E+00	2.6	**1.64**
	North Trail	2.36E+00	1.39E-01	2.50E+00	2.6	0.96
	Town Site	1.46E+00	6.87E-02	1.53E+00	2.6	0.59
	Woodall	2.68E+00	4.19E-02	2.72E+00	2.6	**1.05**
Eastern Cottontail	Camp G and H	2.85E-01	2.67E-02	3.12E-01	2.6	0.12
	Downgradient East	1.92E-01	1.24E-02	2.04E-01	2.6	0.08
	Downgradient West	2.95E-01	1.83E-02	3.13E-01	2.6	0.12
	Grace Panel	6.71E-01	4.31E-02	7.14E-01	2.6	0.27
	Ibex Complex	1.60E+00	7.13E-02	1.68E+00	2.6	0.64
	North Trail	8.78E-01	6.50E-02	9.43E-01	2.6	0.36
	Town Site	3.97E-01	3.22E-02	4.29E-01	2.6	0.16
	Woodall	9.62E-01	1.96E-02	9.82E-01	2.6	0.38
Mule Deer	Camp G and H	1.87E-01	5.53E-03	1.93E-01	2.6	0.07
	Downgradient East	1.26E-01	3.73E-03	1.30E-01	2.6	0.05
	Downgradient West	1.93E-01	4.21E-03	1.98E-01	2.6	0.08
	Grace Panel	4.40E-01	9.33E-03	4.49E-01	2.6	0.17
	Ibex Complex	1.05E+00	1.92E-02	1.07E+00	2.6	0.41
	North Trail	5.76E-01	1.37E-02	5.90E-01	2.6	0.23
	Town Site	2.60E-01	7.00E-03	2.67E-01	2.6	0.10
	Woodall	6.31E-01	4.62E-03	6.35E-01	2.6	0.24
Northern Bobwhite	Camp G and H	4.06E-01	3.38E-02	4.40E-01	35.3	0.01
	Downgradient East	2.86E-01	1.57E-02	3.02E-01	35.3	0.01
	Downgradient West	4.26E-01	2.31E-02	4.49E-01	35.3	0.01
	Grace Panel	9.40E-01	5.45E-02	9.95E-01	35.3	0.03
	Ibex Complex	2.22E+00	9.03E-02	2.31E+00	35.3	0.07
	North Trail	1.23E+00	8.23E-02	1.31E+00	35.3	0.04
	Town Site	6.11E-01	4.08E-02	6.52E-01	35.3	0.02
	Woodall	1.36E+00	2.49E-02	1.38E+00	35.3	0.04
Northern Harrier	Camp G and H	6.81E-02	1.25E-02	8.06E-02	35.3	0.00
	Downgradient East	8.51E-02	5.80E-03	9.09E-02	35.3	0.00
	Downgradient West	8.01E-02	8.52E-03	8.86E-02	35.3	0.00
	Grace Panel	1.04E-01	2.01E-02	1.24E-01	35.3	0.00
	Ibex Complex	1.23E-01	3.33E-02	1.56E-01	35.3	0.00
	North Trail	1.24E-01	3.03E-02	1.54E-01	35.3	0.00
	Town Site	1.13E-01	1.50E-02	1.28E-01	35.3	0.00
	Woodall	1.27E-01	9.16E-03	1.37E-01	35.3	0.00

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Nickel						
American Robin	Camp G and H	6.92E-01	4.51E-01	1.14E+00	11.5	0.10
	Downgradient East	3.30E-01	2.52E-01	5.82E-01	11.5	0.05
	Downgradient West	7.19E-01	3.52E-01	1.07E+00	11.5	0.09
	Grace Panel	2.41E+00	8.15E-01	3.23E+00	11.5	0.28
	Ibex Complex	1.84E+00	5.22E-01	2.37E+00	11.5	0.21
	North Trail	7.84E-01	6.72E-01	1.46E+00	11.5	0.13
	Town Site	7.46E-02	3.59E-01	4.33E-01	11.5	0.04
	Woodall	1.35E+00	5.39E-01	1.89E+00	11.5	0.16
Coyote	Camp G and H	9.54E-02	1.50E-01	2.46E-01	2.71	0.09
	Downgradient East	8.55E-02	9.22E-02	1.78E-01	2.71	0.07
	Downgradient West	8.44E-02	1.18E-01	2.02E-01	2.71	0.07
	Grace Panel	1.46E-01	2.72E-01	4.18E-01	2.71	0.15
	Ibex Complex	1.33E-01	1.80E-01	3.13E-01	2.71	0.12
	North Trail	6.37E-02	2.25E-01	2.88E-01	2.71	0.11
	Town Site	9.64E-02	1.20E-01	2.16E-01	2.71	0.08
	Woodall	9.42E-02	1.89E-01	2.83E-01	2.71	0.10
Deer Mouse	Camp G and H	8.74E-01	5.34E-01	1.41E+00	2.71	0.52
	Downgradient East	3.39E-01	2.99E-01	6.37E-01	2.71	0.24
	Downgradient West	7.67E-01	4.17E-01	1.18E+00	2.71	0.44
	Grace Panel	2.56E+00	9.66E-01	3.52E+00	2.71	**1.30**
	Ibex Complex	1.86E+00	6.19E-01	2.48E+00	2.71	0.92
	North Trail	8.08E-01	7.96E-01	1.60E+00	2.71	0.59
	Town Site	7.18E-02	4.25E-01	4.97E-01	2.71	0.18
	Woodall	1.52E+00	6.39E-01	2.16E+00	2.71	0.80
Eastern Cottontail	Camp G and H	3.73E-01	2.51E-01	6.24E-01	2.71	0.23
	Downgradient East	5.86E-02	1.40E-01	1.99E-01	2.71	0.07
	Downgradient West	1.73E-01	1.96E-01	3.69E-01	2.71	0.14
	Grace Panel	5.53E-01	4.53E-01	1.01E+00	2.71	0.37
	Ibex Complex	2.83E-01	2.90E-01	5.74E-01	2.71	0.21
	North Trail	1.45E-01	3.73E-01	5.18E-01	2.71	0.19
	Town Site	6.10E-03	1.99E-01	2.05E-01	2.71	0.08
	Woodall	4.50E-01	3.00E-01	7.50E-01	2.71	0.28
Mule Deer	Camp G and H	2.45E-01	5.02E-02	2.95E-01	2.71	0.11
	Downgradient East	3.84E-02	3.49E-02	7.33E-02	2.71	0.03
	Downgradient West	1.14E-01	3.94E-02	1.53E-01	2.71	0.06
	Grace Panel	3.63E-01	9.08E-02	4.54E-01	2.71	0.17
	Ibex Complex	1.86E-01	6.31E-02	2.49E-01	2.71	0.09
	North Trail	9.51E-02	7.53E-02	1.70E-01	2.71	0.06
	Town Site	4.00E-03	4.02E-02	4.42E-02	2.71	0.02
	Woodall	2.95E-01	6.77E-02	3.63E-01	2.71	0.13

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Northern Bobwhite	Camp G and H	5.04E-01	3.17E-01	8.22E-01	11.5	0.07
	Downgradient East	1.08E-01	1.77E-01	2.85E-01	11.5	0.02
	Downgradient West	2.86E-01	2.48E-01	5.34E-01	11.5	0.05
	Grace Panel	9.28E-01	5.74E-01	1.50E+00	11.5	0.13
	Ibex Complex	5.55E-01	3.67E-01	9.22E-01	11.5	0.08
	North Trail	2.63E-01	4.73E-01	7.36E-01	11.5	0.06
	Town Site	1.65E-02	2.52E-01	2.69E-01	11.5	0.02
	Woodall	6.75E-01	3.80E-01	1.05E+00	11.5	0.09
Northern Harrier	Camp G and H	2.85E-01	1.17E-01	4.02E-01	11.5	0.03
	Downgradient East	2.68E-01	6.53E-02	3.33E-01	11.5	0.03
	Downgradient West	2.49E-01	9.13E-02	3.40E-01	11.5	0.03
	Grace Panel	3.85E-01	2.11E-01	5.96E-01	11.5	0.05
	Ibex Complex	3.64E-01	1.35E-01	5.00E-01	11.5	0.04
	North Trail	1.78E-01	1.74E-01	3.53E-01	11.5	0.03
	Town Site	3.14E-01	9.30E-02	4.06E-01	11.5	0.04
	Woodall	2.55E-01	1.40E-01	3.95E-01	11.5	0.03
Selenium						
American Robin	Camp G and H	1.61E+00	5.54E-02	1.67E+00	0.368	**4.53**
	Downgradient East	3.94E+00	1.11E-01	4.06E+00	0.368	**11.02**
	Downgradient West	6.89E+00	5.92E-02	6.95E+00	0.368	**18.88**
	Grace Panel	1.09E+01	1.35E-01	1.11E+01	0.368	**30.10**
	Ibex Complex	1.00E+01	2.09E-01	1.03E+01	0.368	**27.87**
	North Trail	8.50E+00	2.19E-01	8.72E+00	0.368	**23.69**
	Town Site	7.52E-01	5.27E-02	8.05E-01	0.368	**2.19**
	Woodall	1.29E+01	1.91E-01	1.30E+01	0.368	**35.45**
Coyote	Camp G and H	2.62E-02	1.96E-02	4.58E-02	0.145	0.32
	Downgradient East	2.17E-01	1.39E-01	3.56E-01	0.145	**2.46**
	Downgradient West	1.10E-01	2.05E-02	1.31E-01	0.145	0.90
	Grace Panel	1.82E+00	4.51E-02	1.87E+00	0.145	**12.89**
	Ibex Complex	9.93E-01	9.15E-02	1.08E+00	0.145	**7.48**
	North Trail	7.81E-01	7.32E-02	8.55E-01	0.145	**5.89**
	Town Site	1.48E-01	1.84E-02	1.66E-01	0.145	**1.14**
	Woodall	1.66E+00	1.66E-01	1.82E+00	0.145	**12.57**
Deer Mouse	Camp G and H	2.03E+00	1.06E-01	2.13E+00	0.145	**14.71**
	Downgradient East	4.25E+00	3.07E-01	4.55E+00	0.145	**31.40**
	Downgradient West	8.80E+00	5.41E-02	8.86E+00	0.145	**61.09**
	Grace Panel	1.17E+01	2.74E-01	1.19E+01	0.145	**82.28**
	Ibex Complex	1.09E+01	7.85E-01	1.16E+01	0.145	**80.34**
	North Trail	1.04E+01	2.38E-01	1.06E+01	0.145	**73.36**
	Town Site	7.71E-01	4.59E-02	8.17E-01	0.145	**5.63**
	Woodall	1.28E+01	1.70E-01	1.29E+01	0.145	**89.30**

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Eastern Cottontail	Camp G and H	8.55E-01	4.99E-02	9.05E-01	0.145	**6.24**
	Downgradient East	1.00E+00	1.44E-01	1.15E+00	0.145	**7.92**
	Downgradient West	3.88E+00	2.54E-02	3.90E+00	0.145	**26.91**
	Grace Panel	2.60E+00	1.28E-01	2.73E+00	0.145	**18.81**
	Ibex Complex	2.63E+00	3.68E-01	3.00E+00	0.145	**20.68**
	North Trail	4.08E+00	1.12E-01	4.19E+00	0.145	**28.88**
	Town Site	1.33E-01	2.15E-02	1.54E-01	0.145	**1.07**
	Woodall	1.65E+00	7.95E-02	1.73E+00	0.145	**11.93**
Mule Deer	Camp G and H	5.04E-01	7.12E-03	5.11E-01	0.145	**3.52**
	Downgradient East	5.02E-01	9.87E-02	6.00E-01	0.145	**4.14**
	Downgradient West	1.23E+00	7.25E-03	1.24E+00	0.145	**8.53**
	Grace Panel	1.34E+00	1.51E-02	1.36E+00	0.145	**9.36**
	Ibex Complex	1.50E+00	4.17E-02	1.54E+00	0.145	**10.63**
	North Trail	2.67E+00	2.44E-02	2.70E+00	0.145	**18.60**
	Town Site	7.44E-02	6.52E-03	8.09E-02	0.145	0.56
	Woodall	1.06E+00	1.08E-01	1.16E+00	0.145	**8.03**
Northern Bobwhite	Camp G and H	1.16E+00	3.90E-02	1.20E+00	0.368	**3.25**
	Downgradient East	1.63E+00	7.82E-02	1.71E+00	0.368	**4.63**
	Downgradient West	5.20E+00	4.17E-02	5.24E+00	0.368	**14.23**
	Grace Panel	4.31E+00	9.48E-02	4.40E+00	0.368	**11.96**
	Ibex Complex	4.23E+00	1.47E-01	4.37E+00	0.368	**11.88**
	North Trail	5.63E+00	1.54E-01	5.78E+00	0.368	**15.71**
	Town Site	2.45E-01	3.71E-02	2.82E-01	0.368	0.77
	Woodall	3.50E+00	1.34E-01	3.64E+00	0.368	**9.89**
Northern Harrier	Camp G and H	1.99E-02	1.44E-02	3.43E-02	0.368	0.09
	Downgradient East	5.56E-01	2.88E-02	5.85E-01	0.368	**1.59**
	Downgradient West	7.83E-02	1.54E-02	9.36E-02	0.368	0.25
	Grace Panel	5.56E+00	3.49E-02	5.59E+00	0.368	**15.19**
	Ibex Complex	2.86E+00	5.42E-02	2.92E+00	0.368	**7.93**
	North Trail	2.22E+00	5.69E-02	2.28E+00	0.368	**6.19**
	Town Site	4.55E-01	1.37E-02	4.69E-01	0.368	**1.27**
	Woodall	4.94E+00	4.94E-02	4.99E+00	0.368	**13.55**
Vanadium						
American Robin	Camp G and H	5.69E-01	2.98E+00	3.55E+00	0.413	**8.59**
	Downgradient East	4.33E-01	3.05E-01	7.38E-01	0.413	**1.79**
	Downgradient West	8.81E-02	5.38E-01	6.26E-01	0.413	**1.52**
	Grace Panel	1.56E+00	1.27E+00	2.83E+00	0.413	**6.85**
	Ibex Complex	4.94E-01	2.51E+00	3.00E+00	0.413	**7.27**
	North Trail	8.02E-02	9.71E-01	1.05E+00	0.413	**2.55**
	Town Site	1.54E-01	1.79E+00	1.95E+00	0.413	**4.71**
	Woodall	6.32E-01	8.29E-01	1.46E+00	0.413	**3.54**

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Coyote	Camp G and H	1.88E-02	9.94E-01	1.01E+00	5.11	0.20
	Downgradient East	2.43E-02	1.03E-01	1.27E-01	5.11	0.02
	Downgradient West	1.32E-02	1.80E-01	1.93E-01	5.11	0.04
	Grace Panel	6.22E-02	4.23E-01	4.85E-01	5.11	0.09
	Ibex Complex	5.23E-02	8.77E-01	9.29E-01	5.11	0.18
	North Trail	4.55E-02	3.25E-01	3.70E-01	5.11	0.07
	Town Site	3.20E-02	5.98E-01	6.30E-01	5.11	0.12
	Woodall	6.21E-02	2.80E-01	3.42E-01	5.11	0.07
Deer Mouse	Camp G and H	7.10E-01	3.53E+00	4.24E+00	5.11	0.83
	Downgradient East	4.25E-01	3.61E-01	7.87E-01	5.11	0.15
	Downgradient West	1.03E-01	6.37E-01	7.41E-01	5.11	0.14
	Grace Panel	1.62E+00	1.50E+00	3.13E+00	5.11	0.61
	Ibex Complex	5.17E-01	2.97E+00	3.49E+00	5.11	0.68
	North Trail	9.15E-02	1.15E+00	1.24E+00	5.11	0.24
	Town Site	1.76E-01	2.12E+00	2.30E+00	5.11	0.45
	Woodall	6.07E-01	9.83E-01	1.59E+00	5.11	0.31
Eastern Cottontail	Camp G and H	2.94E-01	1.66E+00	1.95E+00	5.11	0.38
	Downgradient East	4.75E-02	1.69E-01	2.17E-01	5.11	0.04
	Downgradient West	3.53E-02	2.99E-01	3.34E-01	5.11	0.07
	Grace Panel	3.15E-01	7.05E-01	1.02E+00	5.11	0.20
	Ibex Complex	1.03E-01	1.39E+00	1.50E+00	5.11	0.29
	North Trail	2.83E-02	5.40E-01	5.68E-01	5.11	0.11
	Town Site	5.37E-02	9.96E-01	1.05E+00	5.11	0.21
	Woodall	4.89E-02	4.61E-01	5.10E-01	5.11	0.10
Mule Deer	Camp G and H	1.93E-01	3.32E-01	5.25E-01	5.11	0.10
	Downgradient East	3.11E-02	3.46E-02	6.58E-02	5.11	0.01
	Downgradient West	2.32E-02	6.00E-02	8.32E-02	5.11	0.02
	Grace Panel	2.07E-01	1.41E-01	3.48E-01	5.11	0.07
	Ibex Complex	6.76E-02	3.13E-01	3.81E-01	5.11	0.07
	North Trail	1.86E-02	1.09E-01	1.27E-01	5.11	0.02
	Town Site	3.52E-02	1.99E-01	2.35E-01	5.11	0.05
	Woodall	3.21E-02	9.52E-02	1.27E-01	5.11	0.02
Northern Bobwhite	Camp G and H	4.01E-01	2.10E+00	2.50E+00	0.413	**6.05**
	Downgradient East	1.09E-01	2.15E-01	3.24E-01	0.413	0.78
	Downgradient West	5.06E-02	3.78E-01	4.29E-01	0.413	**1.04**
	Grace Panel	5.53E-01	8.93E-01	1.45E+00	0.413	**3.50**
	Ibex Complex	1.79E-01	1.77E+00	1.94E+00	0.413	**4.71**
	North Trail	4.18E-02	6.83E-01	7.25E-01	0.413	**1.76**
	Town Site	7.96E-02	1.26E+00	1.34E+00	0.413	**3.25**
	Woodall	1.37E-01	5.83E-01	7.20E-01	0.413	**1.74**

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Northern Harrier	Camp G and H	3.85E-02	7.73E-01	8.11E-01	0.413	**1.96**
	Downgradient East	6.29E-02	7.90E-02	1.42E-01	0.413	0.34
	Downgradient West	3.97E-02	1.39E-01	1.79E-01	0.413	0.43
	Grace Panel	1.43E-01	3.29E-01	4.72E-01	0.413	**1.14**
	Ibex Complex	1.52E-01	6.50E-01	8.03E-01	0.413	**1.94**
	North Trail	1.46E-01	2.52E-01	3.98E-01	0.413	0.96
	Town Site	9.90E-02	4.65E-01	5.64E-01	0.413	**1.36**
	Woodall	1.79E-01	2.15E-01	3.94E-01	0.413	0.96
Zinc						
American Robin	Camp G and H	3.23E+01	2.51E+00	3.48E+01	66.5	0.52
	Downgradient East	2.39E+01	1.05E+00	2.49E+01	66.5	0.37
	Downgradient West	2.14E+01	1.20E+00	2.26E+01	66.5	0.34
	Grace Panel	3.29E+01	3.09E+00	3.60E+01	66.5	0.54
	Ibex Complex	2.94E+01	3.75E+00	3.32E+01	66.5	0.50
	North Trail	2.53E+01	2.79E+00	2.81E+01	66.5	0.42
	Town Site	1.71E+01	2.63E+00	1.97E+01	66.5	0.30
	Woodall	2.50E+01	2.18E+00	2.72E+01	66.5	0.41
Coyote	Camp G and H	1.76E+01	8.36E-01	1.84E+01	75.9	0.24
	Downgradient East	2.86E+01	3.77E-01	2.89E+01	75.9	0.38
	Downgradient West	2.31E+01	4.01E-01	2.35E+01	75.9	0.31
	Grace Panel	1.26E+01	1.03E+00	1.36E+01	75.9	0.18
	Ibex Complex	3.10E+01	1.31E+00	3.24E+01	75.9	0.43
	North Trail	1.06E+01	9.32E-01	1.15E+01	75.9	0.15
	Town Site	3.33E+01	8.79E-01	3.42E+01	75.9	0.45
	Woodall	1.94E+01	7.43E-01	2.02E+01	75.9	0.27
Deer Mouse	Camp G and H	3.47E+01	2.97E+00	3.77E+01	75.9	0.50
	Downgradient East	2.31E+01	1.25E+00	2.43E+01	75.9	0.32
	Downgradient West	2.17E+01	1.42E+00	2.31E+01	75.9	0.30
	Grace Panel	3.50E+01	3.66E+00	3.86E+01	75.9	0.51
	Ibex Complex	2.93E+01	4.44E+00	3.37E+01	75.9	0.44
	North Trail	2.69E+01	3.30E+00	3.02E+01	75.9	0.40
	Town Site	1.62E+01	3.12E+00	1.93E+01	75.9	0.25
	Woodall	2.56E+01	2.58E+00	2.81E+01	75.9	0.37
Eastern Cottontail	Camp G and H	8.15E+00	1.39E+00	9.54E+00	75.9	0.13
	Downgradient East	2.09E+00	5.85E-01	2.67E+00	75.9	0.04
	Downgradient West	3.40E+00	6.67E-01	4.06E+00	75.9	0.05
	Grace Panel	7.75E+00	1.72E+00	9.46E+00	75.9	0.12
	Ibex Complex	3.82E+00	2.08E+00	5.90E+00	75.9	0.08
	North Trail	5.92E+00	1.55E+00	7.46E+00	75.9	0.10
	Town Site	9.09E-01	1.46E+00	2.37E+00	75.9	0.03
	Woodall	4.28E+00	1.21E+00	5.49E+00	75.9	0.07

TABLE 4.3-2
Tier 1 HQs Based on LOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			TRV (mg/kg-BW/day)	HQ
		Food	Abiotic	Total		
Mule Deer	Camp G and H	5.34E+00	2.79E-01	5.62E+00	75.9	0.07
	Downgradient East	1.37E+00	1.39E-01	1.51E+00	75.9	0.02
	Downgradient West	2.23E+00	1.34E-01	2.36E+00	75.9	0.03
	Grace Panel	5.08E+00	3.44E-01	5.42E+00	75.9	0.07
	Ibex Complex	2.51E+00	4.67E-01	2.97E+00	75.9	0.04
	North Trail	3.88E+00	3.13E-01	4.19E+00	75.9	0.06
	Town Site	5.96E-01	2.94E-01	8.90E-01	75.9	0.01
	Woodall	2.81E+00	2.57E-01	3.07E+00	75.9	0.04
Northern Bobwhite	Camp G and H	1.32E+01	1.76E+00	1.50E+01	66.5	0.23
	Downgradient East	5.43E+00	7.41E-01	6.17E+00	66.5	0.09
	Downgradient West	6.55E+00	8.44E-01	7.40E+00	66.5	0.11
	Grace Panel	1.29E+01	2.17E+00	1.50E+01	66.5	0.23
	Ibex Complex	8.07E+00	2.64E+00	1.07E+01	66.5	0.16
	North Trail	9.86E+00	1.96E+00	1.18E+01	66.5	0.18
	Town Site	3.24E+00	1.85E+00	5.09E+00	66.5	0.08
	Woodall	8.01E+00	1.53E+00	9.54E+00	66.5	0.14
Northern Harrier	Camp G and H	5.65E+01	6.50E-01	5.71E+01	66.5	0.86
	Downgradient East	9.28E+01	2.73E-01	9.31E+01	66.5	**1.40**
	Downgradient West	7.49E+01	3.11E-01	7.52E+01	66.5	**1.13**
	Grace Panel	4.00E+01	8.01E-01	4.08E+01	66.5	0.61
	Ibex Complex	1.01E+02	9.72E-01	1.02E+02	66.5	**1.53**
	North Trail	3.37E+01	7.22E-01	3.44E+01	66.5	0.52
	Town Site	1.09E+02	6.83E-01	1.09E+02	66.5	**1.64**
	Woodall	6.28E+01	5.64E-01	6.34E+01	66.5	0.95

Notes:
HQ - Hazard Quotient
LOAEL - Lowest-Observable Adverse Effects Levels
TRV - Toxicity Reference Value
mg/kg-BW/day - milligrams per kilogram body weight per day
Bold = HQ > 1.0

Table 4.3-3
Surface Soil EPCs versus Terrestrial Invertebrate Benchmarks

ECOPC	Terrestrial Invertebrate Benchmark	Exposure Unit	Surface Soil (0 - 6 inches) EPC[1]
Antimony	78	Camp G and H	4.448
		Downgradient East	1.417
		Downgradient West	1.632
		Grace Panel	6.79
		Ibex Complex	4.54
		North Trail	2.811
		Town Site	3.088
		Woodall	2.941
Arsenic	60	Woodall	18.29
		Town Site	20.58
		North Trail	36.4
		Ibex Complex	32.76
		Grace Panel	35.1
		Downgradient West	15.37
		Downgradient East	8.972
		Camp G and H	20.18
Barium	330	Camp G and H	120
		Downgradient East	195
		Downgradient West	264.7
		Grace Panel	68.2
		Ibex Complex	90.15
		North Trail	67.6
		Town Site	197.9
		Woodall	144.1
Cadmium	140	Camp G and H	71.24
		Downgradient East	9.352
		Downgradient West	18.07
		Grace Panel	54.54
		Ibex Complex	74.03
		North Trail	33.88
		Town Site	50.76
		Woodall	35.77
Chromium	0.4	Camp G and H	**515.6**
		Downgradient East	**150.1**
		Downgradient West	**223**
		Grace Panel	**622.1**
		Ibex Complex	**714.9**
		North Trail	**418.2**
		Town Site	**426.5**
		Woodall	**470.5**
Copper	80	Camp G and H	**91.47**
		Downgradient East	48.84
		Downgradient West	60.71
		Grace Panel	**136**
		Ibex Complex	**92.89**
		North Trail	**94.28**
		Town Site	75.75
		Woodall	**89.84**

Table 4.3-3
Surface Soil EPCs versus Terrestrial Invertebrate Benchmarks

ECOPC	Terrestrial Invertebrate Benchmark	Exposure Unit	Surface Soil (0 - 6 inches) EPC[1]
Lead	1700	Camp G and H	22.44
		Downgradient East	17.65
		Downgradient West	91.94
		Grace Panel	11.8
		Ibex Complex	13.91
		North Trail	11.03
		Town Site	771.4
		Woodall	12.73
Manganese	450	Camp G and H	271.2
		Downgradient East	**1279**
		Downgradient West	**731.9**
		Grace Panel	137
		Ibex Complex	**677.3**
		North Trail	278.4
		Town Site	**799.9**
		Woodall	**1115**
Mercury	0.1	Camp G and H	**0.467**
		Downgradient East	**0.206**
		Downgradient West	**0.296**
		Grace Panel	**0.88**
		Ibex Complex	**0.407**
		North Trail	**0.51**
		Town Site	**0.571**
		Woodall	**0.328**
Molybdenum	N/A	Camp G and H	17.8
		Downgradient East	8.289
		Downgradient West	12.17
		Grace Panel	28.7
		Ibex Complex	47.52
		North Trail	43.33
		Town Site	21.47
		Woodall	13.08
Nickel	280	Camp G and H	167
		Downgradient East	93.34
		Downgradient West	130.4
		Grace Panel	302
		Ibex Complex	193.4
		North Trail	248.9
		Town Site	132.8
		Woodall	199.8
Selenium	4.1	Camp G and H	**20.51**
		Downgradient East	**41.16**
		Downgradient West	**21.94**
		Grace Panel	**49.9**
		Ibex Complex	**77.37**
		North Trail	**81.27**
		Town Site	**19.52**
		Woodall	**70.6**

Table 4.3-3
Surface Soil EPCs versus Terrestrial Invertebrate Benchmarks

ECOPC	Terrestrial Invertebrate Benchmark	Exposure Unit	Surface Soil (0 - 6 inches) EPC[1]
Vanadium	N/A	Camp G and H	1104
		Downgradient East	112.9
		Downgradient West	199.2
		Grace Panel	470
		Ibex Complex	929
		North Trail	359.7
		Town Site	663.8
		Woodall	307.1
Zinc	120	Camp G and H	**928.6**
		Downgradient East	**390.2**
		Downgradient West	**444.4**
		Grace Panel	**1144**
		Ibex Complex	**1388**
		North Trail	**1032**
		Town Site	**975.4**
		Woodall	**805.7**

Table 4.3-4
Rooting Zone Soil EPCs versus Terrestrial Vegetation Benchmarks

ECOPC	Terrestrial Invertebrate Benchmark	Exposure Unit	Rooting Zone Soil (0 - 12 inches) EPC[1]
Antimony	5	Camp G and H	**5.8**
		Downgradient East	1.059
		Downgradient West	1.271
		Grace Panel	6.033
		Ibex Complex	4.152
		North Trail	3.087
		Town Site	2.184
		Woodall	3.706
Barium	500	Camp G and H	175
		Downgradient East	207.5
		Downgradient West	157.6
		Grace Panel	66.62
		Ibex Complex	226.3
		North Trail	56.9
		Town Site	208.2
		Woodall	101.9
Cadmium	32	Camp G and H	**71.7**
		Downgradient East	8.136
		Downgradient West	21.13
		Grace Panel	**35.85**
		Ibex Complex	**61.16**
		North Trail	**99.53**
		Town Site	**46.77**
		Woodall	**39.52**
Chromium	1	Camp G and H	**576.8**
		Downgradient East	**122.9**
		Downgradient West	**197.4**
		Grace Panel	**579**
		Ibex Complex	**571.1**
		North Trail	**477.7**
		Town Site	**374.3**
		Woodall	**526.2**
Copper	70	Camp G and H	**136.7**
		Downgradient East	36.45
		Downgradient West	51.21
		Grace Panel	**114.8**
		Ibex Complex	**93.28**
		North Trail	**111.3**
		Town Site	64.61
		Woodall	**94.83**
Lead	120	Camp G and H	22.18
		Downgradient East	17.46
		Downgradient West	74.02
		Grace Panel	10.88
		Ibex Complex	13.69
		North Trail	10.03
		Town Site	305.1
		Woodall	12.08

Table 4.3-4
Rooting Zone Soil EPCs versus Terrestrial Vegetation Benchmarks

ECOPC	Terrestrial Invertebrate Benchmark	Exposure Unit	Rooting Zone Soil (0 - 12 inches) EPC[1]
Manganese	220	Camp G and H	**582.8**
		Downgradient East	**1581**
		Downgradient West	**852.4**
		Grace Panel	193.7
		Ibex Complex	**1572**
		North Trail	**249.2**
		Town Site	**892.2**
		Woodall	**583.4**
Mercury	0.3	Camp G and H	**0.542**
		Downgradient East	0.153
		Downgradient West	**0.518**
		Grace Panel	**0.955**
		Ibex Complex	**0.379**
		North Trail	**0.407**
		Town Site	**0.519**
		Woodall	**0.416**
Molybdenum	2	Camp G and H	**21.8**
		Downgradient East	**6.328**
		Downgradient West	**10.26**
		Grace Panel	**25.43**
		Ibex Complex	**37.06**
		North Trail	**52.56**
		Town Site	**16.61**
		Woodall	**21.51**
Nickel	38	Camp G and H	**275.8**
		Downgradient East	**72.35**
		Downgradient West	**101.3**
		Grace Panel	**285.8**
		Ibex Complex	**196.2**
		North Trail	**272.3**
		Town Site	**110.4**
		Woodall	**206.7**
Selenium	0.52	Camp G and H	**33.25**
		Downgradient East	**95.8**
		Downgradient West	**16.91**
		Grace Panel	**85.65**
		Ibex Complex	**245.3**
		North Trail	**74.35**
		Town Site	**14.34**
		Woodall	**53.01**
Vanadium	2	Camp G and H	**1422**
		Downgradient East	**84.64**
		Downgradient West	**197.8**
		Grace Panel	**400.2**
		Ibex Complex	**730.4**
		North Trail	**647.9**
		Town Site	**560.3**
		Woodall	**355.6**

Table 4.3-4
Rooting Zone Soil EPCs versus Terrestrial Vegetation Benchmarks

ECOPC	Terrestrial Invertebrate Benchmark	Exposure Unit	Rooting Zone Soil (0 - 12 inches) EPC[1]
Zinc	160	Camp G and H	**1158**
		Downgradient East	**265.4**
		Downgradient West	**492.1**
		Grace Panel	**944.5**
		Ibex Complex	**998.6**
		North Trail	**1491**
		Town Site	**666.8**
		Woodall	**873.1**
Arsenic	18	Woodall	**23.23**
		Town Site	17.88
		North Trail	**36.4**
		Ibex Complex	**28.93**
		Grace Panel	**38.27**
		Downgradient West	14.87
		Downgradient East	7.436
		Camp G and H	**27.65**

Notes:
All units in mg/kg (milligrams per kilogram)
EPC - Exposure Point Concentration
ECOPC - Ecological Contaminant of Potential Concern
[1]Bold Value indicates EPC > Benchmark

Table 4.3-5
Percentage of Vanadium Exposure
Represented by Soil Ingestion

Location	American Robin		Northern Bobwhite		Northern Harrier	
	HQ	Percent Exposure From Soil	HQ	Percent Exposure From Soil	HQ	Percent Exposure From Soil
CGC-1	0.3	45%	0.1	74%	0.1	28%
HHP-1	0.3	64%	0.1	79%	0.1	31%
NQ-06	0.9	88%	0.6	95%	0.4	49%
NQ-07	1.8	78%	1.1	87%	0.6	62%
NQ-08	3.8	57%	1.8	84%	1.0	54%
NQ-11	5.0	97%	3.4	99%	1.6	78%
NQ-12	1.4	89%	0.9	94%	0.6	54%
NQ-13	2.0	95%	1.3	97%	0.6	74%
NQ-14	2.1	96%	1.4	98%	0.7	77%
NQ-15	0.3	71%	0.2	85%	0.3	16%
NQ-16	8.1	72%	5.1	80%	2.0	74%
NQ-17	2.6	94%	1.8	96%	1.0	64%
NQ-18	15.8	97%	11.0	98%	4.4	90%
NT2-04	0.3	71%	0.2	85%	0.2	21%
NT5-05	3.3	21%	0.9	56%	0.4	47%
NT8-03	0.5	53%	0.2	71%	0.3	23%
NWC-2	1.0	16%	0.3	34%	0.2	23%
PC-3	0.4	63%	0.2	74%	0.1	49%
PC-5	0.4	47%	0.2	62%	0.2	24%
SLC-2	1.1	19%	0.3	47%	0.2	34%
SLC-3	0.4	67%	0.2	71%	0.2	39%
ST10-04	5.3	50%	2.3	80%	1.0	66%
ST11-02	1.1	26%	0.4	52%	0.3	24%
ST9-17	2.8	93%	1.9	98%	0.9	74%
SWP-4	1.4	90%	0.0	96%	0.5	68%

Notes:
HQ - Hazard Quotient

Table 4.3-6
Exposure Point Concentrations for PRSC Decision Units

Location	ECOC	Surface Soil	Vegetation	Terrestrial Invertebrate	Small Mammal
DU1	Cadmium	1.4	1.1	N/A	0.2
	Chromium	66.1	0.4	N/A	1.7
	Copper	23.1	3.4	N/A	11.7
	Lead	85.7	0.1	N/A	0.2
	Molybdenum	3.0	1.8	N/A	0.8
	Nickel	36.0	1.9	N/A	1.2
	Selenium	0.4	10.8	6.4	23.2
	Vanadium	30.0	0.1	N/A	0.5
	Zinc	100.0	27.8	N/A	344.0
DU2	Cadmium	1.3	1.1	N/A	0.1
	Chromium	61.1	0.3	N/A	1.1
	Copper	23.5	3.2	N/A	13.5
	Lead	32.5	0.0	N/A	1.0
	Molybdenum	2.7	4.8	N/A	0.8
	Nickel	33.4	3.7	N/A	1.0
	Selenium	0.3	25.0	6.3	65.2
	Vanadium	30.0	0.1	N/A	0.4
	Zinc	99.0	36.3	N/A	323.0
DU3	Cadmium	1.3	0.7	N/A	0.9
	Chromium	58.4	0.6	N/A	5.2
	Copper	23.1	3.2	N/A	15.0
	Lead	21.2	0.1	N/A	0.3
	Molybdenum	2.2	2.2	N/A	1.2
	Nickel	36.2	2.0	N/A	2.9
	Selenium	0.5	7.9	6.5	31.6
	Vanadium	32.0	0.2	N/A	0.9
	Zinc	115.0	24.7	N/A	102.5
DU4	Cadmium	1.2	0.4	N/A	0.3
	Chromium	69.3	0.5	N/A	5.3
	Copper	23.4	2.8	N/A	12.7
	Lead	21.6	0.0	N/A	0.2
	Molybdenum	3.1	1.6	N/A	0.9
	Nickel	34.1	1.5	N/A	2.9
	Selenium	0.3	8.4	6.3	18.0
	Vanadium	35.0	0.2	N/A	0.7
	Zinc	103.0	19.4	N/A	113.7
DU5	Cadmium	19.3	3.2	N/A	0.3
	Chromium	354.0	1.2	N/A	3.1
	Copper	54.0	4.2	N/A	14.8
	Lead	13.5	0.1	N/A	0.3
	Molybdenum	13.7	2.6	N/A	1.0
	Nickel	97.2	1.8	N/A	1.8
	Selenium	21.5	4.3	23.5	11.5
	Vanadium	132.7	0.7	N/A	1.5
	Zinc	433.3	37.9	N/A	276.7

Notes:
All data provided in mg/kg DW (milligrams per kilogram dry weight)
N/A indicated data not available
ECOC - Ecological Chemical of Concern
Surface soil exposure point concentrations (EPCs) represent the composite sample concentration except in DU5 where the average among triplicate composite samples was used.
Vegetation and small mammal EPCs are averages of samples available for the DU.

Table 4.3-7
HQ Calculations for PRSC Decision Units

		Exposure (mg/kg BW/day)			TRV	HQ
COC	Receptor	Food	Soil	Total	(mg/kg BW/day)	
Decision Unit 1						
Cadmium	American robin - Veg	2.37E-01	3.78E-03	2.41E-01	2.37E+00	0.10
	Coyote - Veg	5.87E-01	1.26E-03	5.88E-01	9.09E-01	0.65
	Deer mouse - Veg	2.37E-01	4.48E-03	2.41E-01	9.09E-01	0.27
	Eastern cottontail	6.88E-02	2.10E-03	7.09E-02	9.09E-01	0.08
	Mule deer	4.51E-02	4.20E-04	4.56E-02	9.09E-01	0.05
	Northern bobwhite - Veg	1.07E-01	2.66E-03	1.10E-01	2.37E+00	0.05
	Northern harrier - Veg	1.64E-02	9.80E-04	1.74E-02	2.37E+00	0.01
Chromium	American robin - Veg	8.93E-02	1.78E-01	2.68E-01	2.78E+00	0.10
	Coyote - Veg	5.87E-01	5.95E-02	6.46E-01	1.20E+01	0.05
	Deer mouse - Veg	8.93E-02	2.12E-01	3.01E-01	1.20E+01	0.03
	Eastern cottontail	2.59E-02	9.92E-02	1.25E-01	1.20E+01	0.01
	Mule Deer	1.70E-02	1.98E-02	3.68E-02	1.20E+01	0.00
	Northern bobwhite - Veg	4.04E-02	1.26E-01	1.66E-01	2.78E+00	0.06
	Northern harrier - Veg	1.70E-01	4.63E-02	2.16E-01	2.78E+00	0.08
Copper	American robin - Veg	7.14E-01	6.24E-02	7.76E-01	4.68E+00	0.17
	Coyote - Veg	5.87E-01	2.08E-02	6.07E-01	6.79E+00	0.09
	Deer mouse - Veg	7.14E-01	7.39E-02	7.88E-01	6.79E+00	0.12
	Eastern cottontail	2.07E-01	3.47E-02	2.42E-01	6.79E+00	0.04
	Mule deer	1.36E-01	6.93E-03	1.43E-01	6.79E+00	0.02
	Northern bobwhite - Veg	3.23E-01	4.39E-02	3.67E-01	4.68E+00	0.08
	Northern harrier - Veg	1.17E+00	1.62E-02	1.19E+00	4.68E+00	0.25
Lead	American robin - Veg	1.05E-02	2.31E-01	2.42E-01	1.94E+00	0.12
	Coyote - Veg	5.87E-01	7.71E-02	6.64E-01	5.00E+00	0.13
	Deer mouse - Veg	1.05E-02	2.74E-01	2.85E-01	5.00E+00	0.06
	Eastern cottontail	3.05E-03	1.29E-01	1.32E-01	5.00E+00	0.03
	Mule deer	2.00E-03	2.57E-02	2.77E-02	5.00E+00	0.01
	Northern bobwhite - Veg	4.75E-03	1.63E-01	1.68E-01	1.94E+00	0.09
	Northern harrier - Veg	1.77E-02	6.00E-02	7.76E-02	1.94E+00	0.04
Molybdenum	American robin - Veg	3.71E-01	8.10E-03	3.79E-01	3.53E+01	0.01
	Coyote - Veg	5.87E-01	2.70E-03	5.89E-01	2.60E+00	0.23
	Deer mouse - Veg	3.71E-01	9.60E-03	3.80E-01	2.60E+00	0.15
	Eastern cottontail	1.08E-01	4.50E-03	1.12E-01	2.60E+00	0.04
	Mule deer	7.06E-02	9.00E-04	7.15E-02	2.60E+00	0.03
	Northern bobwhite - Veg	1.68E-01	5.70E-03	1.73E-01	3.53E+01	0.00
	Northern harrier - Veg	8.13E-02	2.10E-03	8.34E-02	3.53E+01	0.00
Nickel	American robin - Veg	4.08E-01	9.72E-02	5.06E-01	1.15E+01	0.04
	Coyote - Veg	5.87E-01	3.24E-02	6.19E-01	2.71E+00	0.23
	Deer mouse - Veg	4.08E-01	1.15E-01	5.24E-01	2.71E+00	0.19
	Eastern cottontail	1.19E-01	5.40E-02	1.73E-01	2.71E+00	0.06
	Mule deer	7.78E-02	1.08E-02	8.86E-02	2.71E+00	0.03
	Northern bobwhite - Veg	1.85E-01	6.84E-02	2.53E-01	1.15E+01	0.02
	Northern harrier - Veg	1.20E-01	2.52E-02	1.45E-01	1.15E+01	0.01
Selenium	American robin	1.80E+00	1.08E-03	1.81E+00	3.68E-01	4.91
	Coyote	7.14E-01	3.60E-04	7.15E-01	1.45E-01	4.93
	Deer mouse	2.07E+00	1.28E-03	2.07E+00	1.45E-01	14.30
	Eastern cottontail	6.59E-01	6.00E-04	6.60E-01	1.45E-01	4.55
	Mule deer	4.32E-01	1.20E-04	4.32E-01	1.45E-01	2.98
	Northern bobwhite	9.66E-01	7.60E-04	9.67E-01	3.68E-01	2.63
	Northern harrier	2.27E+00	2.80E-04	2.27E+00	3.68E-01	6.18

Table 4.3-7
HQ Calculations for PRSC Decision Units

		Exposure (mg/kg BW/day)			TRV	HQ
COC	Receptor	Food	Soil	Total	(mg/kg BW/day)	
Vanadium	American robin - Veg	2.31E-02	8.10E-02	1.04E-01	4.13E-01	0.25
	Coyote - Veg	5.87E-01	2.70E-02	6.14E-01	5.11E+00	0.12
	Deer mouse - Veg	2.31E-02	9.60E-02	1.19E-01	5.11E+00	0.02
	Eastern cottontail	6.71E-03	4.50E-02	5.17E-02	5.11E+00	0.01
	Mule deer	4.40E-03	9.00E-03	1.34E-02	5.11E+00	0.00
	Northern bobwhite - Veg	1.05E-02	5.70E-02	6.75E-02	4.13E-01	0.16
	Northern harrier - Veg	5.17E-02	2.10E-02	7.27E-02	4.13E-01	0.18
Zinc	American robin - Veg	5.83E+00	2.70E-01	6.10E+00	6.65E+01	0.09
	Coyote - Veg	5.87E-01	9.00E-02	6.77E-01	7.59E+01	0.01
	Deer mouse - Veg	5.83E+00	3.20E-01	6.15E+00	7.59E+01	0.08
	Eastern cottontail	1.69E+00	1.50E-01	1.84E+00	7.59E+01	0.02
	Mule deer	1.11E+00	3.00E-02	1.14E+00	7.59E+01	0.02
	Northern bobwhite - Veg	2.64E+00	1.90E-01	2.83E+00	6.65E+01	0.04
	Northern harrier - Veg	3.44E+01	7.00E-02	3.45E+01	6.65E+01	0.52
Decision Unit 2						
Cadmium	American robin - Veg	2.37E-01	3.51E-03	2.41E-01	2.37E+00	0.10
	Coyote - Veg	5.87E-01	1.17E-03	5.88E-01	9.09E-01	0.65
	Deer mouse - Veg	2.37E-01	4.16E-03	2.42E-01	9.09E-01	0.27
	Eastern cottontail	6.90E-02	1.95E-03	7.09E-02	9.09E-01	0.08
	Mule deer	4.52E-02	3.90E-04	4.56E-02	9.09E-01	0.05
	Northern bobwhite - Veg	1.07E-01	2.47E-03	1.10E-01	2.37E+00	0.05
	Northern harrier - Veg	8.45E-03	9.10E-04	9.36E-03	2.37E+00	0.00
Chromium	American robin - Veg	6.41E-02	1.65E-01	2.29E-01	2.78E+00	0.08
	Coyote - Veg	5.87E-01	5.50E-02	6.42E-01	1.20E+01	0.05
	Deer mouse - Veg	6.41E-02	1.96E-01	2.60E-01	1.20E+01	0.02
	Eastern cottontail	1.86E-02	9.17E-02	1.10E-01	1.20E+01	0.01
	Mule deer	1.22E-02	1.83E-02	3.05E-02	1.20E+01	0.00
	Northern bobwhite - Veg	2.90E-02	1.16E-01	1.45E-01	2.78E+00	0.05
	Northern harrier - Veg	1.06E-01	4.28E-02	1.48E-01	2.78E+00	0.05
Copper	American robin - Veg	6.72E-01	6.35E-02	7.35E-01	4.68E+00	0.16
	Coyote - Veg	5.87E-01	2.12E-02	6.08E-01	6.79E+00	0.09
	Deer mouse - Veg	6.72E-01	7.52E-02	7.47E-01	6.79E+00	0.11
	Eastern cottontail	1.95E-01	3.53E-02	2.30E-01	6.79E+00	0.03
	Mule deer	1.28E-01	7.05E-03	1.35E-01	6.79E+00	0.02
	Northern bobwhite - Veg	3.04E-01	4.47E-02	3.49E-01	4.68E+00	0.07
	Northern harrier - Veg	1.35E+00	1.65E-02	1.36E+00	4.68E+00	0.29
Lead	American robin - Veg	7.35E-03	8.78E-02	9.51E-02	1.94E+00	0.05
	Coyote - Veg	5.87E-01	2.93E-02	6.16E-01	5.00E+00	0.12
	Deer mouse - Veg	7.35E-03	1.04E-01	1.11E-01	5.00E+00	0.02
	Eastern cottontail	2.14E-03	4.88E-02	5.09E-02	5.00E+00	0.01
	Mule deer	1.40E-03	9.75E-03	1.12E-02	5.00E+00	0.00
	Northern bobwhite - Veg	3.33E-03	6.18E-02	6.51E-02	1.94E+00	0.03
	Northern harrier - Veg	1.05E-01	2.28E-02	1.28E-01	1.94E+00	0.07
Molybdenum	American robin - Veg	1.00E+00	7.29E-03	1.01E+00	3.53E+01	0.03
	Coyote - Veg	5.87E-01	2.43E-03	5.89E-01	2.60E+00	0.23
	Deer mouse - Veg	1.00E+00	8.64E-03	1.01E+00	2.60E+00	0.39
	Eastern cottontail	2.92E-01	4.05E-03	2.96E-01	2.60E+00	0.11
	Mule deer	1.91E-01	8.10E-04	1.92E-01	2.60E+00	0.07
	Northern bobwhite - Veg	4.55E-01	5.13E-03	4.60E-01	3.53E+01	0.01
	Northern harrier - Veg	7.85E-02	1.89E-03	8.04E-02	3.53E+01	0.00

Table 4.3-7
HQ Calculations for PRSC Decision Units

		Exposure (mg/kg BW/day)			TRV	HQ
COC	Receptor	Food	Soil	Total	(mg/kg BW/day)	
Nickel	American robin - Veg	7.70E-01	9.02E-02	8.60E-01	1.15E+01	0.07
	Coyote - Veg	5.87E-01	3.01E-02	6.17E-01	2.71E+00	0.23
	Deer mouse - Veg	7.70E-01	1.07E-01	8.77E-01	2.71E+00	0.32
	Eastern cottontail	2.24E-01	5.01E-02	2.74E-01	2.71E+00	0.10
	Mule deer	1.47E-01	1.00E-02	1.57E-01	2.71E+00	0.06
	Northern bobwhite - Veg	3.48E-01	6.35E-02	4.12E-01	1.15E+01	0.04
	Northern harrier - Veg	9.60E-02	2.34E-02	1.19E-01	1.15E+01	0.01
Selenium	American robin	3.29E+00	7.83E-04	3.29E+00	3.68E-01	8.93
	Coyote	1.98E+00	2.61E-04	1.98E+00	1.45E-01	13.66
	Deer mouse	3.99E+00	9.28E-04	3.99E+00	1.45E-01	27.51
	Eastern cottontail	1.53E+00	4.35E-04	1.53E+00	1.45E-01	10.52
	Mule deer	1.00E+00	8.70E-05	1.00E+00	1.45E-01	6.90
	Northern bobwhite	2.12E+00	5.51E-04	2.12E+00	3.68E-01	5.76
	Northern harrier	6.37E+00	2.03E-04	6.37E+00	3.68E-01	17.31
Vanadium	American robin - Veg	2.10E-02	8.10E-02	1.02E-01	4.13E-01	0.25
	Coyote - Veg	5.87E-01	2.70E-02	6.14E-01	5.11E+00	0.12
	Deer mouse - Veg	2.10E-02	9.60E-02	1.17E-01	5.11E+00	0.02
	Eastern cottontail	6.10E-03	4.50E-02	5.11E-02	5.11E+00	0.01
	Mule deer	4.00E-03	9.00E-03	1.30E-02	5.11E+00	0.00
	Northern bobwhite - Veg	9.50E-03	5.70E-02	6.65E-02	4.13E-01	0.16
	Northern harrier - Veg	3.50E-02	2.10E-02	5.60E-02	4.13E-01	0.14
Zinc	American robin - Veg	7.61E+00	2.67E-01	7.88E+00	6.65E+01	0.12
	Coyote - Veg	5.87E-01	8.91E-02	6.76E-01	7.59E+01	0.01
	Deer mouse - Veg	7.61E+00	3.17E-01	7.93E+00	7.59E+01	0.10
	Eastern cottontail	2.21E+00	1.49E-01	2.36E+00	7.59E+01	0.03
	Mule deer	1.45E+00	2.97E-02	1.48E+00	7.59E+01	0.02
	Northern bobwhite - Veg	3.44E+00	1.88E-01	3.63E+00	6.65E+01	0.05
	Northern harrier - Veg	3.23E+01	6.93E-02	3.24E+01	6.65E+01	0.49
Decision Unit 3						
Cadmium	American robin - Veg	1.43E-01	3.51E-03	1.47E-01	2.37E+00	0.06
	Coyote - Veg	5.87E-01	1.17E-03	5.88E-01	9.09E-01	0.65
	Deer mouse - Veg	1.43E-01	4.16E-03	1.47E-01	9.09E-01	0.16
	Eastern cottontail	4.16E-02	1.95E-03	4.36E-02	9.09E-01	0.05
	Mule deer	2.73E-02	3.90E-04	2.77E-02	9.09E-01	0.03
	Northern bobwhite - Veg	6.48E-02	2.47E-03	6.73E-02	2.37E+00	0.03
	Northern harrier - Veg	8.60E-02	9.10E-04	8.69E-02	2.37E+00	0.04
Chromium	American robin - Veg	1.22E-01	1.58E-01	2.79E-01	2.78E+00	0.10
	Coyote - Veg	5.87E-01	5.26E-02	6.39E-01	1.20E+01	0.05
	Deer mouse - Veg	1.22E-01	1.87E-01	3.09E-01	1.20E+01	0.03
	Eastern cottontail	3.54E-02	8.76E-02	1.23E-01	1.20E+01	0.01
	Mule deer	2.32E-02	1.75E-02	4.07E-02	1.20E+01	0.00
	Northern bobwhite - Veg	5.51E-02	1.11E-01	1.66E-01	2.78E+00	0.06
	Northern harrier - Veg	5.23E-01	4.09E-02	5.64E-01	2.78E+00	0.20
Copper	American robin - Veg	6.74E-01	6.24E-02	7.36E-01	4.68E+00	0.16
	Coyote - Veg	5.87E-01	2.08E-02	6.07E-01	6.79E+00	0.09
	Deer mouse - Veg	6.74E-01	7.39E-02	7.48E-01	6.79E+00	0.11
	Eastern cottontail	1.96E-01	3.47E-02	2.30E-01	6.79E+00	0.03
	Mule deer	1.28E-01	6.93E-03	1.35E-01	6.79E+00	0.02
	Northern bobwhite - Veg	3.05E-01	4.39E-02	3.49E-01	4.68E+00	0.07
	Northern harrier - Veg	1.50E+00	1.62E-02	1.52E+00	4.68E+00	0.32

Table 4.3-7
HQ Calculations for PRSC Decision Units

		Exposure (mg/kg BW/day)			TRV	HQ
COC	Receptor	Food	Soil	Total	(mg/kg BW/day)	
Lead	American robin - Veg	1.68E-02	5.72E-02	7.40E-02	1.94E+00	0.04
	Coyote - Veg	5.87E-01	1.91E-02	6.06E-01	5.00E+00	0.12
	Deer mouse - Veg	1.68E-02	6.78E-02	8.46E-02	5.00E+00	0.02
	Eastern cottontail	4.88E-03	3.18E-02	3.67E-02	5.00E+00	0.01
	Mule deer	3.20E-03	6.36E-03	9.56E-03	5.00E+00	0.00
	Northern bobwhite - Veg	7.60E-03	4.03E-02	4.79E-02	1.94E+00	0.02
	Northern harrier - Veg	3.04E-02	1.48E-02	4.52E-02	1.94E+00	0.02
Molybdenum	American robin - Veg	4.61E-01	5.94E-03	4.67E-01	3.53E+01	0.01
	Coyote - Veg	5.87E-01	1.98E-03	5.89E-01	2.60E+00	0.23
	Deer mouse - Veg	4.61E-01	7.04E-03	4.68E-01	2.60E+00	0.18
	Eastern cottontail	1.34E-01	3.30E-03	1.37E-01	2.60E+00	0.05
	Mule deer	8.78E-02	6.60E-04	8.85E-02	2.60E+00	0.03
	Northern bobwhite - Veg	2.09E-01	4.18E-03	2.13E-01	3.53E+01	0.01
	Northern harrier - Veg	1.23E-01	1.54E-03	1.25E-01	3.53E+01	0.00
Nickel	American robin - Veg	4.25E-01	9.77E-02	5.23E-01	1.15E+01	0.05
	Coyote - Veg	5.87E-01	3.26E-02	6.19E-01	2.71E+00	0.23
	Deer mouse - Veg	4.25E-01	1.16E-01	5.41E-01	2.71E+00	0.20
	Eastern cottontail	1.24E-01	5.43E-02	1.78E-01	2.71E+00	0.07
	Mule deer	8.10E-02	1.09E-02	9.19E-02	2.71E+00	0.03
	Northern bobwhite - Veg	1.92E-01	6.88E-02	2.61E-01	1.15E+01	0.02
	Northern harrier - Veg	2.92E-01	2.53E-02	3.18E-01	1.15E+01	0.03
Selenium	American robin	1.51E+00	1.43E-03	1.51E+00	3.68E-01	4.11
	Coyote	9.61E-01	4.77E-04	9.61E-01	1.45E-01	6.63
	Deer mouse	1.69E+00	1.70E-03	1.69E+00	1.45E-01	11.68
	Eastern cottontail	4.83E-01	7.95E-04	4.84E-01	1.45E-01	3.34
	Mule deer	3.17E-01	1.59E-04	3.17E-01	1.45E-01	2.18
	Northern bobwhite	7.32E-01	1.01E-03	7.33E-01	3.68E-01	1.99
	Northern harrier	3.09E+00	3.71E-04	3.09E+00	3.68E-01	8.41
Vanadium	American robin - Veg	4.52E-02	8.64E-02	1.32E-01	4.13E-01	0.32
	Coyote - Veg	5.87E-01	2.88E-02	6.15E-01	5.11E+00	0.12
	Deer mouse - Veg	4.52E-02	1.02E-01	1.48E-01	5.11E+00	0.03
	Eastern cottontail	1.31E-02	4.80E-02	6.11E-02	5.11E+00	0.01
	Mule deer	8.60E-03	9.60E-03	1.82E-02	5.11E+00	0.00
	Northern bobwhite - Veg	2.04E-02	6.08E-02	8.12E-02	4.13E-01	0.20
	Northern harrier - Veg	9.18E-02	2.24E-02	1.14E-01	4.13E-01	0.28
Zinc	American robin - Veg	5.18E+00	3.11E-01	5.49E+00	6.65E+01	0.08
	Coyote - Veg	5.87E-01	1.04E-01	6.90E-01	7.59E+01	0.01
	Deer mouse - Veg	5.18E+00	3.68E-01	5.54E+00	7.59E+01	0.07
	Eastern cottontail	1.50E+00	1.73E-01	1.68E+00	7.59E+01	0.02
	Mule deer	9.86E-01	3.45E-02	1.02E+00	7.59E+01	0.01
	Northern bobwhite - Veg	2.34E+00	2.19E-01	2.56E+00	6.65E+01	0.04
	Northern harrier - Veg	1.02E+01	8.05E-02	1.03E+01	6.65E+01	0.16
Decision Unit 4						
Cadmium	American robin - Veg	9.19E-02	3.24E-03	9.51E-02	2.37E+00	0.04
	Coyote - Veg	5.87E-01	1.08E-03	5.88E-01	9.09E-01	0.65
	Deer mouse - Veg	9.19E-02	3.84E-03	9.57E-02	9.09E-01	0.11
	Eastern cottontail	2.67E-02	1.80E-03	2.85E-02	9.09E-01	0.03
	Mule deer	1.75E-02	3.60E-04	1.79E-02	9.09E-01	0.02
	Northern bobwhite - Veg	4.16E-02	2.28E-03	4.38E-02	2.37E+00	0.02
	Northern harrier - Veg	3.46E-02	8.40E-04	3.54E-02	2.37E+00	0.01

Table 4.3-7
HQ Calculations for PRSC Decision Units

		Exposure (mg/kg BW/day)			TRV	HQ
COC	Receptor	Food	Soil	Total	(mg/kg BW/day)	
Chromium	American robin - Veg	1.10E-01	1.87E-01	2.97E-01	2.78E+00	0.11
	Coyote - Veg	5.87E-01	6.24E-02	6.49E-01	1.20E+01	0.05
	Deer mouse - Veg	1.10E-01	2.22E-01	3.32E-01	1.20E+01	0.03
	Eastern cottontail	3.20E-02	1.04E-01	1.36E-01	1.20E+01	0.01
	Mule deer	2.10E-02	2.08E-02	4.18E-02	1.20E+01	0.00
	Northern bobwhite - Veg	4.99E-02	1.32E-01	1.82E-01	2.78E+00	0.07
	Northern harrier - Veg	5.26E-01	4.85E-02	5.74E-01	2.78E+00	0.21
Copper	American robin - Veg	5.88E-01	6.32E-02	6.51E-01	4.68E+00	0.14
	Coyote - Veg	5.87E-01	2.11E-02	6.08E-01	6.79E+00	0.09
	Deer mouse - Veg	5.88E-01	7.49E-02	6.63E-01	6.79E+00	0.10
	Eastern cottontail	1.71E-01	3.51E-02	2.06E-01	6.79E+00	0.03
	Mule deer	1.12E-01	7.02E-03	1.19E-01	6.79E+00	0.02
	Northern bobwhite - Veg	2.66E-01	4.45E-02	3.10E-01	4.68E+00	0.07
	Northern harrier - Veg	1.27E+00	1.64E-02	1.28E+00	4.68E+00	0.27
Lead	American robin - Veg	8.40E-03	5.83E-02	6.67E-02	1.94E+00	0.03
	Coyote - Veg	5.87E-01	1.94E-02	6.06E-01	5.00E+00	0.12
	Deer mouse - Veg	8.40E-03	6.91E-02	7.75E-02	5.00E+00	0.02
	Eastern cottontail	2.44E-03	3.24E-02	3.48E-02	5.00E+00	0.01
	Mule deer	1.60E-03	6.48E-03	8.08E-03	5.00E+00	0.00
	Northern bobwhite - Veg	3.80E-03	4.10E-02	4.48E-02	1.94E+00	0.02
	Northern harrier - Veg	1.66E-02	1.51E-02	3.17E-02	1.94E+00	0.02
Molybdenum	American robin - Veg	3.37E-01	8.37E-03	3.45E-01	3.53E+01	0.01
	Coyote - Veg	5.87E-01	2.79E-03	5.89E-01	2.60E+00	0.23
	Deer mouse - Veg	3.37E-01	9.92E-03	3.47E-01	2.60E+00	0.13
	Eastern cottontail	9.79E-02	4.65E-03	1.03E-01	2.60E+00	0.04
	Mule deer	6.42E-02	9.30E-04	6.51E-02	2.60E+00	0.03
	Northern bobwhite - Veg	1.52E-01	5.89E-03	1.58E-01	3.53E+01	0.00
	Northern harrier - Veg	9.46E-02	2.17E-03	9.68E-02	3.53E+01	0.00
Nickel	American robin - Veg	3.08E-01	9.21E-02	4.00E-01	1.15E+01	0.03
	Coyote - Veg	5.87E-01	3.07E-02	6.17E-01	2.71E+00	0.23
	Deer mouse - Veg	3.08E-01	1.09E-01	4.17E-01	2.71E+00	0.15
	Eastern cottontail	8.94E-02	5.12E-02	1.41E-01	2.71E+00	0.05
	Mule deer	5.86E-02	1.02E-02	6.88E-02	2.71E+00	0.03
	Northern bobwhite - Veg	1.39E-01	6.48E-02	2.04E-01	1.15E+01	0.02
	Northern harrier - Veg	2.95E-01	2.39E-02	3.19E-01	1.15E+01	0.03
Selenium	American robin	1.54E+00	7.29E-04	1.54E+00	3.68E-01	4.18
	Coyote	5.59E-01	2.43E-04	5.59E-01	1.45E-01	3.86
	Deer mouse	1.73E+00	8.64E-04	1.73E+00	1.45E-01	11.96
	Eastern cottontail	5.11E-01	4.05E-04	5.11E-01	1.45E-01	3.53
	Mule deer	3.35E-01	8.10E-05	3.35E-01	1.45E-01	2.31
	Northern bobwhite	7.67E-01	5.13E-04	7.67E-01	3.68E-01	2.09
	Northern harrier	1.77E+00	1.89E-04	1.77E+00	3.68E-01	4.82
Vanadium	American robin - Veg	3.89E-02	9.45E-02	1.33E-01	4.13E-01	0.32
	Coyote - Veg	5.87E-01	3.15E-02	6.18E-01	5.11E+00	0.12
	Deer mouse - Veg	3.89E-02	1.12E-01	1.51E-01	5.11E+00	0.03
	Eastern cottontail	1.13E-02	5.25E-02	6.38E-02	5.11E+00	0.01
	Mule deer	7.40E-03	1.05E-02	1.79E-02	5.11E+00	0.00
	Northern bobwhite - Veg	1.76E-02	6.65E-02	8.41E-02	4.13E-01	0.20
	Northern harrier - Veg	6.77E-02	2.45E-02	9.22E-02	4.13E-01	0.22

Table 4.3-7
HQ Calculations for PRSC Decision Units

		Exposure (mg/kg BW/day)			TRV	HQ
COC	Receptor	Food	Soil	Total	(mg/kg BW/day)	
Zinc	American robin - Veg	4.07E+00	2.78E-01	4.35E+00	6.65E+01	0.07
	Coyote - Veg	5.87E-01	9.27E-02	6.79E-01	7.59E+01	0.01
	Deer mouse - Veg	4.07E+00	3.30E-01	4.40E+00	7.59E+01	0.06
	Eastern cottontail	1.18E+00	1.55E-01	1.34E+00	7.59E+01	0.02
	Mule deer	7.76E-01	3.09E-02	8.07E-01	7.59E+01	0.01
	Northern bobwhite - Veg	1.84E+00	1.96E-01	2.04E+00	6.65E+01	0.03
	Northern harrier - Veg	1.14E+01	7.21E-02	1.14E+01	6.65E+01	0.17
Decision Unit 5						
Cadmium	American robin - Veg	6.78E-01	5.22E-02	7.30E-01	2.37E+00	0.31
	Coyote - Veg	5.87E-01	1.74E-02	6.04E-01	9.09E-01	0.66
	Deer mouse - Veg	6.78E-01	6.19E-02	7.40E-01	9.09E-01	0.81
	Eastern cottontail	1.97E-01	2.90E-02	2.26E-01	9.09E-01	0.25
	Mule deer	1.29E-01	5.80E-03	1.35E-01	9.09E-01	0.15
	Northern bobwhite - Veg	3.07E-01	3.67E-02	3.43E-01	2.37E+00	0.14
	Northern harrier - Veg	2.61E-02	1.35E-02	3.97E-02	2.37E+00	0.02
Chromium	American robin - Veg	2.55E-01	9.56E-01	1.21E+00	2.78E+00	0.44
	Coyote - Veg	5.87E-01	3.19E-01	9.05E-01	1.20E+01	0.08
	Deer mouse - Veg	2.55E-01	1.13E+00	1.39E+00	1.20E+01	0.12
	Eastern cottontail	7.41E-02	5.31E-01	6.05E-01	1.20E+01	0.05
	Mule deer	4.86E-02	1.06E-01	1.55E-01	1.20E+01	0.01
	Northern bobwhite - Veg	1.15E-01	6.73E-01	7.88E-01	2.78E+00	0.28
	Northern harrier - Veg	3.09E-01	2.48E-01	5.56E-01	2.78E+00	0.20
Copper	American robin - Veg	8.90E-01	1.46E-01	1.04E+00	4.68E+00	0.22
	Coyote - Veg	5.87E-01	4.86E-02	6.35E-01	6.79E+00	0.09
	Deer mouse - Veg	8.90E-01	1.73E-01	1.06E+00	6.79E+00	0.16
	Eastern cottontail	2.58E-01	8.10E-02	3.39E-01	6.79E+00	0.05
	Mule deer	1.69E-01	1.62E-02	1.86E-01	6.79E+00	0.03
	Northern bobwhite - Veg	4.02E-01	1.03E-01	5.05E-01	4.68E+00	0.11
	Northern harrier - Veg	1.48E+00	3.78E-02	1.52E+00	4.68E+00	0.33
Lead	American robin - Veg	1.89E-02	3.64E-02	5.53E-02	1.94E+00	0.03
	Coyote - Veg	5.87E-01	1.21E-02	5.99E-01	5.00E+00	0.12
	Deer mouse - Veg	1.89E-02	4.31E-02	6.20E-02	5.00E+00	0.01
	Eastern cottontail	5.49E-03	2.02E-02	2.57E-02	5.00E+00	0.01
	Mule deer	3.60E-03	4.04E-03	7.64E-03	5.00E+00	0.00
	Northern bobwhite - Veg	8.55E-03	2.56E-02	3.41E-02	1.94E+00	0.02
	Northern harrier - Veg	3.36E-02	9.43E-03	4.31E-02	1.94E+00	0.02
Molybdenum	American robin - Veg	5.45E-01	3.71E-02	5.82E-01	3.53E+01	0.02
	Coyote - Veg	5.87E-01	1.24E-02	5.99E-01	2.60E+00	0.23
	Deer mouse - Veg	5.45E-01	4.39E-02	5.89E-01	2.60E+00	0.23
	Eastern cottontail	1.58E-01	2.06E-02	1.79E-01	2.60E+00	0.07
	Mule deer	1.04E-01	4.12E-03	1.08E-01	2.60E+00	0.04
	Northern bobwhite - Veg	2.47E-01	2.61E-02	2.73E-01	3.53E+01	0.01
	Northern harrier - Veg	1.02E-01	9.61E-03	1.11E-01	3.53E+01	0.00
Nickel	American robin - Veg	3.87E-01	2.63E-01	6.49E-01	1.15E+01	0.06
	Coyote - Veg	5.87E-01	8.75E-02	6.74E-01	2.71E+00	0.25
	Deer mouse - Veg	3.87E-01	3.11E-01	6.98E-01	2.71E+00	0.26
	Eastern cottontail	1.12E-01	1.46E-01	2.58E-01	2.71E+00	0.10
	Mule deer	7.37E-02	2.92E-02	1.03E-01	2.71E+00	0.04
	Northern bobwhite - Veg	1.75E-01	1.85E-01	3.60E-01	1.15E+01	0.03
	Northern harrier - Veg	1.84E-01	6.81E-02	2.52E-01	1.15E+01	0.02

Table 4.3-7
HQ Calculations for PRSC Decision Units

		Exposure (mg/kg BW/day)			TRV	HQ
COC	Receptor	Food	Soil	Total	(mg/kg BW/day)	
Selenium	American robin	2.08E+00	3.13E-02	2.11E+00	3.68E-01	5.74
	Coyote	3.79E-01	1.04E-02	3.89E-01	1.45E-01	2.69
	Deer mouse	2.06E+00	3.71E-02	2.10E+00	1.45E-01	14.49
	Eastern cottontail	2.63E-01	1.74E-02	2.81E-01	1.45E-01	1.94
	Mule deer	1.73E-01	3.48E-03	1.76E-01	1.45E-01	1.21
	Northern bobwhite	5.63E-01	2.20E-02	5.85E-01	3.68E-01	1.59
	Northern harrier	1.16E+00	8.12E-03	1.17E+00	3.68E-01	3.18
Vanadium	American robin - Veg	1.48E-01	3.58E-01	5.07E-01	4.13E-01	1.23
	Coyote - Veg	5.87E-01	1.19E-01	7.06E-01	5.11E+00	0.14
	Deer mouse - Veg	1.48E-01	4.25E-01	5.73E-01	5.11E+00	0.11
	Eastern cottontail	4.31E-02	1.99E-01	2.42E-01	5.11E+00	0.05
	Mule deer	2.83E-02	3.98E-02	6.81E-02	5.11E+00	0.01
	Northern bobwhite - Veg	6.71E-02	2.52E-01	3.19E-01	4.13E-01	0.77
	Northern harrier - Veg	1.52E-01	9.29E-02	2.45E-01	4.13E-01	0.59
Zinc	American robin - Veg	7.95E+00	1.17E+00	9.12E+00	6.65E+01	0.14
	Coyote - Veg	5.87E-01	3.90E-01	9.77E-01	7.59E+01	0.01
	Deer mouse - Veg	7.95E+00	1.39E+00	9.34E+00	7.59E+01	0.12
	Eastern cottontail	2.31E+00	6.50E-01	2.96E+00	7.59E+01	0.04
	Mule deer	1.51E+00	1.30E-01	1.64E+00	7.59E+01	0.02
	Northern bobwhite - Veg	3.60E+00	8.23E-01	4.42E+00	6.65E+01	0.07
	Northern harrier - Veg	2.77E+01	3.03E-01	2.80E+01	6.65E+01	0.42

Notes:
COC - Chemical of Concern
mg/kg-BW/day - milligrams per kilogram body weight per day
TRV - Toxicity Reference Value
HQ - Hazard Quotient

Table 4.3-8
Selenium HQ Comparisons Between EUs and PRSC DUs

	Mine Panel EUs						PRSC DUs					Downgradient EUs	
Receptors	**Camp G and H**	**Grace Panel**	**Ibex Complex**	**North Trail**	**Town Site**	**Woodall**	**DU1**	**DU2**	**DU3**	**DU4**	**DU5**	**Downgradient East**	**Downgradient West**
American robin	**4.53**	**30.10**	**27.87**	**23.69**	**2.19**	**35.45**	4.91	8.93	4.11	4.18	5.74	**11.02**	**18.88**
Coyote	0.32	**12.89**	**7.48**	**5.89**	**1.14**	**12.57**	4.93	13.66	6.63	3.86	2.69	**2.46**	0.90
Deer mouse	**14.71**	**82.28**	**80.34**	**73.36**	**5.63**	**89.30**	14.30	27.51	11.68	11.96	14.49	**31.40**	**61.09**
Eastern cottontail	**6.24**	**18.81**	**20.68**	**28.88**	**1.07**	**11.93**	4.55	10.52	3.34	3.53	1.94	**7.92**	**26.91**
Mule deer	**3.52**	**9.36**	**10.63**	**18.60**	0.56	**8.03**	2.98	6.90	2.18	2.31	1.21	**4.14**	**8.53**
Northern bobwhite	**3.25**	**11.96**	**11.88**	**15.71**	0.77	**9.89**	2.63	5.76	1.99	2.09	1.59	**4.63**	**14.23**
Northern harrier	0.09	**15.19**	**7.93**	**6.19**	**1.27**	**13.55**	6.18	17.31	8.41	4.82	3.18	**1.59**	0.25

Notes:
HQ - Hazard Quotient
EU - Exposure Unit
DU - Decision Unit
Bold = HQ > 1.0

Table 4.4-1
Selenium HQs Calculated Using
Geometric Mean NOAEL TRVs

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			NOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)
		Food	Abiotic	Total		
American Robin	Camp G and H	1.61E+00	5.54E-02	1.67E+00	6.06E-01	2.75
	Downgradient East	3.94E+00	1.11E-01	4.06E+00		6.69
	Downgradient West	6.89E+00	5.92E-02	6.95E+00		11.46
	Grace Panel	1.09E+01	1.35E-01	1.11E+01		18.28
	Ibex Complex	1.00E+01	2.09E-01	1.03E+01		16.92
	North Trail	8.50E+00	2.19E-01	8.72E+00		14.38
	Town Site	7.52E-01	5.27E-02	8.05E-01		1.33
	Woodall	1.29E+01	1.91E-01	1.30E+01		21.53
Deer Mouse	Camp G and H	2.03E+00	6.56E-02	2.09E+00	4.37E-01	4.79
	Downgradient East	4.25E+00	1.32E-01	4.38E+00		10.02
	Downgradient West	8.80E+00	7.02E-02	8.87E+00		20.31
	Grace Panel	1.17E+01	1.60E-01	1.18E+01		27.04
	Ibex Complex	1.09E+01	2.48E-01	1.11E+01		25.43
	North Trail	1.04E+01	2.60E-01	1.07E+01		24.39
	Town Site	7.71E-01	6.25E-02	8.34E-01		1.91
	Woodall	1.28E+01	2.26E-01	1.30E+01		29.76
Northern Harrier	Camp G and H	1.99E-02	1.44E-02	3.43E-02	6.06E-01	0.06
	Downgradient East	5.56E-01	2.88E-02	5.85E-01		0.97
	Downgradient West	7.83E-02	1.54E-02	9.36E-02		0.15
	Grace Panel	5.56E+00	3.49E-02	5.59E+00		9.23
	Ibex Complex	2.86E+00	5.42E-02	2.92E+00		4.82
	North Trail	2.22E+00	5.69E-02	2.28E+00		3.76
	Town Site	4.55E-01	1.37E-02	4.69E-01		0.77
	Woodall	4.94E+00	4.94E-02	4.99E+00		8.23

Notes:
HQ - Hazard Quotient
mg/kg-BW/day - milligrams per kilogram body weight per day
NOAEL - No-Observed Adverse Effects Levels
TRV - Toxicity Reference Value

Table 4.4-2
Selenium HQs at Background Sampling Locations

Receptor	Exposure Unit	Exposure (mg/kg-BW/day)			LOAEL TRV (mg/kg-BW/day)	Hazard Quotient (HQ)
		Food	Abiotic	Total		
Upland Locations						
NT8-03	Deer Mouse	7.68E-02	1.38E-03	7.82E-02	1.45E-01	0.54
ST11-02	Deer Mouse	5.92E-02	1.02E-03	6.02E-02	1.45E-01	0.42
NT8-03	American Robin	7.88E-02	1.16E-03	7.99E-02	3.68E-01	0.22
ST11-02	American Robin	6.20E-02	8.64E-04	6.28E-02	3.68E-01	0.17
NT8-03	Northern Harrier	6.01E-02	3.01E-04	6.04E-02	3.68E-01	0.16
ST11-02	Northern Harrier	3.25E-02	2.24E-04	3.27E-02	3.68E-01	0.09
Riparian Locations						
CGC-1	Mallard	8.15E-02	3.49E-03	8.50E-02	3.68E-01	0.23
CGC-1	Meadow Vole	3.10E-02	3.40E-03	3.44E-02	1.45E-01	0.24
CGC-1	Mink	2.67E-01	5.08E-03	2.72E-01	1.45E-01	1.88
HHP-1	Mallard	9.20E-01	5.56E-03	9.26E-01	3.68E-01	2.52
HHP-1	Meadow Vole	1.73E-02	3.19E-03	2.05E-02	1.45E-01	0.14
HHP-1	Mink	3.09E-01	7.10E-03	3.16E-01	1.45E-01	2.18
NWC-2	Mallard	9.07E-02	1.39E-03	9.21E-02	3.68E-01	0.25
NWC-2	Meadow Vole	2.43E-02	1.62E-03	2.59E-02	1.45E-01	0.18
NWC-2	Mink	1.01E-02	2.14E-03	1.23E-02	1.45E-01	0.08

Notes:

HQ - Hazard Quotient

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

LOAEL - Lowest-Observable Adverse Effects Levels

TRV - Toxicity Reference Value

Table 4.4-3
Effect of Relative Bioavailability of Vanadium on Tier 1 HQ Calculations

Receptor	Exposure Unit	Exposure Food (mg/kg BW/day)	Soil Exposure (mg/kg BW/day) at Varying Relative Bioavailabilities				Total Exposure (mg/kg BW/day) at Varying Relative Bioavailabilities				LOAEL (mg/kg BW/day)	Hazard Quotient (HQ) at Varying Relative Bioavailabilities			
			100%	75%	50%	25%	100%	75%	50%	25%		1.00	0.75	0.50	0.25
American robin	Woodall	6.32E-01	8.29E-01	6.22E-01	4.15E-01	2.07E-01	1.46E+00	1.25E+00	1.05E+00	8.39E-01	4.13E-01	3.54	3.04	2.53	2.03
	Town Site	1.54E-01	1.79E+00	1.34E+00	8.96E-01	4.48E-01	1.95E+00	1.50E+00	1.05E+00	6.02E-01		4.71	3.63	2.54	1.46
	Camp G and H	5.69E-01	2.98E+00	2.24E+00	1.49E+00	7.45E-01	3.55E+00	2.80E+00	2.06E+00	1.31E+00		8.59	6.79	4.99	3.18
	Downgradient East	4.33E-01	3.05E-01	2.29E-01	1.52E-01	7.62E-02	7.38E-01	6.62E-01	5.86E-01	5.10E-01		1.79	1.60	1.42	1.23
	Downgradient West	8.81E-02	5.38E-01	4.03E-01	2.69E-01	1.34E-01	6.26E-01	4.91E-01	3.57E-01	2.23E-01		1.52	1.19	0.86	0.54
	Grace Panel	1.56E+00	1.27E+00	9.52E-01	6.35E-01	3.17E-01	2.83E+00	2.51E+00	2.19E+00	1.88E+00		6.85	6.08	5.31	4.54
	Ibex Complex	4.94E-01	2.51E+00	1.88E+00	1.25E+00	6.27E-01	3.00E+00	2.38E+00	1.75E+00	1.12E+00		7.27	5.75	4.23	2.72
	North Trail	8.02E-02	9.71E-01	7.28E-01	4.86E-01	2.43E-01	1.05E+00	8.09E-01	5.66E-01	3.23E-01		2.55	1.96	1.37	0.78
Northern bobwhite	Woodall	1.37E-01	5.83E-01	4.38E-01	2.92E-01	1.46E-01	7.20E-01	5.74E-01	4.28E-01	2.82E-01		1.74	1.39	1.04	0.68
	Town Site	7.96E-02	1.26E+00	9.46E-01	6.31E-01	3.15E-01	1.34E+00	1.03E+00	7.10E-01	3.95E-01		3.25	2.48	1.72	0.96
	Camp G and H	4.01E-01	2.10E+00	1.57E+00	1.05E+00	5.24E-01	2.50E+00	1.97E+00	1.45E+00	9.25E-01		6.05	4.78	3.51	2.24
	Downgradient East	1.09E-01	2.15E-01	1.61E-01	1.07E-01	5.36E-02	3.24E-01	2.70E-01	2.16E-01	1.63E-01		0.78	0.65	0.52	0.39
	Downgradient West	5.06E-02	3.78E-01	2.84E-01	1.89E-01	9.46E-02	4.29E-01	3.35E-01	2.40E-01	1.45E-01		1.04	0.81	0.58	0.35
	Grace Panel	5.53E-01	8.93E-01	6.70E-01	4.47E-01	2.23E-01	1.45E+00	1.22E+00	9.99E-01	7.76E-01		3.50	2.96	2.42	1.88
	Ibex Complex	1.79E-01	1.77E+00	1.32E+00	8.83E-01	4.41E-01	1.94E+00	1.50E+00	1.06E+00	6.20E-01		4.71	3.64	2.57	1.50
	North Trail	4.18E-02	6.83E-01	5.13E-01	3.42E-01	1.71E-01	7.25E-01	5.54E-01	3.84E-01	2.13E-01		1.76	1.34	0.93	0.51
Northern harrier	Woodall	1.79E-01	2.15E-01	1.61E-01	1.07E-01	5.37E-02	3.94E-01	3.41E-01	2.87E-01	2.33E-01		0.96	0.82	0.69	0.56
	Town Site	9.90E-02	4.65E-01	3.48E-01	2.32E-01	1.16E-01	5.64E-01	4.47E-01	3.31E-01	2.15E-01		1.36	1.08	0.80	0.52
	Camp G and H	3.85E-02	7.73E-01	5.80E-01	3.86E-01	1.93E-01	8.11E-01	6.18E-01	4.25E-01	2.32E-01		1.96	1.50	1.03	0.56
	Downgradient East	6.29E-02	7.90E-02	5.93E-02	3.95E-02	1.98E-02	1.42E-01	1.22E-01	1.02E-01	8.26E-02		0.34	0.30	0.25	0.20
	Downgradient West	3.97E-02	1.39E-01	1.05E-01	6.97E-02	3.49E-02	1.79E-01	1.44E-01	1.09E-01	7.45E-02		0.43	0.35	0.26	0.18
	Grace Panel	1.43E-01	3.29E-01	2.47E-01	1.65E-01	8.23E-02	4.72E-01	3.90E-01	3.08E-01	2.25E-01		1.14	0.94	0.74	0.55
	Ibex Complex	1.52E-01	6.50E-01	4.88E-01	3.25E-01	1.63E-01	8.03E-01	6.40E-01	4.78E-01	3.15E-01		1.94	1.55	1.16	0.76
	North Trail	1.46E-01	2.52E-01	1.89E-01	1.26E-01	6.29E-02	3.98E-01	3.35E-01	2.72E-01	2.09E-01		0.96	0.81	0.66	0.51

Notes:
HQ - Hazard Quotient
mg/kg-BW/day - milligrams per kilogram body weight per day
LOAEL - Lowest-Observable Adverse Effects Levels

Table 4.5-1
Upland Exposure Unit Risk Characterization Summary;
HQs Greater than 1.0 Using Lowest LOAEL TRVs

	American robin	Coyote	Deer mouse	Eastern cottontail	Mule deer	Northern bobwhite	Northern harrier
Camp G and H EU							
Selenium	**5.9**	≤1.0	**19.2**	**8.3**	**3.8**	**4.3**	≤1.0
Vanadium	**8.6**	≤1.0	**2.5**	**1.2**	≤1.0	**6.0**	**2.0**
Downgradient East EU							
Selenium	**10.6**	**2.4**	**29.9**	**7.2**	**3.9**	**4.3**	**1.6**
Vanadium	**1.8**	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0
Zinc	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	**1.4**
Downgradient West EU							
Selenium	**10.1**	≤1.0	**32.3**	**13.9**	**6.6**	**7.4**	≤1.0
Vanadium	**1.5**	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0
Zinc	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	**1.1**
Grace Panel EU							
Cadmium	≤1.0	≤1.0	**1.3**	≤1.0	≤1.0	≤1.0	≤1.0
Chromium	**1.8**	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0
Nickel	≤1.0	≤1.0	**1.3**	≤1.0	≤1.0	≤1.0	≤1.0
Selenium	**30.5**	**12.9**	**83.6**	**19.4**	**9.4**	**12.3**	**15.2**
Vanadium	**6.8**	≤1.0	**1.4**	≤1.0	≤1.0	**3.5**	**1.1**
Ibex Complex EU							
Cadmium	≤1.0	≤1.0	**1.4**	≤1.0	≤1.0	≤1.0	≤1.0
Molybdenum	≤1.0	≤1.0	**1.6**	≤1.0	≤1.0	≤1.0	≤1.0
Selenium	**27.7**	**7.5**	**79.8**	**20.4**	**10.7**	**11.8**	**7.9**
Vanadium	**7.3**	≤1.0	**1.4**	≤1.0	≤1.0	**4.7**	**1.9**
Zinc	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	**1.5**
North Trail EU							
Selenium	**24.0**	**5.9**	**74.3**	**29.3**	**18.9**	**15.9**	**6.2**
Vanadium	**2.5**	≤1.0	≤1.0	≤1.0	≤1.0	**1.8**	≤1.0
Townsite EU							
Lead	**1.1**	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0
Selenium	**2.2**	**1.1**	**5.6**	**1.1**	≤1.0	≤1.0	**1.3**
Vanadium	**4.7**	≤1.0	≤1.0	≤1.0	≤1.0	**3.2**	**1.4**
Zinc	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	**1.6**
Woodall Mountain EU							
Molybdenum	≤1.0	≤1.0	**1.1**	≤1.0	≤1.0	≤1.0	≤1.0
Selenium	**35.9**	**12.6**	**90.7**	**12.5**	**8.3**	**10.2**	**13.6**
Vanadium	**3.5**	≤1.0	≤1.0	≤1.0	≤1.0	**1.7**	≤1.0

Notes:
EU - Exposure Unit
LOAEL - Lowest Observed Adverse Effect Level
TRV - Toxicity Reference Value
HQ - Hazard Quotient
Bold = HQ > 1.0

Table 4.5-2
Riparian Sampling Location Risk Characterization Summary;
HQs Greater than 1.0 Using Lowest LOAEL TRVs

	American Robin	Coyote	Deer Mouse	Eastern Cottontail	Great Blue Heron	Mallard	Meadow Vole	Mink	Mule Deer	Northern Bobwhite	Northern Harrier	Raccoon	Red-Winged Blackbird
Camp G Creek (CGC-1)													
Manganese	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.7**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Selenium	< 1.0	< 1.0	< 1.0	< 1.0	**1.1**	< 1.0	< 1.0	**1.9**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hoorah Hollow Pond (HHP-1)													
Selenium	< 1.0	< 1.0	**1.4**	< 1.0	**1.1**	**2.5**	< 1.0	**2.2**	< 1.0	< 1.0	< 1.0	**1.1**	< 1.0
Vanadium	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.3**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.1**	< 1.0	< 1.0
North Woodall Creek (NWC-2)													
Barium	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.3**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Selenium	< 1.0	< 1.0	**2.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium	≤ 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.3**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.1**	< 1.0	< 1.0
Pedro Creek (PC-3)													
Selenium	**2.9**	< 1.0	**6.8**	< 1.0	**5.0**	**2.0**	< 1.0	**8.9**	< 1.0	< 1.0	< 1.0	**1.6**	< 1.0
Pedro Creek (PC-5)													
Selenium	**8.9**	**2.2**	**20.9**	< 1.0	**5.1**	**3.2**	**3.5**	**9.9**	**1.1**	**1.4**	**1.2**	**3.2**	**3.2**
Vanadium	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.6**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.6**	< 1.0	< 1.0
State Land Creek (SLC-2)													
Barium	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.3**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Selenium	< 1.0	< 1.0	**1.5**	< 1.0	**4.3**	**2.6**	< 1.0	**7.5**	< 1.0	< 1.0	< 1.0	**1.6**	< 1.0
Vanadium	**1.1**	< 1.0	< 1.0	< 1.0	< 1.0	**1.2**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.2**	< 1.0	< 1.0
State Land Creek (SLC-3)													
Selenium	**1.3**	**1.6**	**3.1**	**< 1.0**	**4.4**	**2.6**	**1.3**	**7.8**	< 1.0	< 1.0	**1.7**	**1.9**	< 1.0
Vanadium	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.2**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Southwest Ponds (SWP-4)													
Chromium	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**3.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Nickel	< 1.0	< 1.0	**1.1**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Selenium	**3.5**	**5.6**	**10.1**	**3.0**	< 1.0	**68.7**	**14.8**	**12.7**	**1.9**	**1.8**	**6.9**	**34.1**	**2.9**
Vanadium	**1.4**	< 1.0	< 1.0	< 1.0	< 1.0	**5.0**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.5**
Zinc	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.4**	< 1.0	< 1.0

Notes:
EU - Exposure Unit
LOAEL - Lowest Observed Adverse Effect Level
TRV - Toxicity Reference Value
HQ - Hazard Quotient
Bold = HQ > 1.0

Table 6.1-1
Summary of Selenium HQs for Each Media in Aquatic Habitats

Hazard Quotient Range	Surface Water - Chronic			Sediments -TRV_{High}			Fish Tissues	Benthic Tissues			Amphibian Tissues
	Streams	Ponds	Wetlands	Streams	Ponds	Wetlands	Streams	Streams	Ponds	Wetlands	Ponds
<= 1	Trail, North	State, Trail	Form, Jouglard, North, Woodall	CampG, Trail, North	Trail, Pedro, West	Jouglard, North, Woodall, Formation	CampG	CampG, Pedro, North, State	West (HH)		CampG, West (HH), Pedro, State
>1 - 5	CampG		CampG, West	State		CampG, State	Pedro, State	Pedro		CampG	
>5 - 10		West				West					
>10 - 20	Pedro, State	Pedro									
>20			Pedro, State	Pedro		Pedro					

Notes:

HQ - Hazard Quotient

EU - Exposure Unit

TRV - Toxicity Reference Value

CampG - Camp G Creek EU

Pedro - Pedro Creek EU

State - Stateland Creek EU

Trail - Trail Canyon Creek EU

West - Westside Ponds EU (includes Hoorah Hollow (HH))

Woodall - Woodall Springs EU

Formation - Formation Creek EU

Jouglard - Jouglard Canyon Spring

North - North Woodall Creek (NW Conda Reference Area EU)

Table 6.1-2
Summary of Cadmium HQs for Each Media in Aquatic Habitats

Hazard Quotient Range	Surface Water - Chronic			Sediments -TRV_{High}		
	Streams	Ponds	Wetlands	Streams	Ponds	Wetlands
</= 1	CampG, Pedro, State, Trail, North	Pedro, State, West	CampG, Formation, Jouglard, North, Pedro, Woodall, West	Camp G, North	Pedro, Trail, West	Camp G, Jouglard, North, Woodall, Formation
>1 - 5				Pedro, State, Trail		CampG, State, West
>5 - 10						Pedro
>10 - 20						
>20						

Notes:

HQ - Hazard Quotient

EU - Exposure Unit

TRV - Toxicity Reference Value

CampG - Camp G Creek EU

Pedro - Pedro Creek EU

State - Stateland Creek EU

Trail - Trail Canyon Creek EU

West - Westside Ponds EU (includes Hoorah Hollow (HH)

Woodall - Woodall Springs EU

Formation - Formation Creek EU

Jouglard - Jouglard Canyon Spring

North - North Woodall Creek (NW Conda Reference Area EU)

Table 6.1-3
Summary of Selenium HQs for Each Media in Mine Features

Hazard Quotient Range	Surface Water	Sediments - TRV_{High}	Benthic Tissues
</= 1	Tailings	Tailings	Tailings
>1 - 5			Pit
>5 - 10		Sed	
>10 - 20			French
>20	French, Pit, Pond, Sed	Pit, French	

Notes:

HQ - Hazard Quotient

Pit - Pit Lake

Tailings - Tailings Pond

French - French Drain

Pond - Mine Area Ponds

Sed - Sediment Basin

Table 6.1-4
Summary of Cadmium HQs for Each Media in Mine Features

Hazard Quotient Range	Surface Water	Sediments
</= 1	Tailings	
>1 - 5	French, Sed	Tailings, Sed
>5 - 10	Pit	
>10 - 20		French
>20	Pond	Pit

Notes:

HQ - Hazard Quotient

Pit - Pit Lake

Tailings - Tailings Pond

French - French Drain

Pond - Mine Area Ponds

Sed - Sediment Basin

Table 6.2-1
Summary of Relative LOAEL HQs for Selenium in Upland EUs

Hazard Quotient Range	American Robin	Coyote	Deer Mouse	Eastern Cottontail	Mule Deer	Northern Bobwhite	Northern Harrier
< 1	None	Camp G & H EU Downgradient West EU	None	None	Townsite EU	Townsite EU	Camp G & H EU Downgradient West EU
>1 - 5	Townsite EU	Townsite EU Downgradient East EU	None	Townsite EU	Camp G & H EU Downgradient East EU	Camp G & H EU Downgradient East EU	Townsite EU Downgradient East EU
>5 - 10	Camp G & H EU	Ibex Complex EU North Trail EU	Townsite EU	Camp G & H EU Downgradient East EU	Downgradient West EU Grace Panel EU Woodall Mtn. EU	Downgradient West EU	Ibex Complex EU North Trail EU
>10 - 20	Downgradient West EU Downgradient East EU	Grace Panel EU Woodall Mtn. EU	Camp G & H EU	Downgradient West EU Grace Panel EU Woodall Mtn. EU	Ibex Complex EU North Trail EU	Grace Panel EU Ibex Complex EU North Trail EU Woodall Mtn. EU	Grace Panel EU Woodall Mtn. EU
>20	North Trail EU Ibex Complex EU Grace Panel EU Woodall Mtn. EU	None	Downgradient West EU Downgradient East EU North Trail EU Ibex Complex EU Grace Panel EU Woodall Mtn. EU	Ibex Complex EU North Trail EU	None	None	None

Notes:
HQ - Hazard Quotient
EU - Exposure Unit
LOAEL - Lowest-Observable Adverse Effects Levels

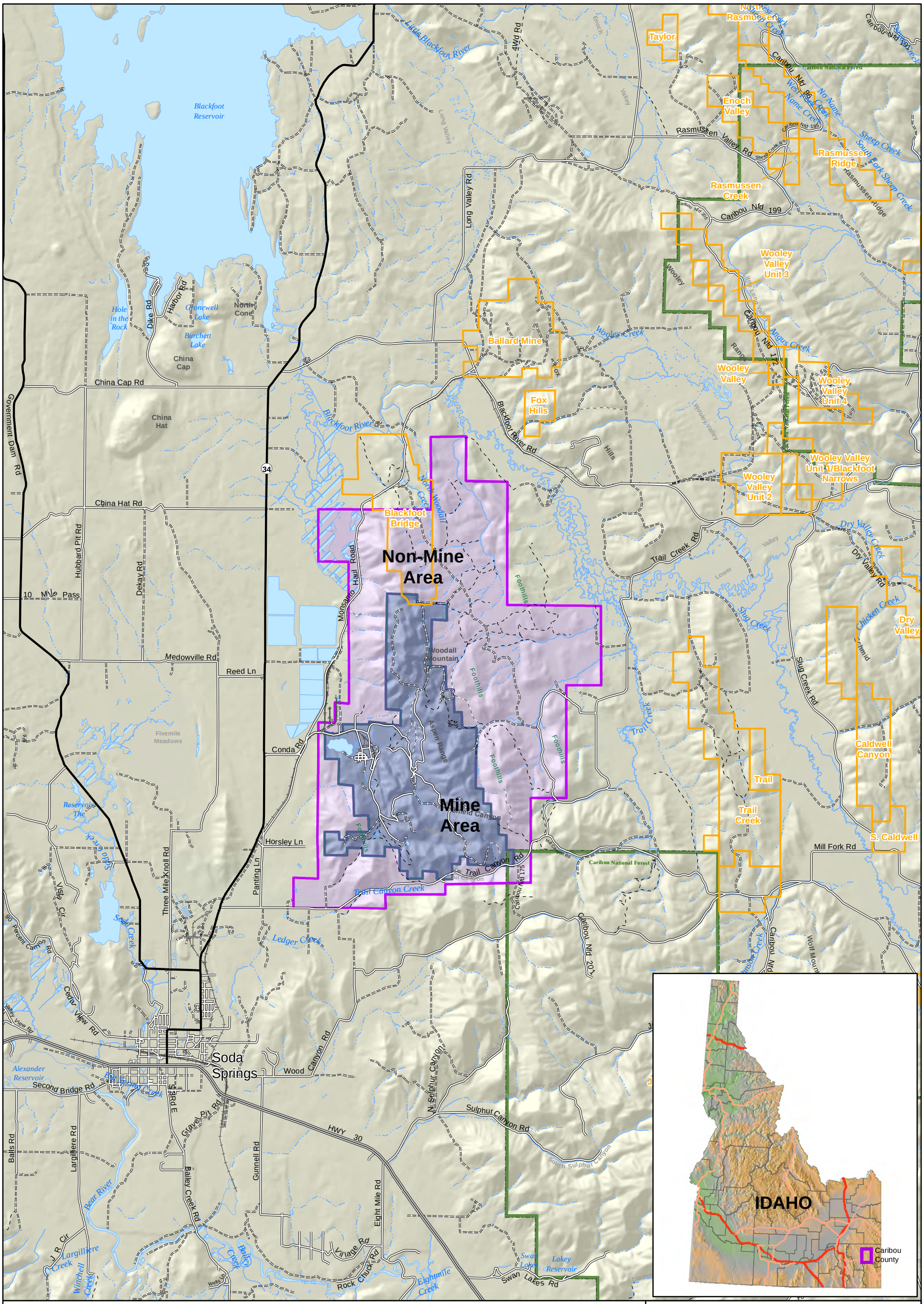
Table 6.2-2
Summary of Relative LOAEL HQs for Selenium in Riparian EUs

Hazard Quotient Range	American Robin	Coyote	Deer Mouse	Eastern Cottontail	Great Blue Heron	Mallard	Meadow Vole
< 1	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1) North Woodall Creek (NWC-2) State Land Creek (SLC-2)	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1) North Woodall Creek (NWC-2) Pedro Creek (PC-3) State Land Creek (SLC-2)	Camp G Creek (CGC-1)	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1) North Woodall Creek (NWC-2) Pedro Creek (PC-3) Pedro Creek (PC-5) State Land Creek (SLC-2) State Land Creek (SLC-3)	North Woodall Creek (NWC-2) Southwest Ponds (SWP-4)	Camp G Creek (CGC-1) North Woodall Creek (NWC-2)	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1) North Woodall Creek (NWC-2) Pedro Creek (PC-3) State Land Creek (SLC-2)
>1 - 5	Pedro Creek (PC-3) State Land Creek (SLC-3) Southwest Ponds (SWP-4)	Pedro Creek (PC-5) State Land Creek (SLC-3)	Hoorah Hollow Pond (HHP-1) North Woodall Creek (NWC-2) State Land Creek (SLC-2) State Land Creek (SLC-3)	Southwest Ponds (SWP-4)	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1) Pedro Creek (PC-3) State Land Creek (SLC-2) State Land Creek (SLC-3)	Hoorah Hollow Pond (HHP-1) Pedro Creek (PC-3) Pedro Creek (PC-5) State Land Creek (SLC-2) State Land Creek (SLC-3)	Pedro Creek (PC-5) State Land Creek (SLC-3)
>5 - 10	Pedro Creek (PC-5)	Southwest Ponds (SWP-4)	Pedro Creek (PC-3)	None	Pedro Creek (PC-5)	None	None
>10 - 20	None	None	Southwest Ponds (SWP-4)	None	None	None	Southwest Ponds (SWP-4)
>20	None	None	Pedro Creek (PC-5)	None	None	Southwest Ponds (SWP-4)	None

Table 6.2-2
Summary of Relative LOAEL HQs for Selenium in Riparian EUs

Hazard Quotient Range	Mink	Mule Deer	Northern Bobwhite	Northern Harrier	Raccoon	Red-Winged Blackbird
< 1	North Woodall Creek (NWC-2)	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1) North Woodall Creek (NWC-2) Pedro Creek (PC-3) State Land Creek (SLC-2) State Land Creek (SLC-3)	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1) North Woodall Creek (NWC-2) Pedro Creek (PC-3) State Land Creek (SLC-2) State Land Creek (SLC-3)	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1) North Woodall Creek (NWC-2) Pedro Creek (PC-3) State Land Creek (SLC-2)	Camp G Creek (CGC-1) North Woodall Creek (NWC-2)	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1) North Woodall Creek (NWC-2) Pedro Creek (PC-3) State Land Creek (SLC-2) State Land Creek (SLC-3)
>1 - 5	Camp G Creek (CGC-1) Hoorah Hollow Pond (HHP-1)	Pedro Creek (PC-5) Southwest Ponds (SWP-4)	Pedro Creek (PC-5) Southwest Ponds (SWP-4)	Pedro Creek (PC-5) State Land Creek (SLC-3)	Hoorah Hollow Pond (HHP-1) Pedro Creek (PC-3) Pedro Creek (PC-5) State Land Creek (SLC-2) State Land Creek (SLC-3)	Pedro Creek (PC-5) Southwest Ponds (SWP-4)
>5 - 10	Pedro Creek (PC-3) Pedro Creek (PC-5) State Land Creek (SLC-2) State Land Creek (SLC-3)	None	None	Southwest Ponds (SWP-4)	None	None
>10 - 20	Southwest Ponds (SWP-4)	None	None	None	None	None
>20	None	None	None	None	Southwest Ponds (SWP-4)	None

Notes:
HQ - Hazard Quotient
EU - Exposure Unit
LOAEL - Lowest-Observable Adverse Effects Levels



J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

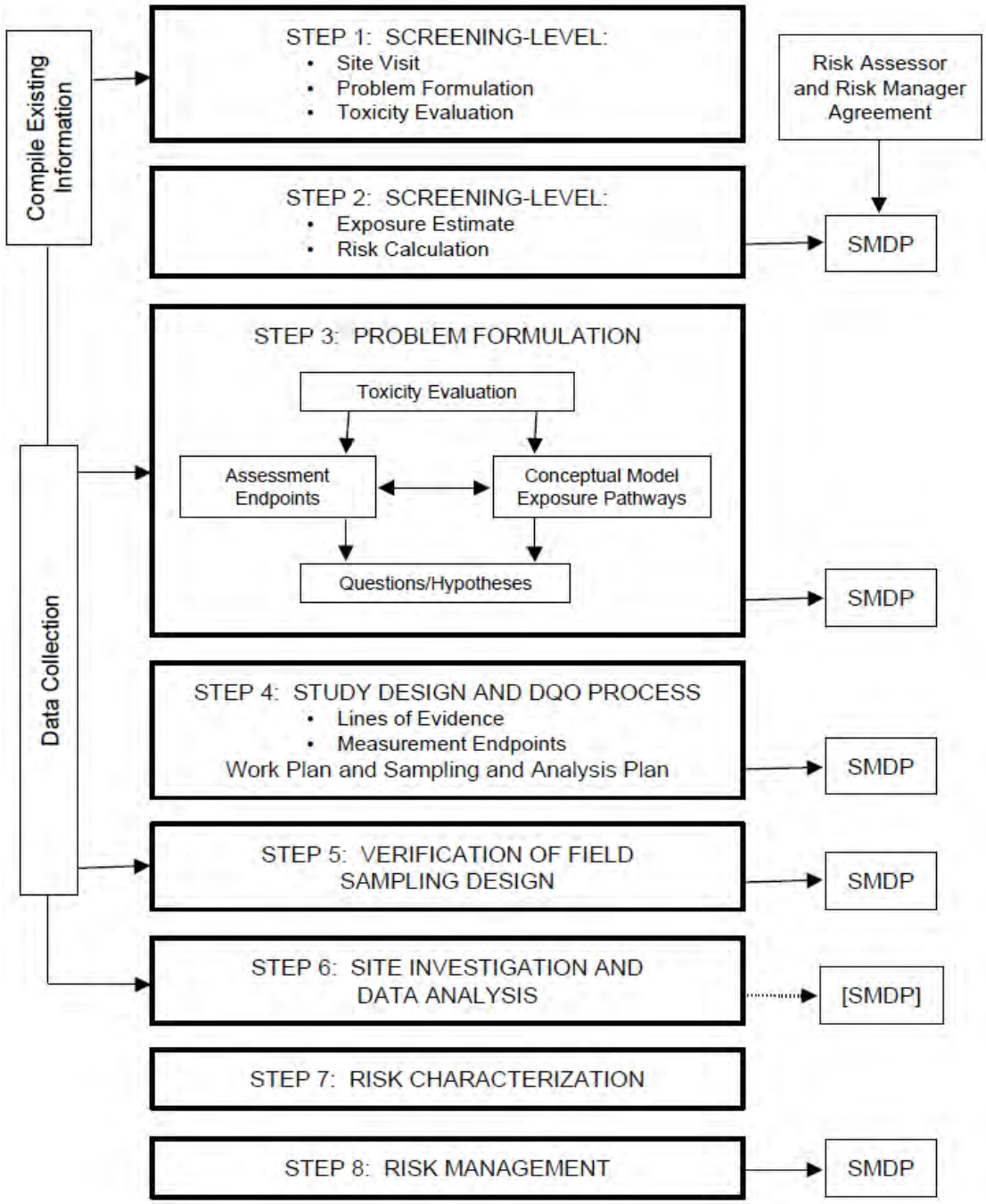
FIGURE 1.0-1

CONDA/WOODALL MOUNTAIN PHOSPHATE MINE LOCATION

DATE: MAR 22, 2016
BY: CRL
FOR: RCR

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig1_0-1_MineAreas.mxd



Source: Exhibit I-2 from U.S. Environmental Protection Agency (EPA). 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final. EPA 540-R-97-006. Environmental Response Team, Edison, NJ.

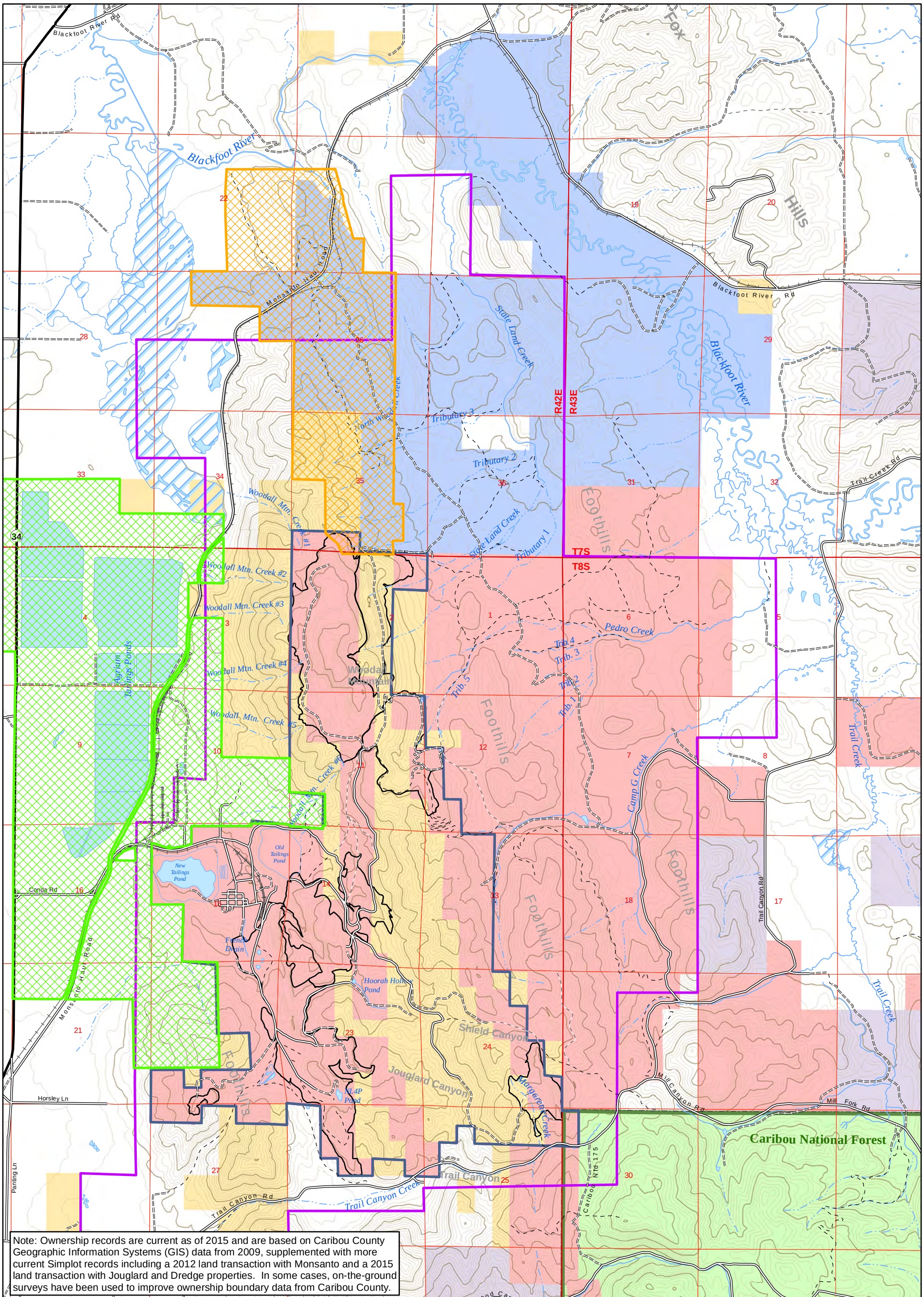
FIGURE 1.0-2. EIGHT STEP ECOLOGICAL RISK ASSESSMENT PROCESS

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

DATE: MAR 26, 2015

BY: RPS | FOR: MCL

FORMATION ENVIRONMENTAL



Note: Ownership records are current as of 2015 and are based on Caribou County Geographic Information Systems (GIS) data from 2009, supplemented with more current Simplot records including a 2012 land transaction with Monsanto and a 2015 land transaction with Jouglard and Dredge properties. In some cases, on-the-ground surveys have been used to improve ownership boundary data from Caribou County.

Legend

- Major Road
- Minor Road
- Unimproved Road
- Trail (4WD)
- Trail (Other than 4WD)
- Railroad
- Intermittent Stream
- Perennial Stream
- Lake/Pond
- Reservoir
- Swamp/Marsh

Land Ownership

- BLM
- J.R. Simplot Co.
- State of Idaho
- USDA Forest Service
- Monsanto

Current and Potential Future Natural Resource Use

- Agrium Boundary
- Blackfoot Bridge Project Boundary

- Mine Area
- Non-Mine Area

N

0 2,500 5,000
Feet

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

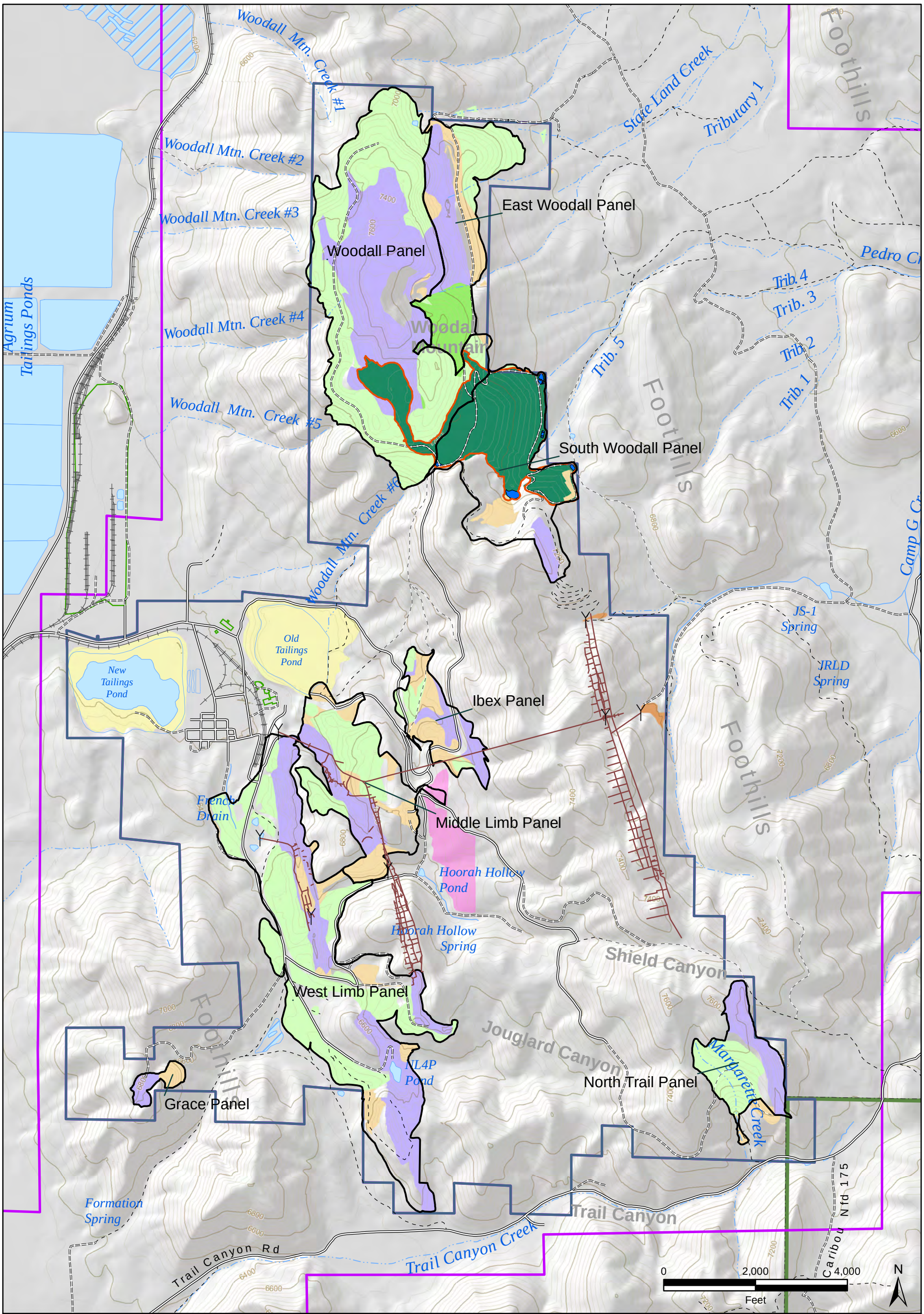
FIGURE 2.1-1

LAND OWNERSHIP AND LAND USE

DATE: MAR 22, 2016
BY: CRL
FOR: KSR

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig2_1-1_LandOwnership.mxd



Legend

- Adit/Portal
- Underground Mine Workings
- Primary Highway
- Major Road
- Minor Road
- Unimproved Road
- Trail (4WD)
- Trail (Other than 4WD)
- Railroad
- Mine Area
- Non-Mine Area
- Mine Panels
- NTCRA/FSPS Boundary
- Conda Facilities
- Intermittent Stream
- Perennial Stream
- Lake/Pond
- Reservoir
- Swamp/Marsh
- NTCRA sedimentation basins
- 200ft Index Contour
- 40 ft Contour
- Dinwoody Formation Borrow Area

Residual Mining Materials (RMM)

- Overburden pile with Dinwoody soil cover as part of the NTCRA and FSPS
- Reclaimed Overburden Disposal Area
- Reclaimed Pit
- Disturbed Pit
- Disturbed Tailings
- Disturbed Overburden Disposal Area
- Waste Rock Piles

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

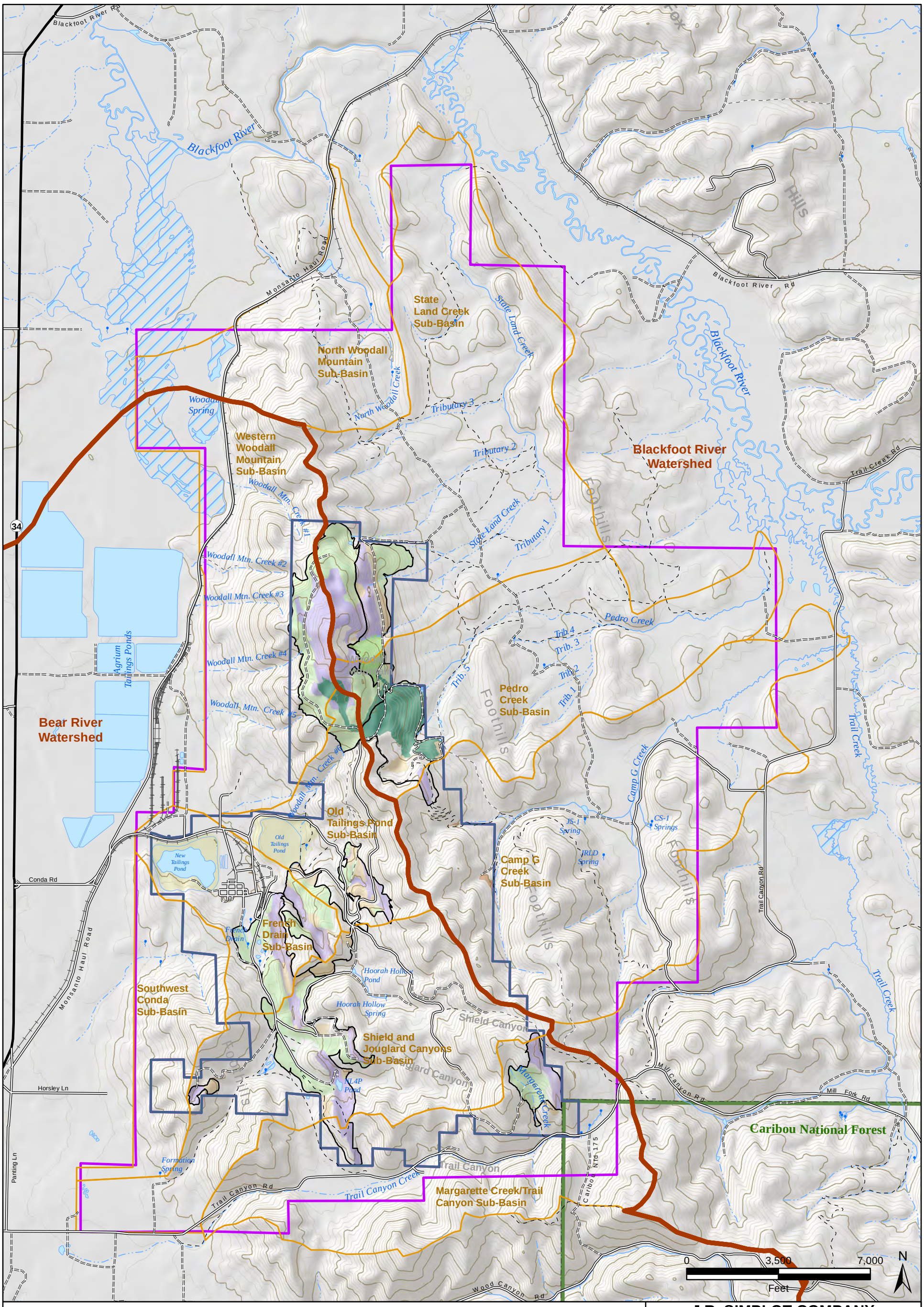
FIGURE 2.1-2

CONDA/WOODALL MOUNTAIN RESIDUAL MINE FEATURES

DATE: MAR 22, 2016
BY: CRL/DDZ
CHECKED: RPS

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig2_1-2_RMM.mxd



Legend

- Major Road
- Minor Road
- Unimproved Road
- Trail (4WD)
- Trail (Other than 4WD)
- Railroad
- Intermittent Stream
- Perennial Stream
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Mine Area
- Non-Mine Area
- Sub-Basins
- Major Watershed Boundary

Residual Mining Materials (RMM)

- Overburden pile with Dinwoody soil cover as part of the NTCRA and FSPS
- Reclaimed Overburden Disposal Area
- Reclaimed Pit
- Disturbed Pit
- Disturbed Tailings
- Disturbed Overburden Disposal Area
- Waste Rock Piles

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

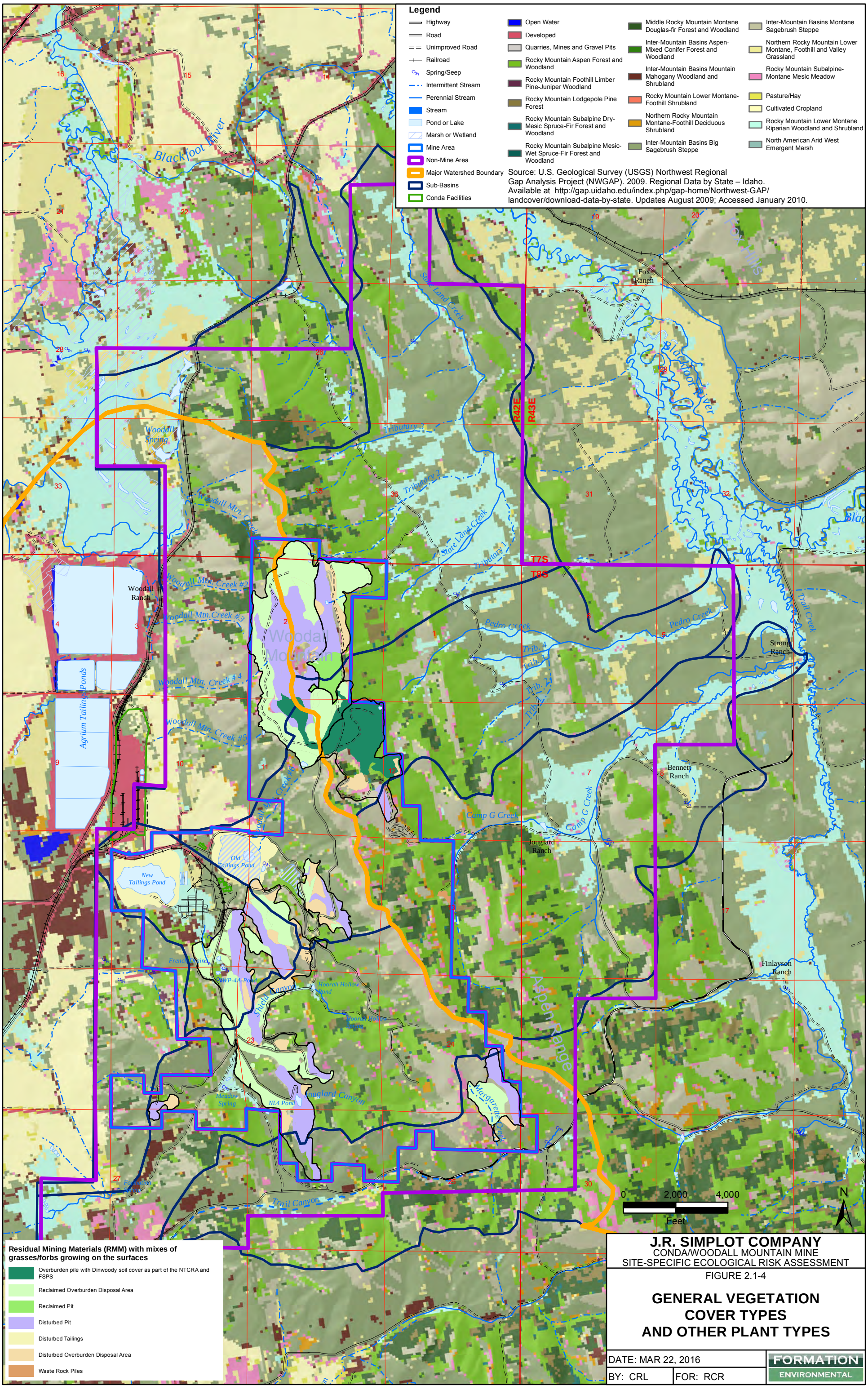
FIGURE 2.1-3

SURFACE WATER DRAINAGES AND SUB-BASIN BOUNDARIES

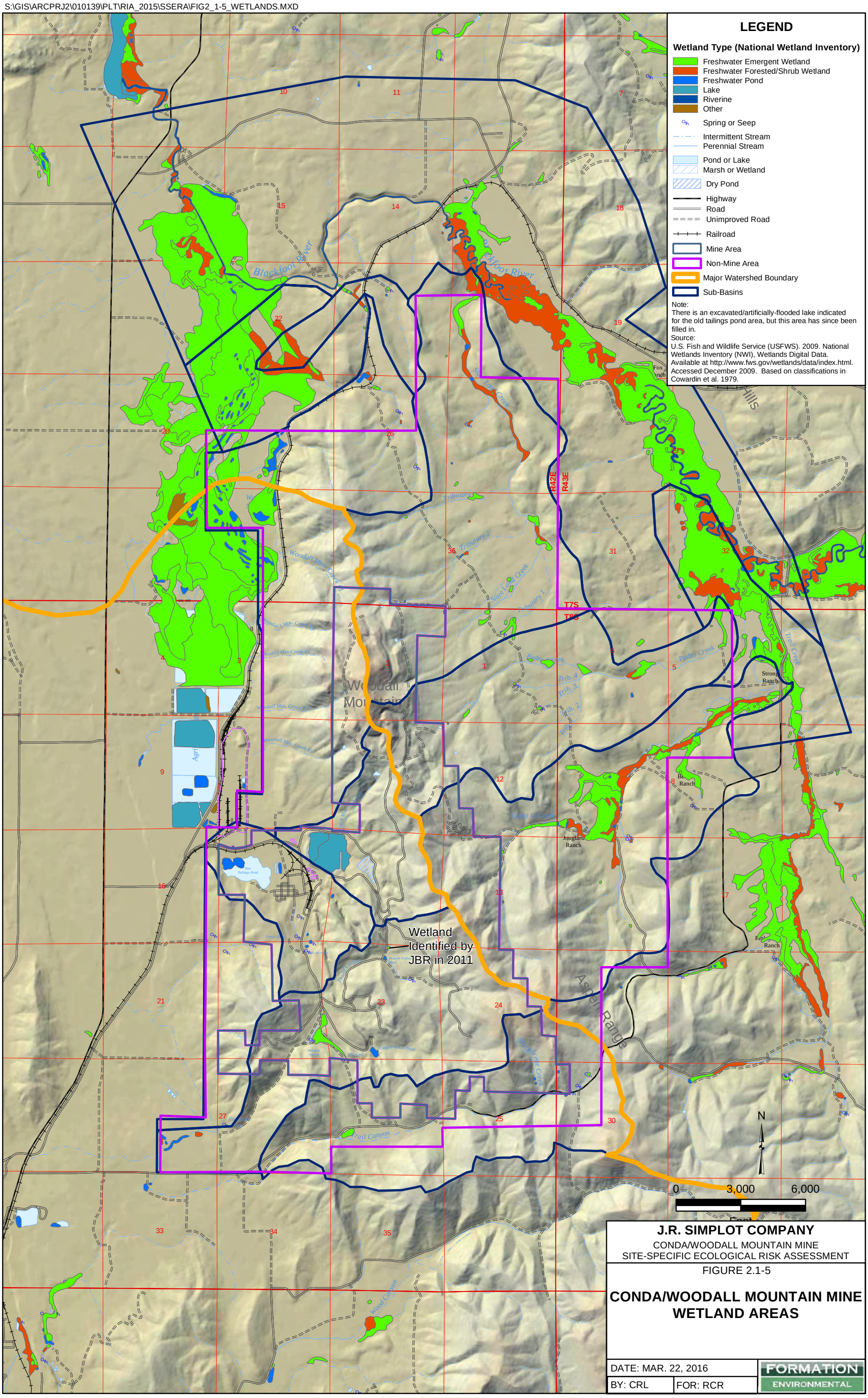
DATE: MAR 22, 2016
BY: KAM
FOR: KSR

FORMATION ENVIRONMENTAL

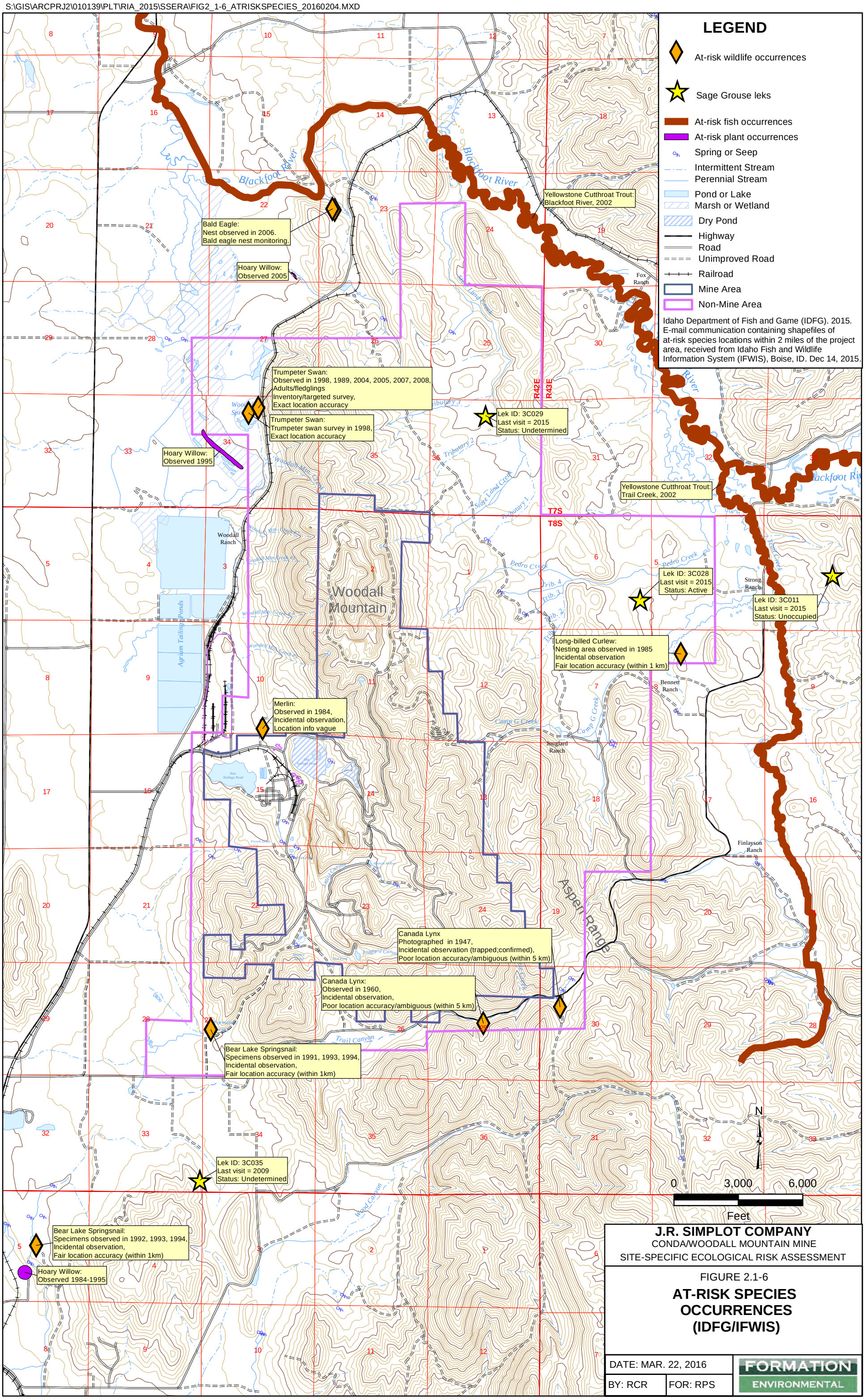
S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig2_1-3_SW_Drainages.mxd


Legend
Highway
Road
Unimproved Road
Railroad
Spring/Seep
Intermittent Stream
Perennial Stream
Stream
Pond or Lake
Marsh or Wetland
Mine Area
Non-Mine Area
Major Watershed Boundary
Sub-Basins
Conda Facilities
Open Water
Developed
Quarries, Mines and Gravel Pits
Rocky Mountain Aspen Forest and Woodland
Rocky Mountain Foothill Limber Pine-Juniper Woodland
Rocky Mountain Lodgepole Pine Forest
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland
Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland
Middle Rocky Mountain Montane Douglas-fir Forest and Woodland
Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland
Inter-Mountain Basins Mountain Mahogany Woodland and Shrubland
Rocky Mountain Lower Montane-Foothill Shrubland
Northern Rocky Mountain Montane-Foothill Deciduous Shrubland
Inter-Mountain Basins Big Sagebrush Steppe
Inter-Mountain Basins Montane Sagebrush Steppe
Northern Rocky Mountain Lower Montane, Foothill and Valley Grassland
Rocky Mountain Subalpine-Montane Mesic Meadow
Pasture/Hay
Cultivated Cropland
Rocky Mountain Lower Montane Riparian Woodland and Shrubland
North American Arid West Emergent Marsh
Source: U.S. Geological Survey (USGS) Northwest Regional Gap Analysis Project (NWGAP). 2009. Regional Data by State – Idaho. Available at http://gap.uidaho.edu/index.php/gap-home/Northwest-GAP/landcover/download-data-by-state. Updates August 2009; Accessed January 2010.
Blackfoot River
Fox Hills
Fox Ranch
State Land Creek
Tributary 3
Tributary 2
Tributary 1
Woodall Spring
Woodall Mtn. Creek
Woodall Mtn. Creek #2
Woodall Mtn.Creek #3
Woodall Mtn. Creek # 4
Woodall Mtn. Creek #5
Woodall Mtn. Creek #6
Woodall Ranch
Agrium Tailings Ponds
Woodall Mountain
Pedro Creek
Trib. 4
Trib. 3
Trib. 2
Trib. 1
Trail Creek
Strong Ranch
Bennett Ranch
Camp G Creek
Jouglard Ranch
Old Tailings Pond
New Tailings Pond
French Gulch
HWP-4A-Pond
Shield Canyon
Hoorah Hollow Pond
Hoorah Hollow Spring
Meadow Spring
NL4 Pond
Jouglard Canyon
Margarette Creek
Aspen Range
Finlayson Ranch
Trail Canyon
R42E
R43E
T7S
T8S
0 2,000 4,000
Feet
N
Residual Mining Materials (RMM) with mixes of grasses/forbs growing on the surfaces
Overburden pile with Dinwoody soil cover as part of the NTCRA and FSPS
Reclaimed Overburden Disposal Area
Reclaimed Pit
Disturbed Pit
Disturbed Tailings
Disturbed Overburden Disposal Area
Waste Rock Piles
J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT
FIGURE 2.1-4
GENERAL VEGETATION COVER TYPES AND OTHER PLANT TYPES
DATE: MAR 22, 2016
BY: CRL
FOR: RCR
FORMATION ENVIRONMENTAL
S:\GIS\arcprj2\0101\39\plt\RIA_2015\SSERA\Fig2_1-4_VegCoverTypes.mxd

S:\GIS\ARCPRJ2\010139\PLT\RIA_2015\SSERA\FIG2_1-5_WETLANDS.MXD



S:\GIS\ARCPRJ2\010139\PLT\RIA_2015\SSERA\FIG2_1-6_ATRISKSPECIES_20160204.MXD



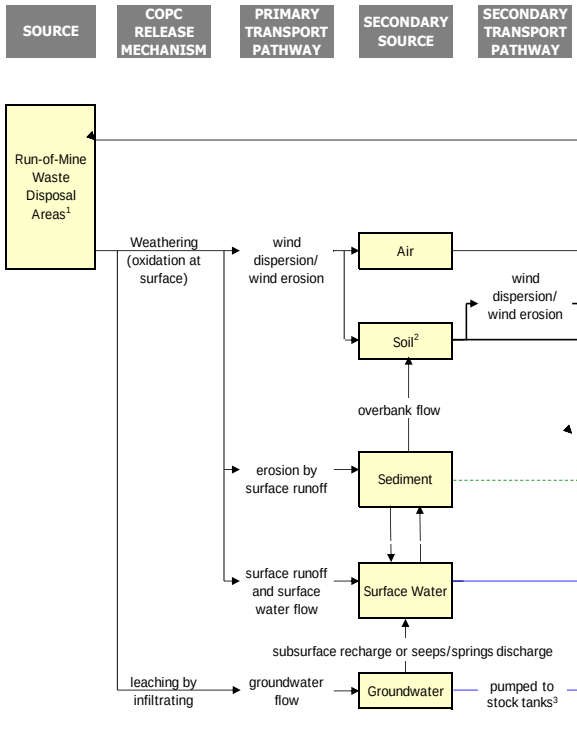
J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 2.1-6

AT-RISK SPECIES OCCURRENCES (IDFG/IFWIS)

DATE: MAR. 22, 2016	FORMATION ENVIRONMENTAL
BY: RCR	FOR: RPS

S:\Jobs\0442-001-900-Simplot-Conda\RIFS_RiskAssessRpts\ERA\DrftReport\Figures\source files\Fig2_2-1_ECSM.pptx



EXPOSURE MEDIA	POTENTIAL ECOLOGICAL EXPOSURE ROUTES	TERRESTRIAL UPLAND RECEPTORS								RIPARIAN/AQUATIC RECEPTORS										DOMESTIC LIVESTOCK RECEPTORS
		1° Producers – Terrestrial Plants	1° Consumers –Terr.Invertebrates	1° Consumers –Terr. Herbivorous Birds	1° Consumers – Terr. Herbivorous Mammals	2° Consumers – Terr. Omnivorous Birds	2° Consumers – Terr. Omnivorous Mammals/Reptiles	3° Consumers – Terr. Carnivorous Mammals	3° Consumers – Terr. Raptors	1° Producers and Consumers – Non-fish Aquatic Life[4]	1° Consumers – Fish	2° and 3° Consumers – Fish [5]	1° Consumers – Aq./Ripar. Herbivorous Birds	1° Consumers – Aq./Ripar. Herbivorous Mammals	2° Consumers – Aq./Ripar. Omnivorous Birds	2° Consumers – Aq./Ripar. Piscivorous Birds	2° Consumers – Aq./Ripar. Benthic-feeding Birds	2° Consumers – Aq./Ripar. Omnivorous Mammals	2° Consumers – Aq./Ripar. Carnivorous Mammals	1° Consumers – Domestic Livestock Receptors
Source Materials	Incidental Ingestion		●	●	●	●	●	●	●											●
	Dermal Contact		⊙	⊙	⊙	⊙	⊙	⊙	⊙											⊙
	Plant Uptake	●																		
	External Radiation	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙											⊙
Food Web Uptake	Ingestion		●	●	●	●	●	●	●											●
Particulates derived from Source Materials	Inhalation of Particulates		⊙	⊙	⊙	⊙	⊙	⊙	⊙											⊙
	Plant Uptake	⊙																		
Particulates derived from Soil	Inhalation of Particulates		⊙	⊙	⊙	⊙	⊙	⊙	⊙											⊙
	Plant Uptake	⊙																		
Soil[2]	Incidental Ingestion		●	●	●	●	●	●	●				●	●	●				●	●
	Dermal Contact		⊙	⊙	⊙	⊙	⊙	⊙	⊙				⊙	⊙	⊙				⊙	⊙
	Uptake	●																		
	External Radiation	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙											⊙
Food Web Uptake	Ingestion		●	●	●	●	●	●	●				●	●	●				●	●
Sediment	Incidental Ingestion									●	●	●	●	●	●	●	●	●	●	●
	Dermal Contact									●	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
	Plant Uptake									●										
Food Web Uptake	Ingestion									●	●	●	●	●	●	●	●	●	●	
Surface Water	Ingestion		⊙	⊙	●	⊙	⊙	●	●	●	●	●	●	●	●	●	●	●	●	●
	Dermal Contact		⊙	⊙	⊙	⊙	⊙	⊙	⊙	●	●	●	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
	Plant Uptake									●										
Food Web Uptake	Ingestion									●	●	●	●	●	●	●	●	●	●	●
Stock Tank Water[3]	Ingestion				●			●	●											●

Notes:

[1] The run-of-mine waste disposal areas include: overburden disposal areas, waste rock piles, and the old tailings pond area; these materials are collectively called "source materials". The old tailings pond area (OTP) includes the historical tailings ponds and the ore-slurry overflow storage area. The ore-slurry was predominantly phosphate but the former storage area likely sits on top of one of the earliest tailings ponds, which the whole OTP encompasses.

[2] Non-source material soils, includes both impacted and non-impacted soils.

[3] Hypothetical future use; not a current pathway; no stock tanks currently on site.

[4] includes periphyton, aquatic plants, zooplankton, benthic invertebrates, amphibians

[5] No secondary consumer fish (e.g., trout) were observed during fishing efforts at each of the creeks in July 2009.

Different line weights, colors, and styles are only used to allow ease of reading.

Internal radiation is possible whenever ingestion is a complete pathway.

Surface water is defined as streams, ponds, seeps, and springs.

All receptors include current or future populations.

● Potentially Complete Pathway, and likely to be significant contributor to overall exposure

⊙ Potentially Complete Pathway, but likely to be insignificant to overall exposure

Incomplete Pathway

FIGURE 2.2-1. ECOLOGICAL CONCEPTUAL SITE MODEL

J.R. SIMPLOT COMPANY

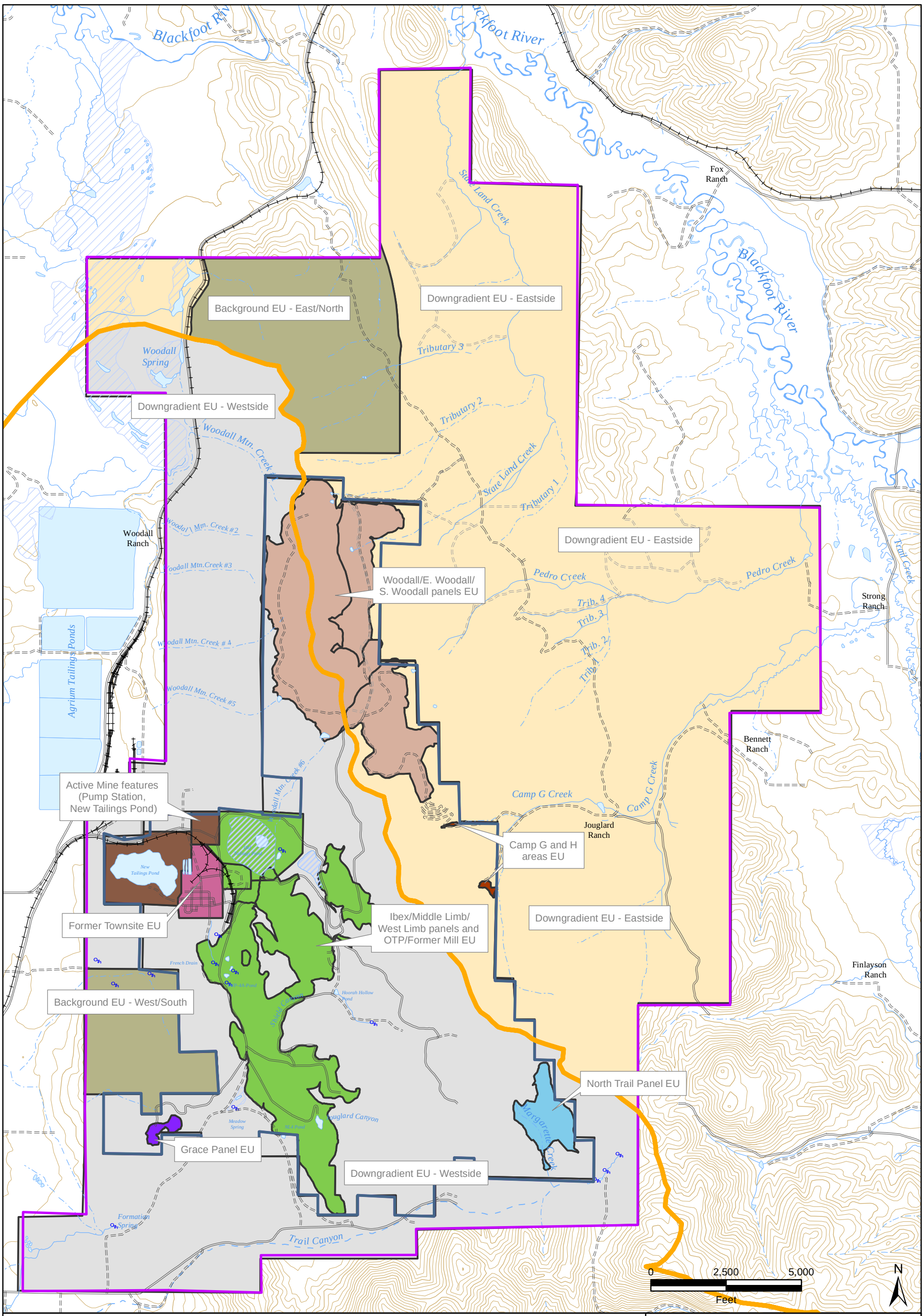
CONDA/WOODALL MOUNTAIN MINE

SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

PRJ: 009-001 MAY 2015

BY: RCR FOR: RPS

FORMATION ENVIRONMENTAL



Legend

- Major Watershed Boundary
- Mine Area
- Non-Mine Area
- Railroad
- Roads - Additional
- Road
- Unimproved Road
- Spring or Seep
- Intermittent Stream
- Perennial Stream
- Stream
- Pond or Lake
- Marsh or Wetland

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU (734 ac)
- Camp G and H Areas EU (4 ac)
- Ibex/M. Limb/W. Limb panels & OTP area EU (749 ac)
- North Trail Panel EU (74 ac)
- Grace Panel EU (12 ac)
- Former Townsite EU (68 ac)
- Background EUs (1,104 ac)
- Active Mine features (162 ac)

Exposure Units

- Downgradient EU - Eastside (6,921 ac)
- Downgradient EU - Westside (5,435 ac)

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 2.4-1

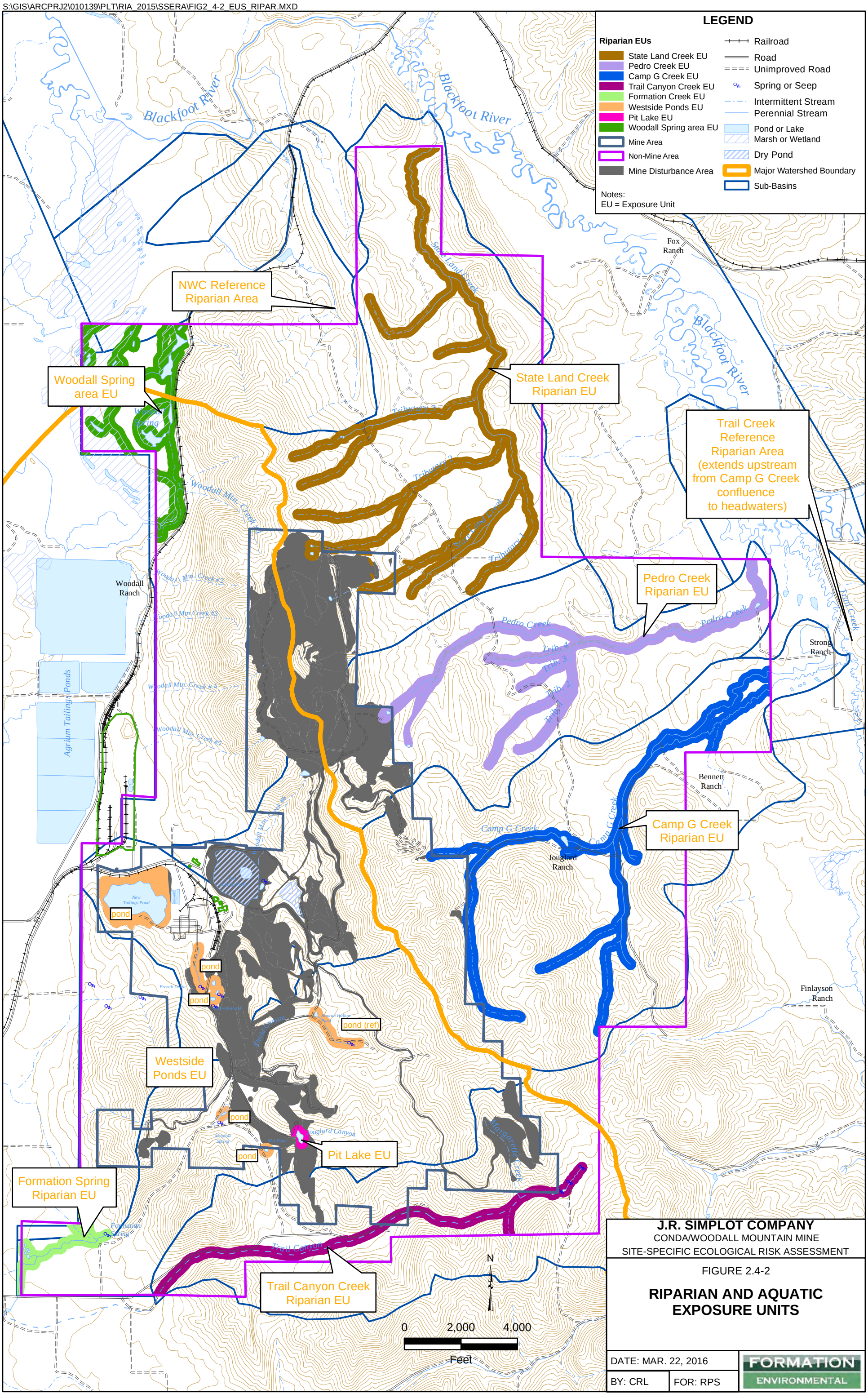
EXPOSURE UNITS

DATE: MAR 22, 2016
BY: CRL
CHK: RPS

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig2_4-1_EUs_mine.mxd

S:\GIS\ARCPRJ2\010139\PLT\RIA_2015\SSERA\FIG2_4-2_EUS_RIPAR.MXD



J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

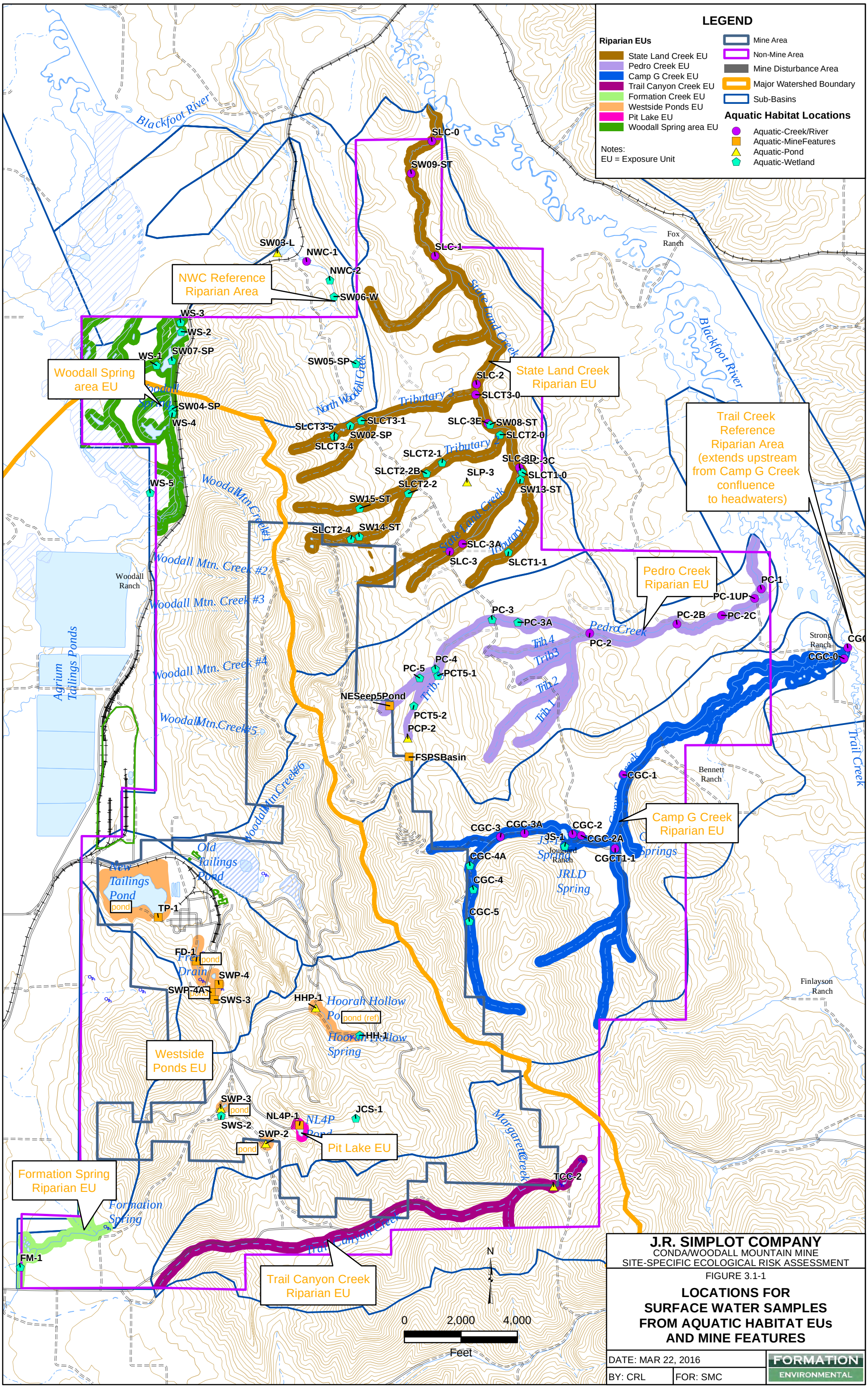
FIGURE 2.4-2

RIPARIAN AND AQUATIC EXPOSURE UNITS

DATE: MAR. 22, 2016

BY: CRL | FOR: RPS

FORMATION ENVIRONMENTAL



J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

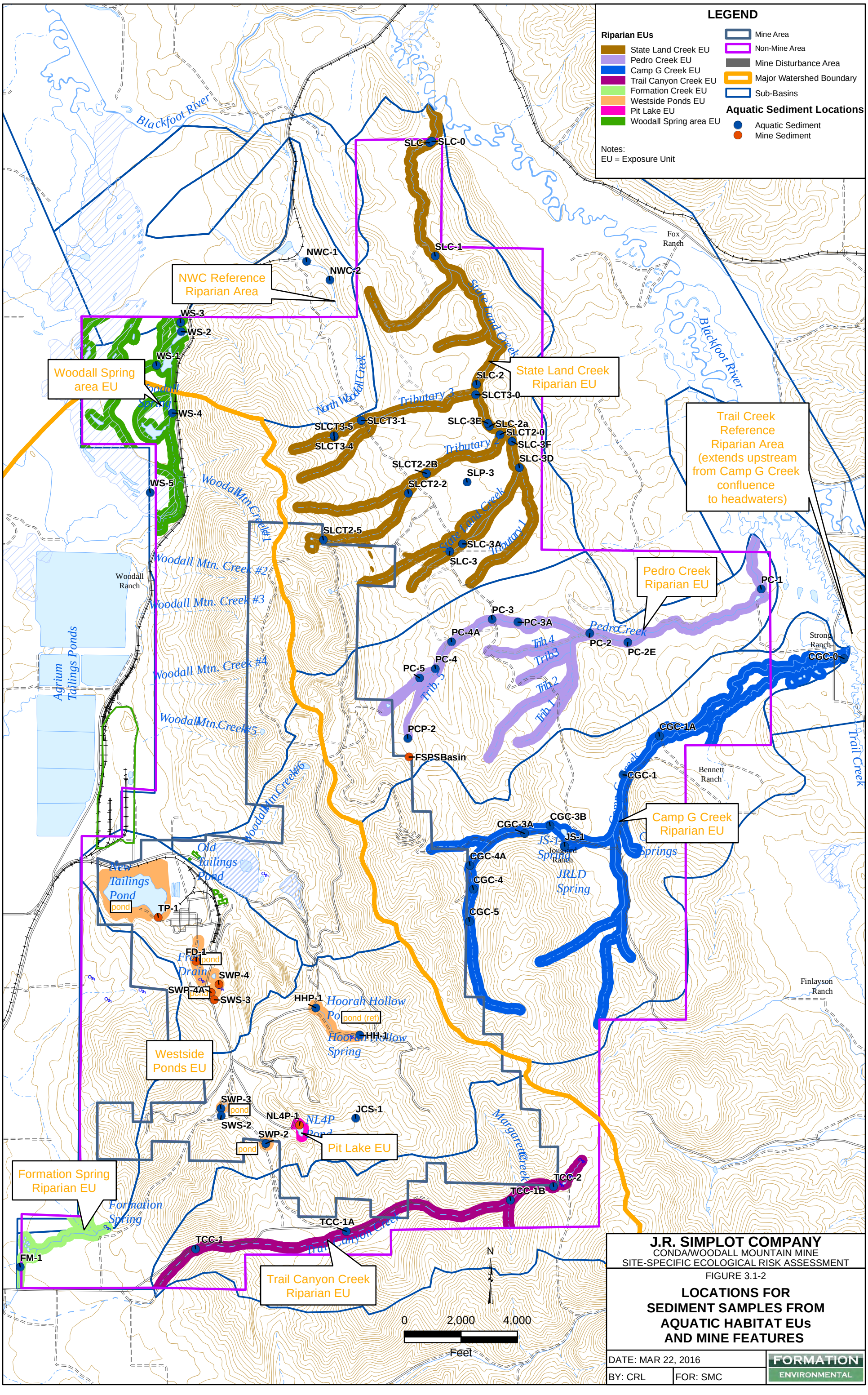
FIGURE 3.1-1

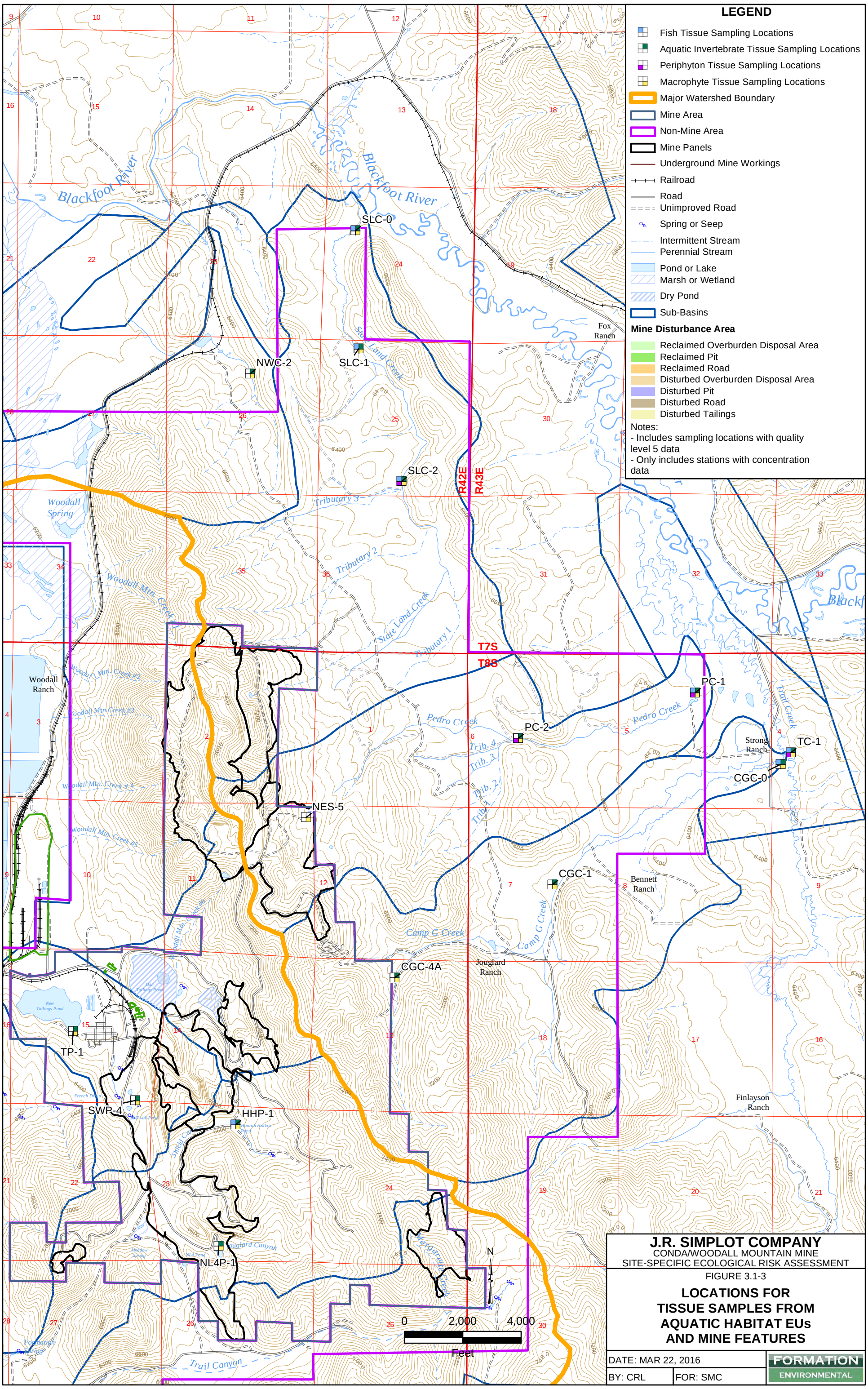
LOCATIONS FOR SURFACE WATER SAMPLES FROM AQUATIC HABITAT EUs AND MINE FEATURES

DATE: MAR 22, 2016
BY: CRL
FOR: SMC

FORMATION ENVIRONMENTAL

S:\GIS\arcprj\2010139\pt\RiA_2015\SSERA\fig3_1-1_AqHab_Locs.mxd


LEGEND
Riparian EUs
State Land Creek EU
Pedro Creek EU
Camp G Creek EU
Trail Canyon Creek EU
Formation Creek EU
Westside Ponds EU
Pit Lake EU
Woodall Spring area EU
Mine Area
Non-Mine Area
Mine Disturbance Area
Major Watershed Boundary
Sub-Basins
Aquatic Sediment Locations
Aquatic Sediment
Mine Sediment
Notes:
EU = Exposure Unit
NWC Reference Riparian Area
Woodall Spring area EU
State Land Creek Riparian EU
Trail Creek Reference Riparian Area (extends upstream from Camp G Creek confluence to headwaters)
Pedro Creek Riparian EU
Camp G Creek Riparian EU
Westside Ponds EU
Pit Lake EU
Formation Spring Riparian EU
Trail Canyon Creek Riparian EU
Blackfoot River
Fox Ranch
Strong Ranch
Bennett Ranch
Finlayson Ranch
Woodall Ranch
Agrium Tailings Ponds
New Tailings Pond
Old Tailings Pond
Hoorah Hollow Pond
Hoorah Hollow Spring
JRLD Spring
Formation Spring
Trail Creek
Margarette Creek
Trail Canyon Creek
Pedro Creek
Tributary 3
Tributary 1
Tributary 2
Trib 1
Trib 2
Trib 3
Trib 4
Trib 5
Woodall Mtn. Creek #1
Woodall Mtn. Creek #2
Woodall Mtn. Creek #3
Woodall Mtn. Creek #4
Woodall Mtn. Creek #5
Woodall Mtn. Creek #6
North Woodall Creek
SLC-0
SLC-1
SLC-2
SLCT3-0
SLCT3-1
SLCT3-5
SLCT3-4
SLC-3E
SLC-2a
SLCT2-0
SLC-3F
SLC-3D
SLCT2-2B
SLP-3
SLCT2-2
SLCT2-5
SLC-3A
SLC-3
NWC-1
NWC-2
WS-3
WS-2
WS-1
WS-4
WS-5
PC-1
PC-3
PC-3A
PC-4A
PC-2
PC-2E
PC-4
PC-5
PCP-2
FSPSBasin
CGC-0
CGC-1A
CGC-1
CGC-3B
CGC-3A
JS-1
CGC-4A
CGC-4
CGC-5
TP-1
FD-1
SWP-4
SWP-4A
SWS-3
HHP-1
HH-1
SWP-3
SWS-2
SWP-2
NL4P-1
JCS-1
TCC-2
TCC-1B
TCC-1A
TCC-1
FM-1
pond
pond (ref)
0
2,000
4,000
Feet
N
J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT
FIGURE 3.1-2
LOCATIONS FOR SEDIMENT SAMPLES FROM AQUATIC HABITAT EUs AND MINE FEATURES
DATE: MAR 22, 2016
BY: CRL
FOR: SMC
FORMATION ENVIRONMENTAL
S:\GIS\arcprj\2010139\pt\RiA_2015\SSERA\fig3_1-2_SD_Locs.mxd


LEGEND
Fish Tissue Sampling Locations
Aquatic Invertebrate Tissue Sampling Locations
Periphyton Tissue Sampling Locations
Macrophyte Tissue Sampling Locations
Major Watershed Boundary
Mine Area
Non-Mine Area
Mine Panels
Underground Mine Workings
Railroad
Road
Unimproved Road
Spring or Seep
Intermittent Stream
Perennial Stream
Pond or Lake
Marsh or Wetland
Dry Pond
Sub-Basins
Mine Disturbance Area
Reclaimed Overburden Disposal Area
Reclaimed Pit
Reclaimed Road
Disturbed Overburden Disposal Area
Disturbed Pit
Disturbed Road
Disturbed Tailings
Notes:
- Includes sampling locations with quality level 5 data
- Only includes stations with concentration data
Blackfoot River
SLC-0
SLC-1
SLC-2
NWC-2
R42E
R43E
T7S
T8S
Woodall Spring
Tributary 3
Tributary 2
Tributary 1
State Land Creek
Woodall Mtn. Creek
Woodall Ranch
Pedro Creek
PC-1
PC-2
Trib. 4
Trib. 3
Trib. 2
Trib. 1
Strong Ranch
TC-1
CGC-0
Trail Creek
Fox Ranch
NES-5
CGC-1
Bennett Ranch
Camp G Creek
CGC-4A
Jouglard Ranch
TP-1
SWP-4
HHP-1
NL4P-1
Finlayson Ranch
Trail Canyon
0
2,000
4,000
Feet
N
J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT
FIGURE 3.1-3
LOCATIONS FOR
TISSUE SAMPLES FROM
AQUATIC HABITAT EUs
AND MINE FEATURES
DATE: MAR 22, 2016
BY: CRL
FOR: SMC
FORMATION
ENVIRONMENTAL
S:\GIS\arcpri2\010139\plt\RiA_2015\SSERA\fig3_1-3_ITAAVPAVMFTlocs.mxd

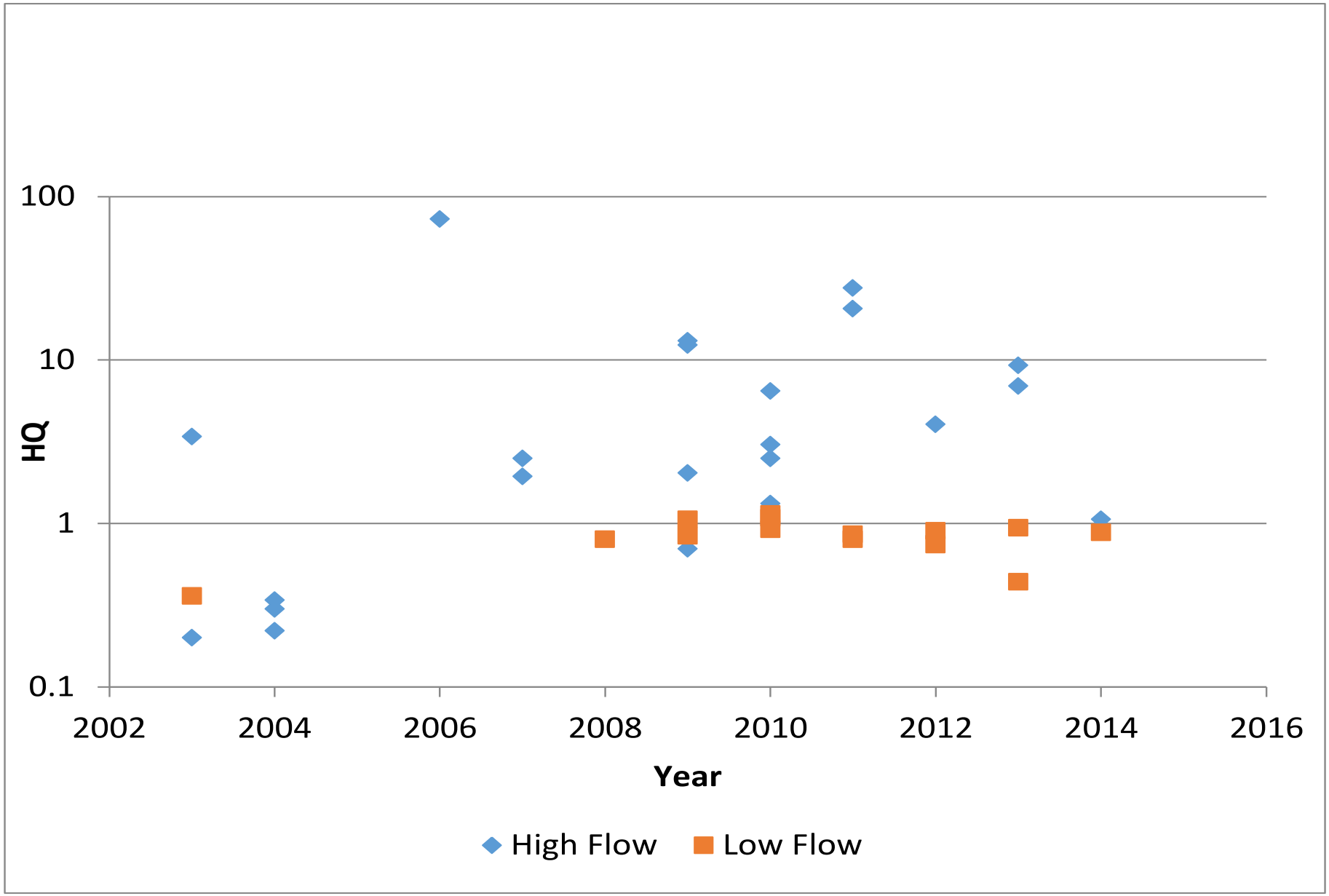


FIGURE 3.3-1 Pedro Creek Stream Habitat HQs Through Time

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE SPECIFIC ECOLOGICAL RISK ASSESSMENT

DATE: APR 07, 2014
BY: AJ
FOR: RPS

FORMATION ENVIRONMENTAL

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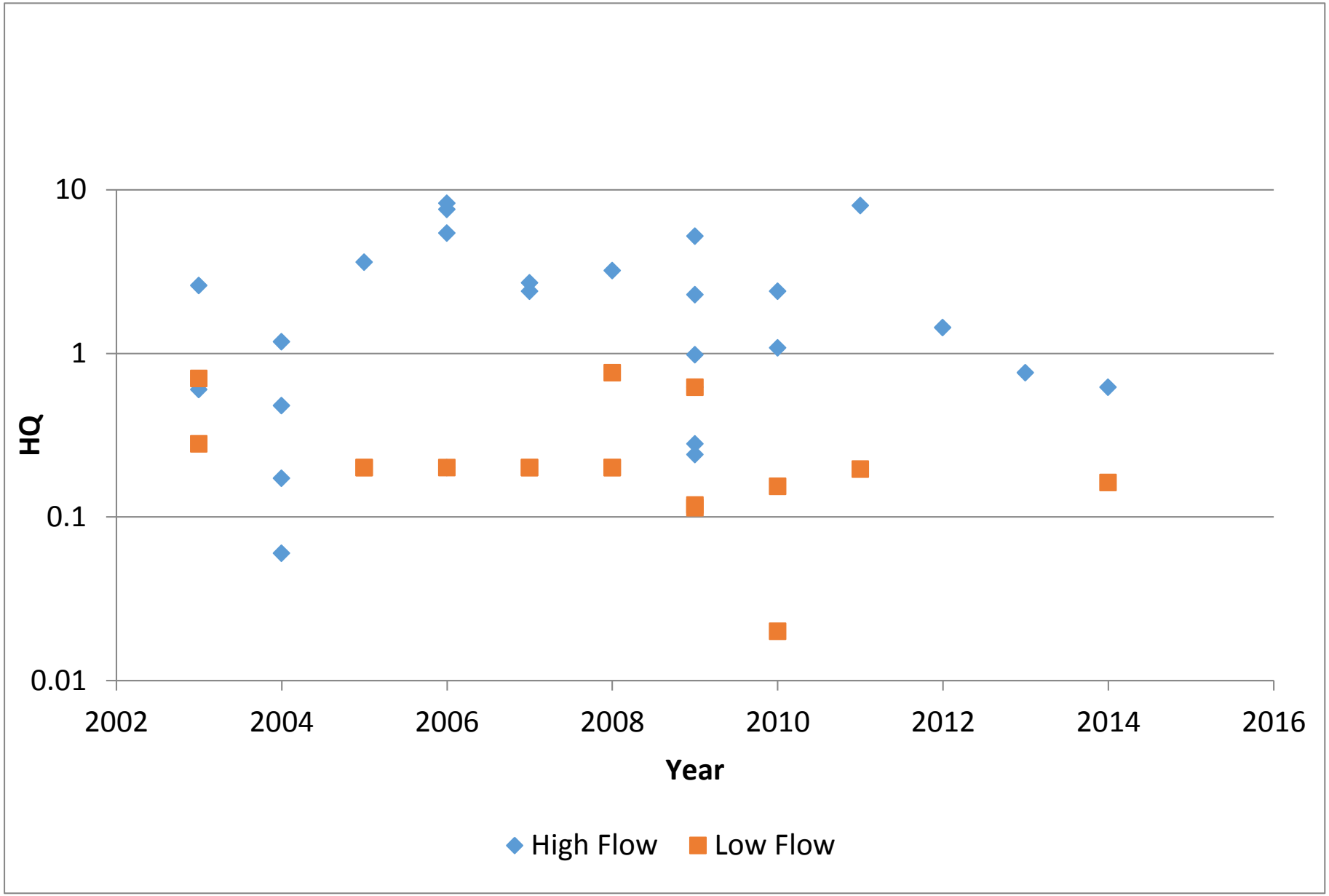

FIGURE 3.3-2 Lower State Land Creek Stream Habitat HQs Through Time

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE SPECIFIC ECOLOGICAL RISK ASSESSMENT

DATE: APR 07, 2014
BY: AJ
FOR: RPS

FORMATION ENVIRONMENTAL

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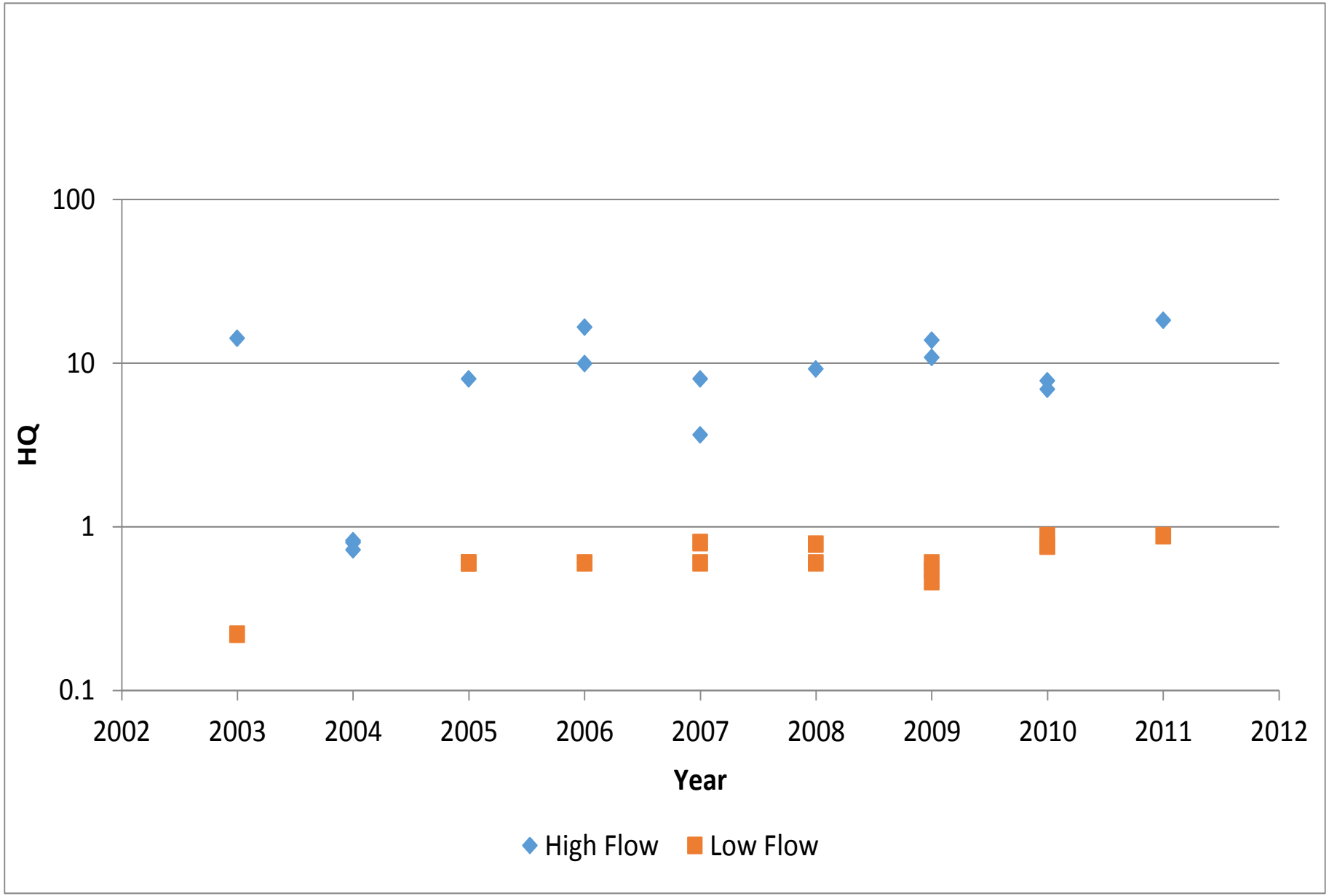

FIGURE 3.3-3 State Land Creek Tributary 2 Wetland Habitat HQs Through Time

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE SPECIFIC ECOLOGICAL RISK ASSESSMENT

DATE: APR 07, 2014
BY: AJ
FOR: RPS

FORMATION ENVIRONMENTAL

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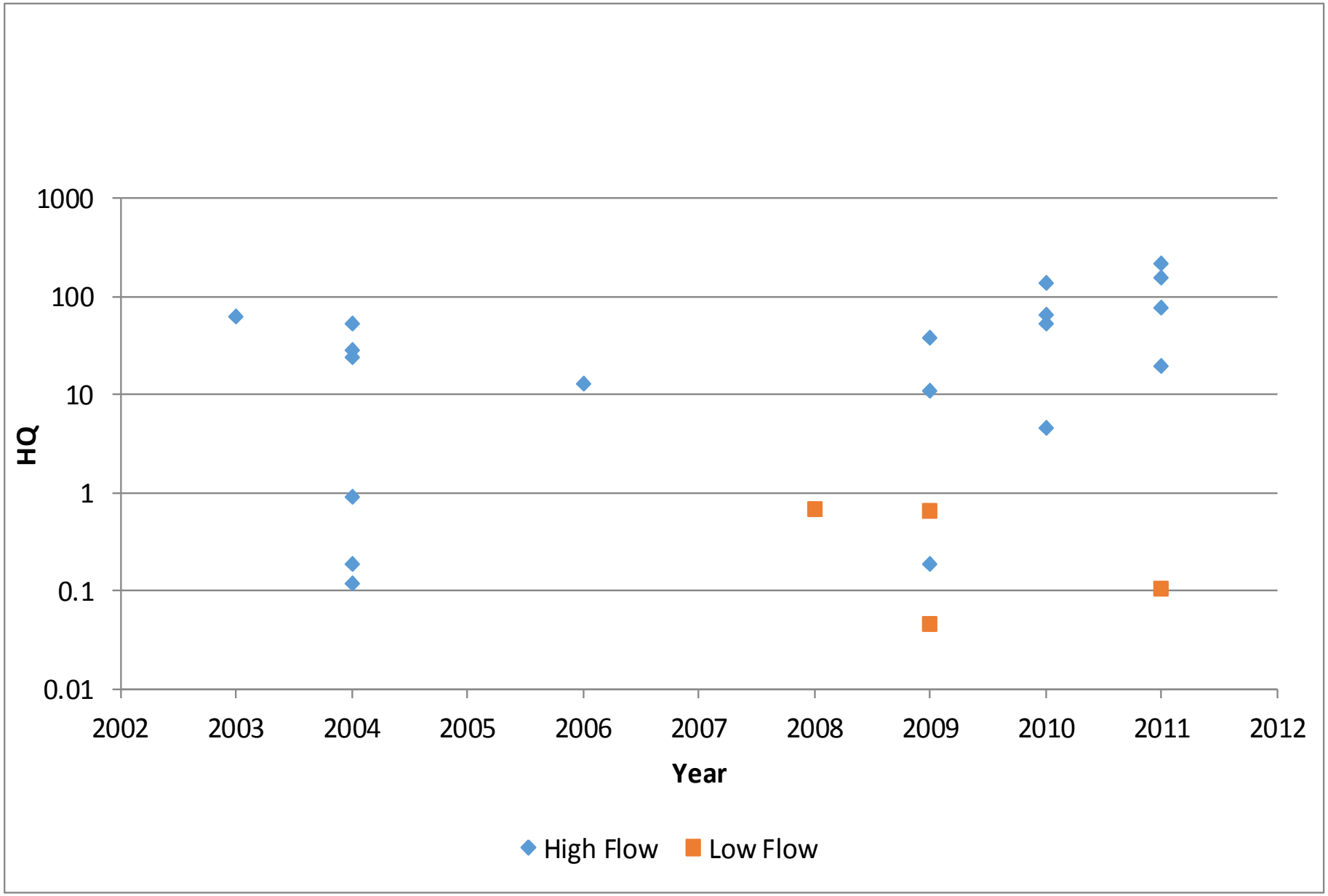

FIGURE 3.3-4 Upper State Land Creek Mainstem Habitat HQs Through Time

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE SPECIFIC ECOLOGICAL RISK ASSESSMENT

DATE: APR 07, 2014
BY: AJ
FOR: RPS

FORMATION ENVIRONMENTAL

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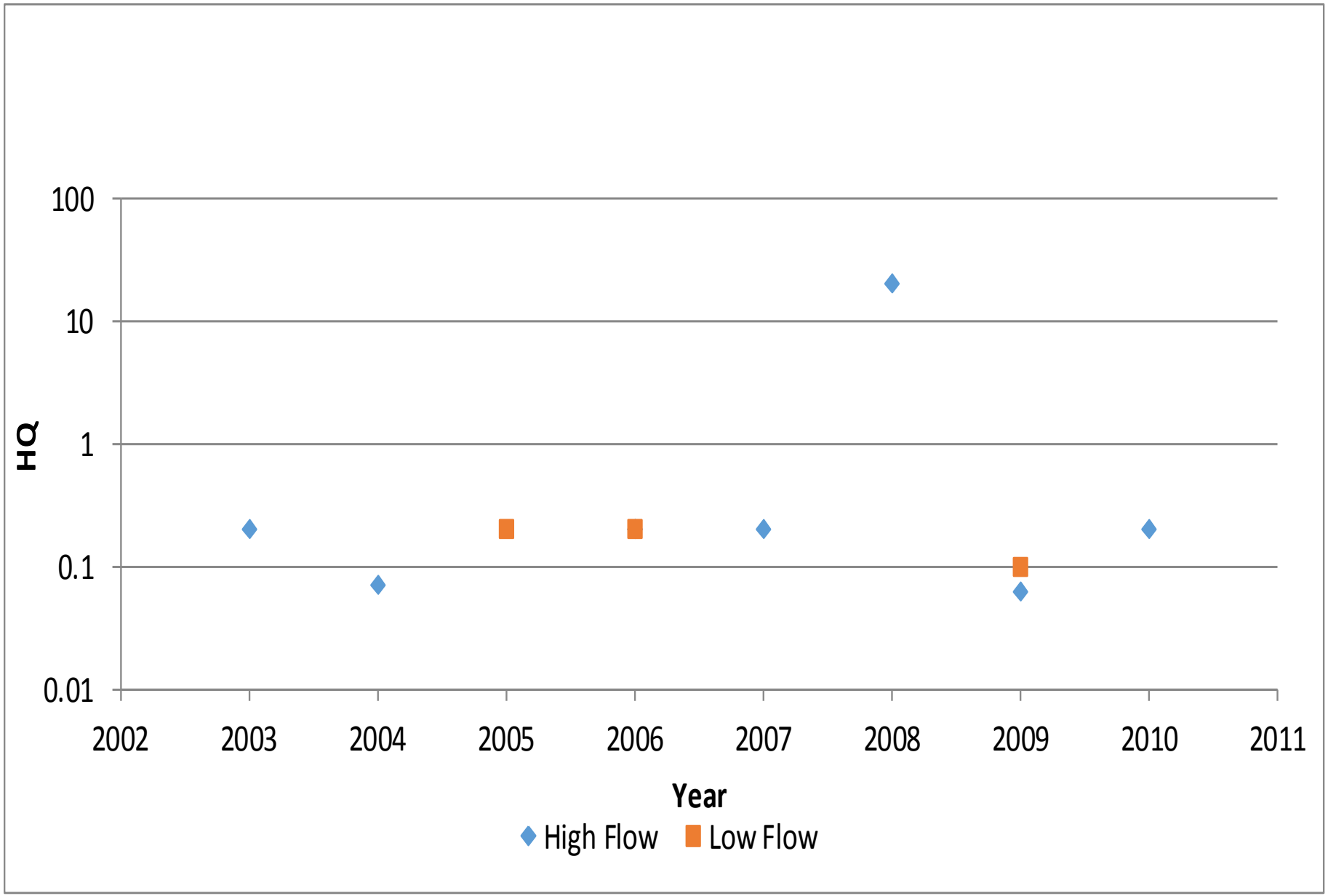


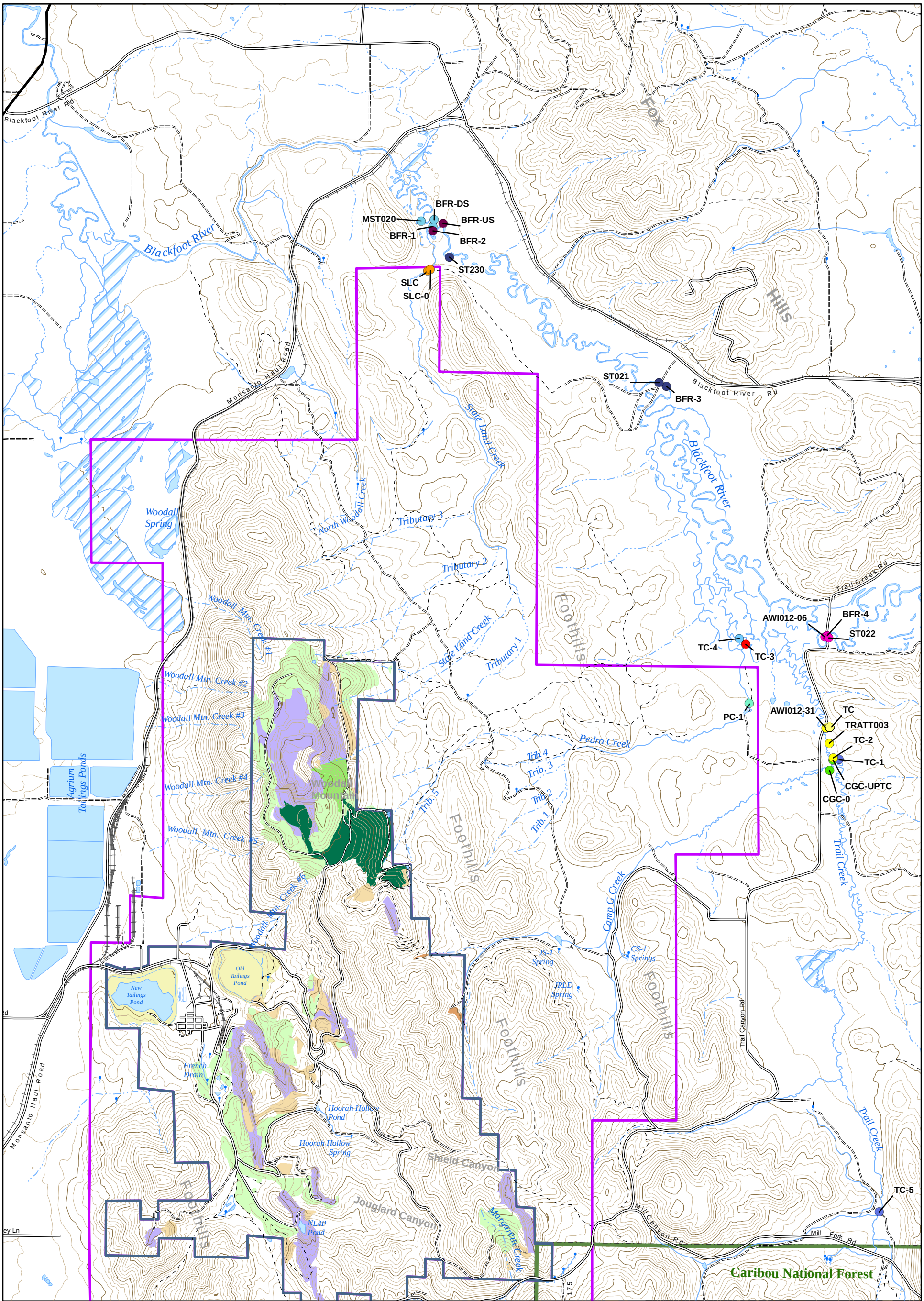
FIGURE 3.3-5 Upper State Land Creek Tributary 1 Habitat HQs Through Time

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE SPECIFIC ECOLOGICAL RISK ASSESSMENT

DATE: APR 07, 2014
BY: AJ
FOR: RPS

FORMATION ENVIRONMENTAL

S:\Jobs\0442-001-900-Simplot-Conda\RIFS_RIreport\RIDataAnalyses_V2\TransportAnalyses\FrenchDrain\FrenchDrain_Boxplot.ppt



Legend

- Major Road
- Minor Road
- Unimproved Road
- Trail (4WD)
- Trail (Other than 4WD)
- Railroad
- Intemittent Stream
- Perennial Stream
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Mine Area
- Non-Mine Area

Offsite Monitoring Locations

- Trail Creek U/S of Camp G
- Camp G Creek Mouth
- Trail Creek D/S of Camp G
- Trail Creek U/S of Pedro
- Pedro Creek Mouth
- Trail Creek D/S of Pedro
- Blackfoot River U/S of Trail
- Blackfoot River D/S of Trail
- Blackfoot River U/S of State Land
- State Land Creek Mouth
- Blackfoot River D/S of State Land

N

0 2,500 5,000
Feet

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 3.4-1

CONDA OFFSITE LOCATIONS

DATE: MAR 29, 2016
BY: EJS
FOR: SMC

FORMATION ENVIRONMENTAL

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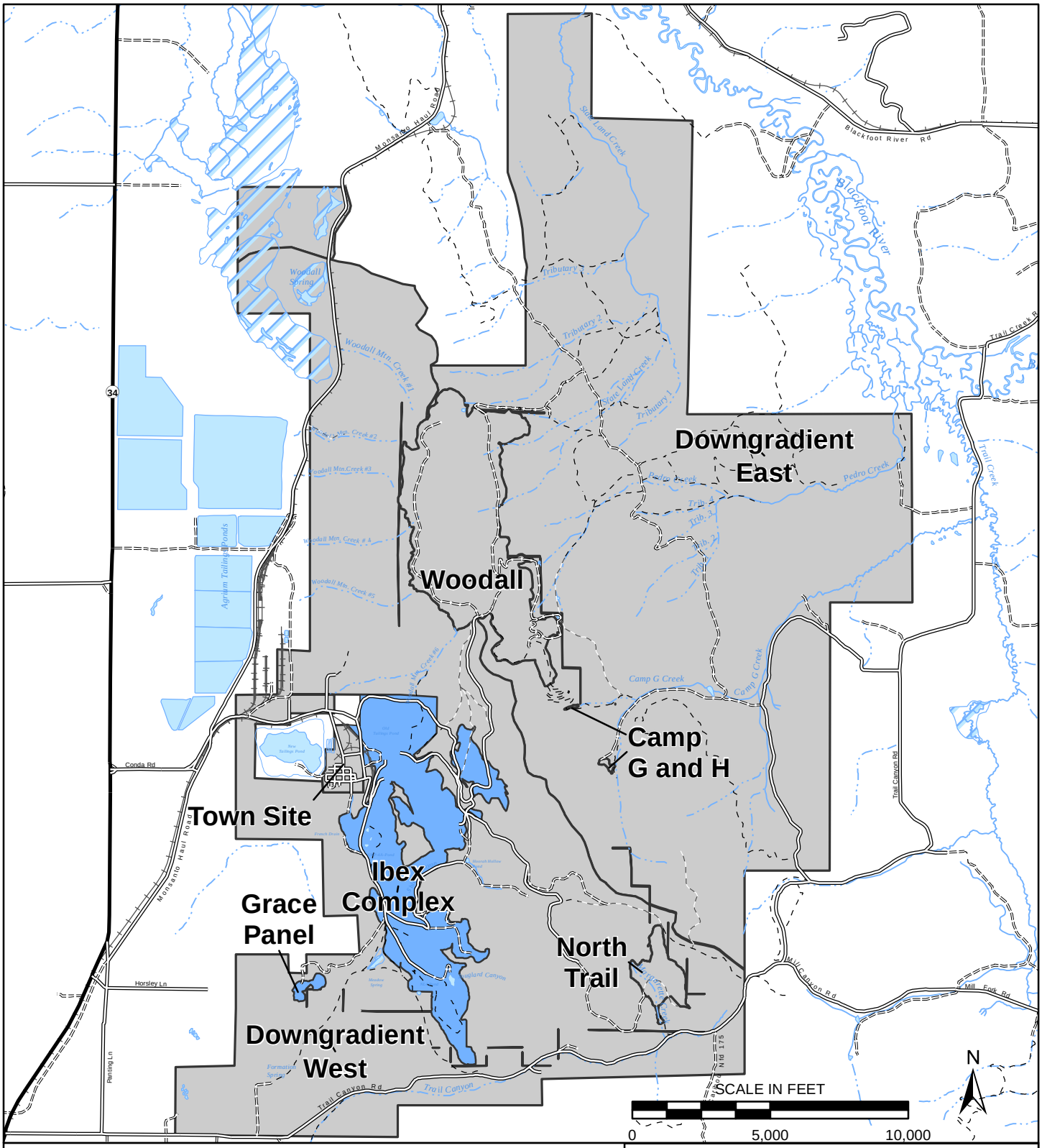

Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-1

UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
CADMIUM; DEER MOUSE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

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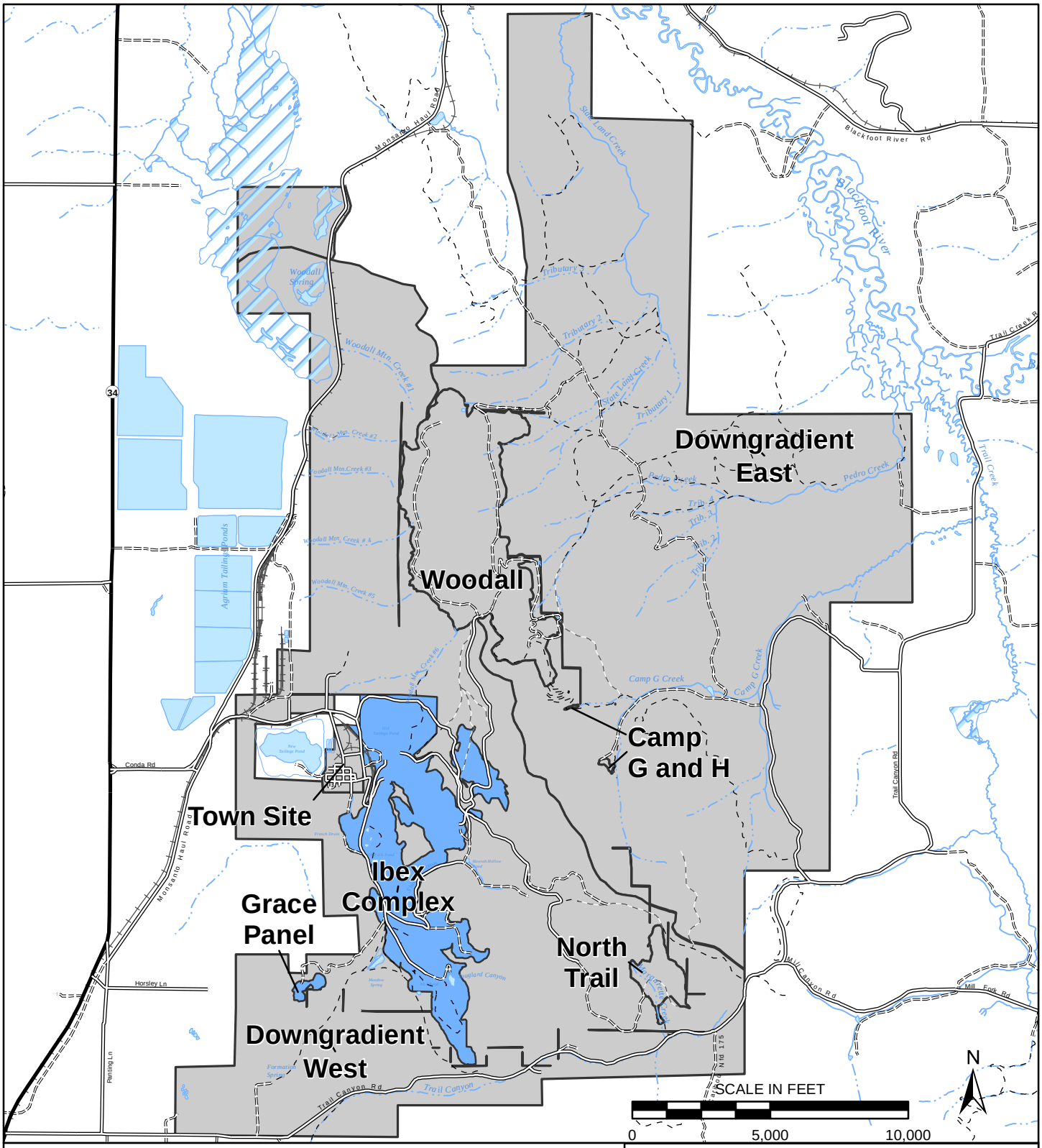


Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-2

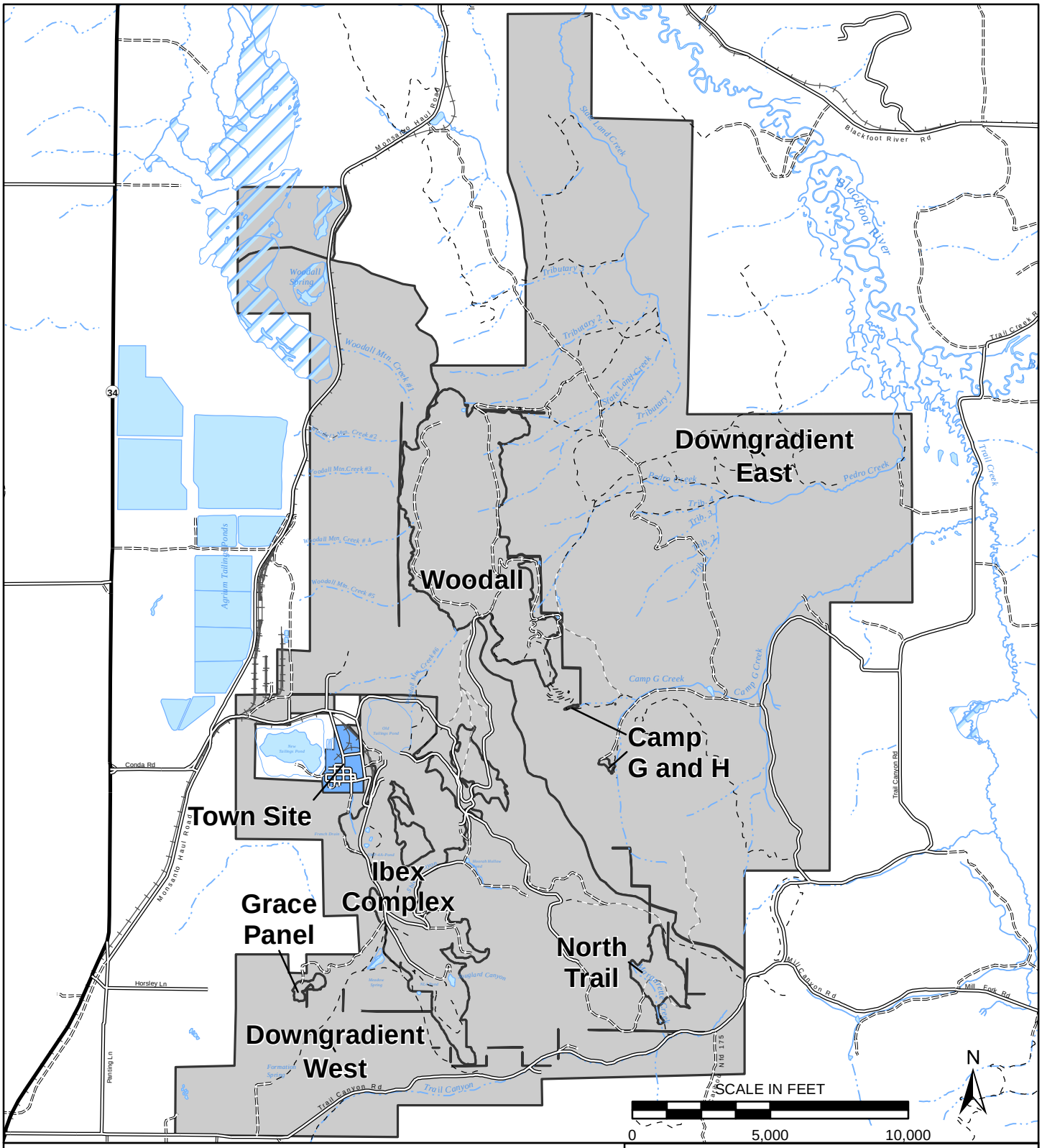
UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
CHROMIUM; AMERICAN ROBIN

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_02_Chromium_American_Robin.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-3

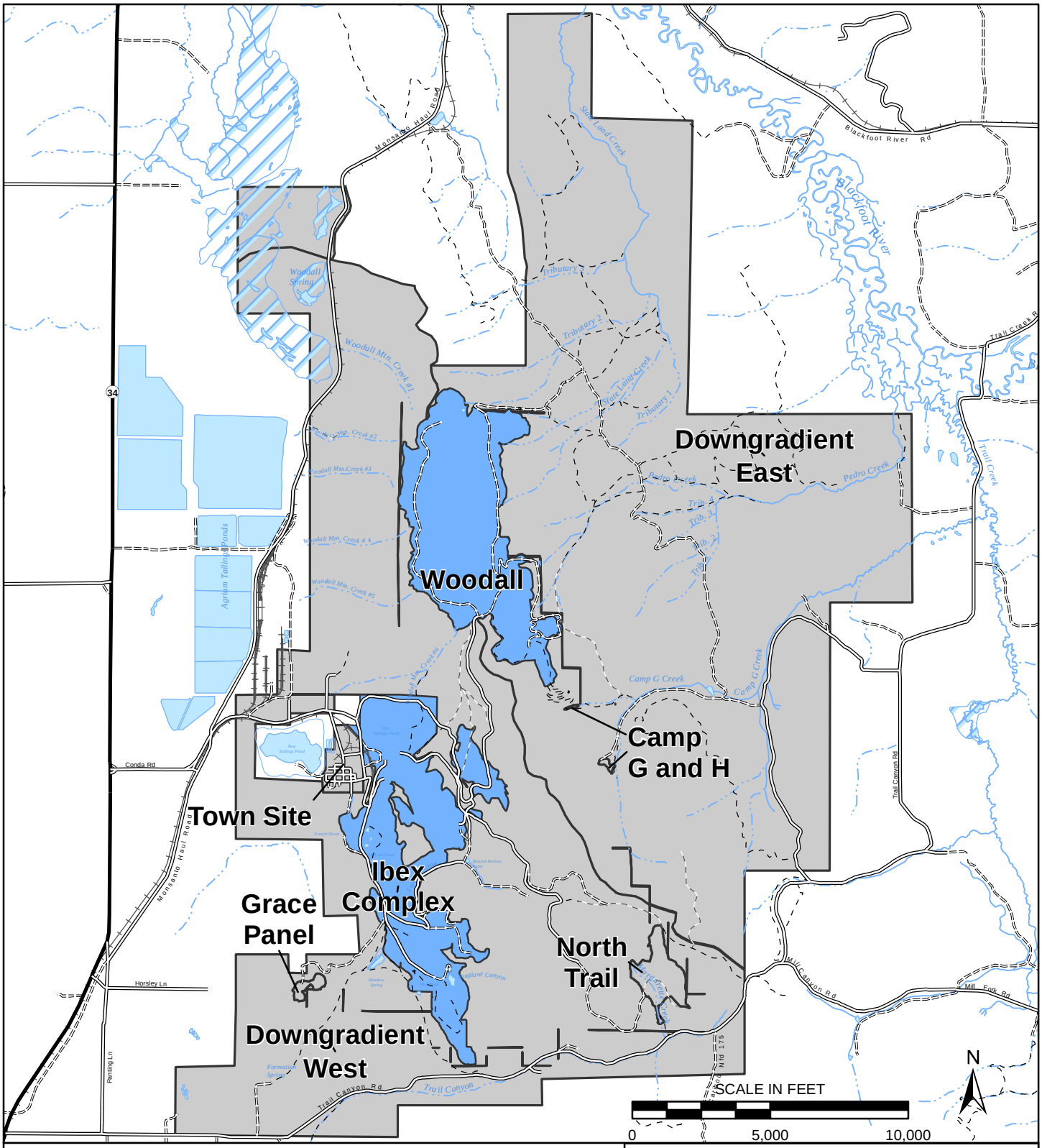
UPLAND TIER 1 HAZARD QUOTIENTS 95UCL EXPOSURE BY EU LEAD; AMERICAN ROBIN

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_03_Lead_American_Robin.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-4

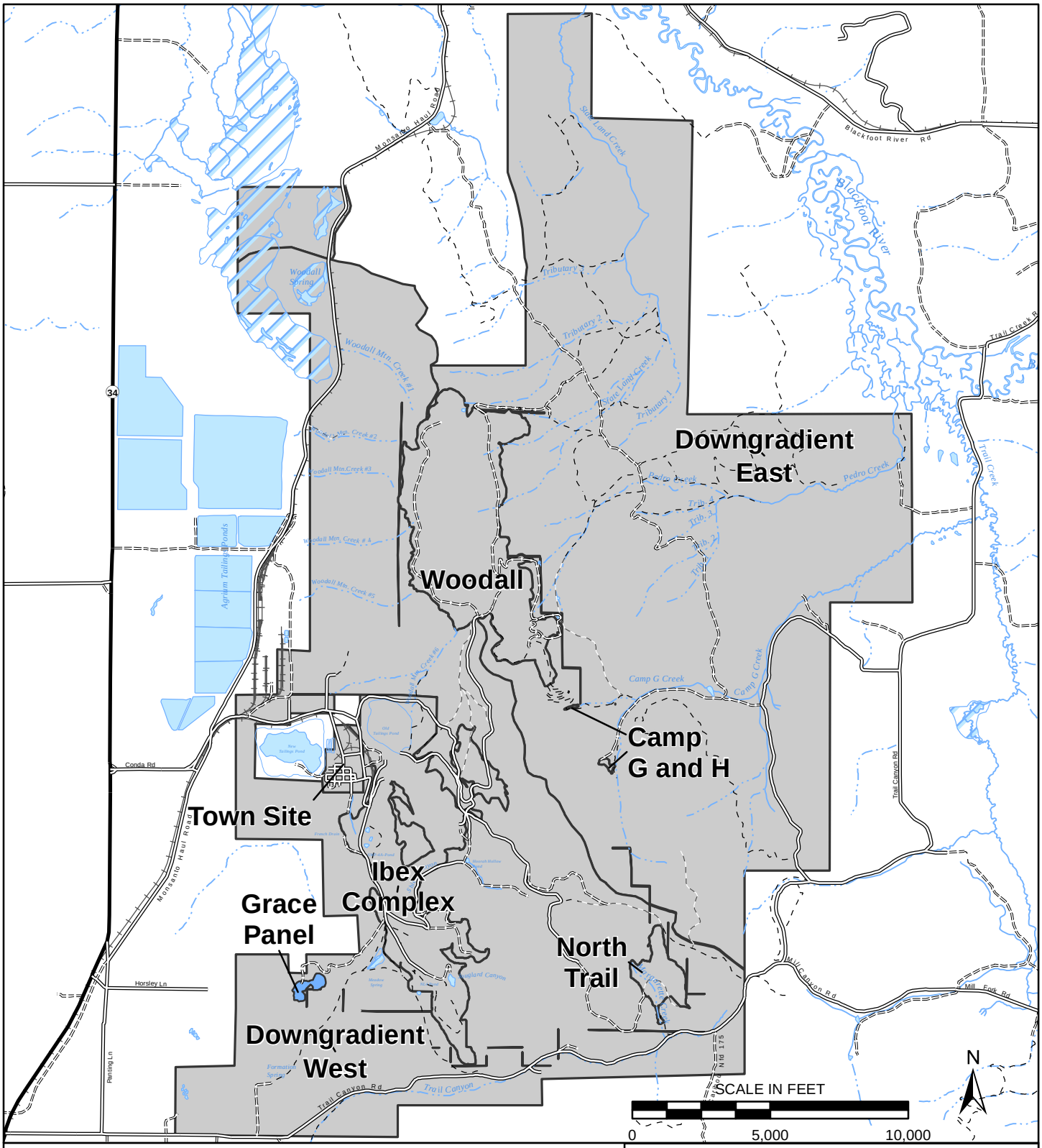
UPLAND TIER 1 HAZARD QUOTIENTS 95UCL EXPOSURE BY EU MOLYBDENUM; DEER MOUSE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_04_Molybdenum_Deer_Mouse.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-5

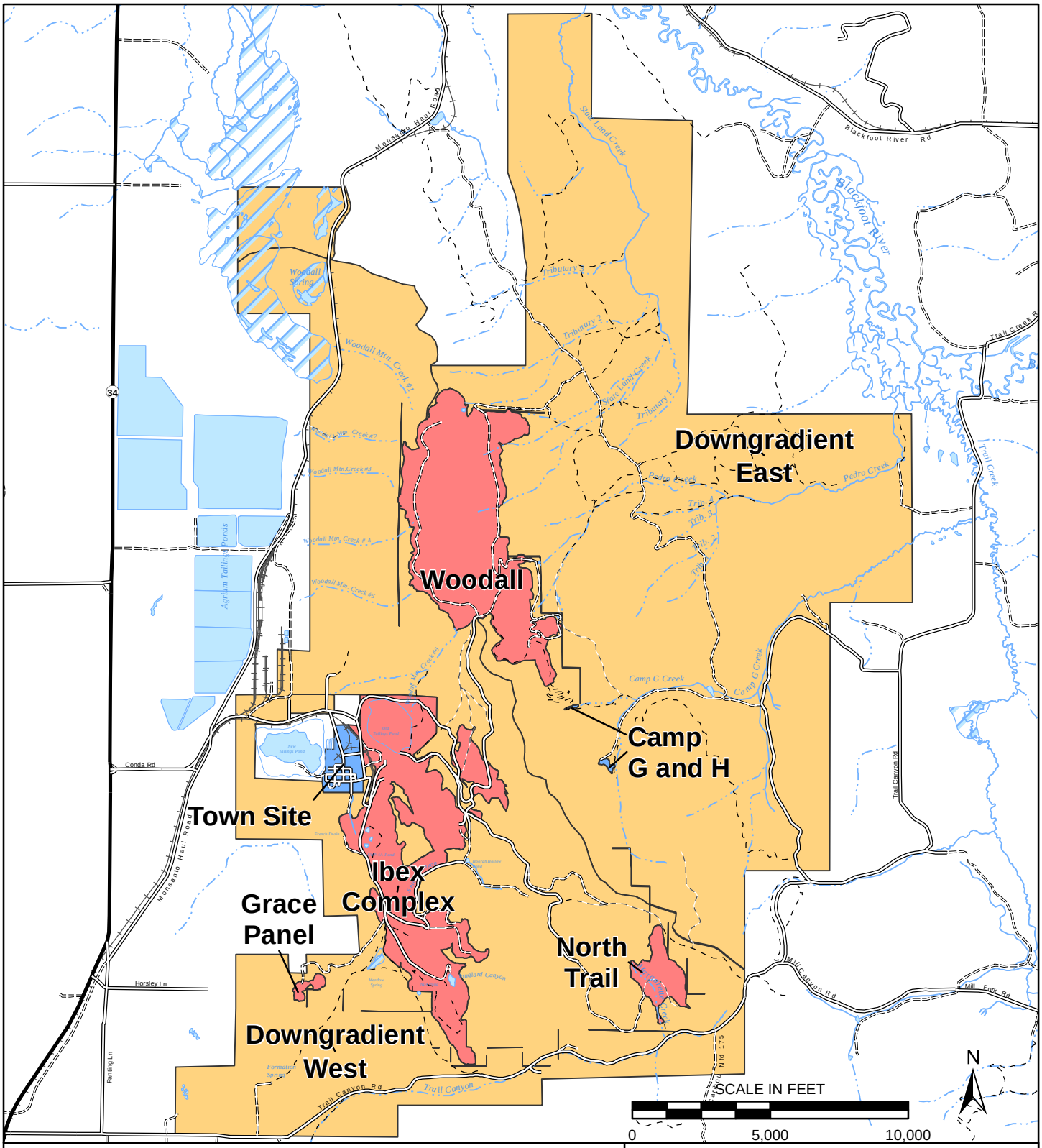
UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
NICKEL; DEER MOUSE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_05_Nickel_Deer_Mouse.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-6

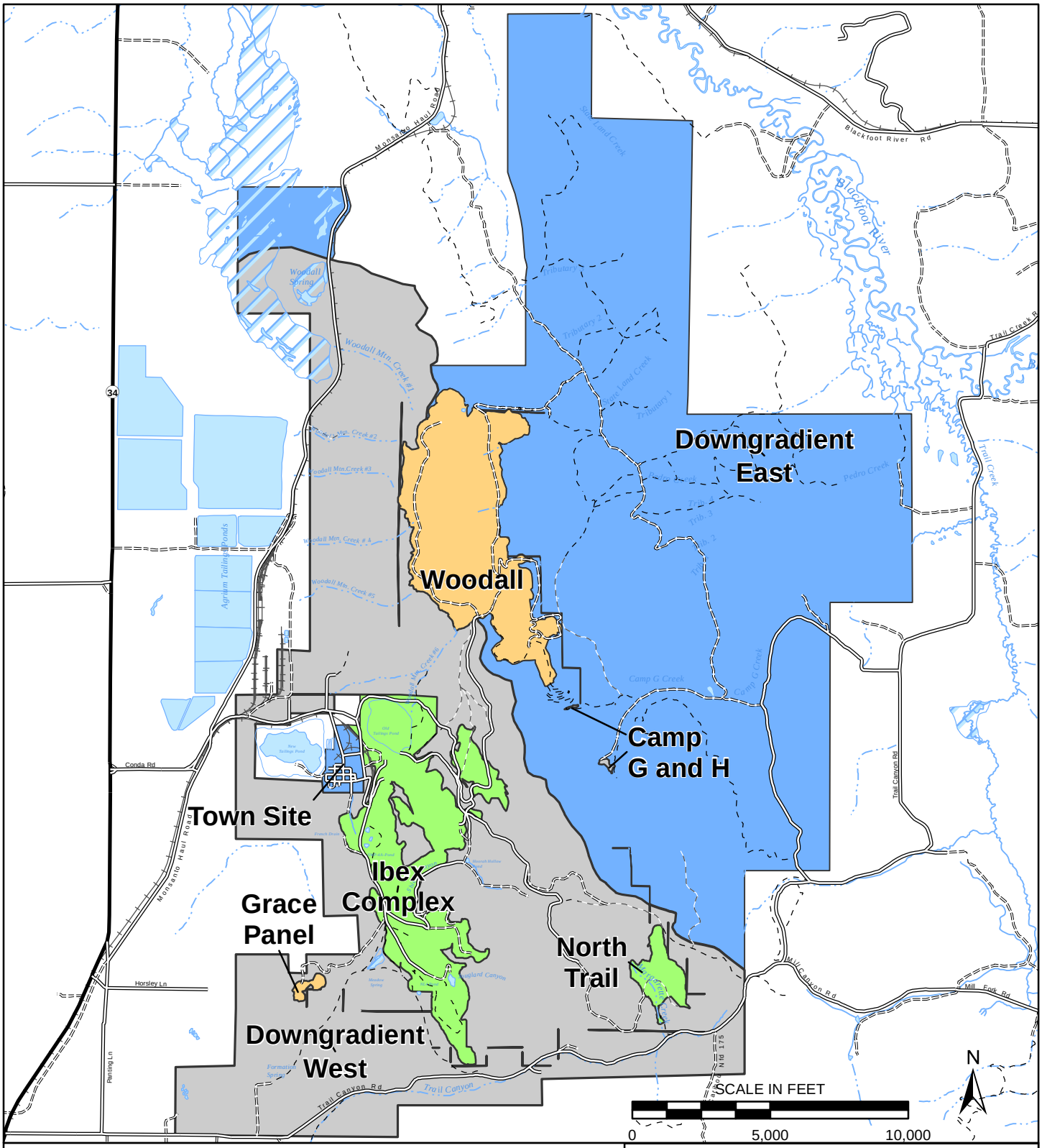
UPLAND TIER 1 HAZARD QUOTIENTS 95UCL EXPOSURE BY EU SELENIUM; AMERICAN ROBIN

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_06_Selenium_American_Robin.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-7

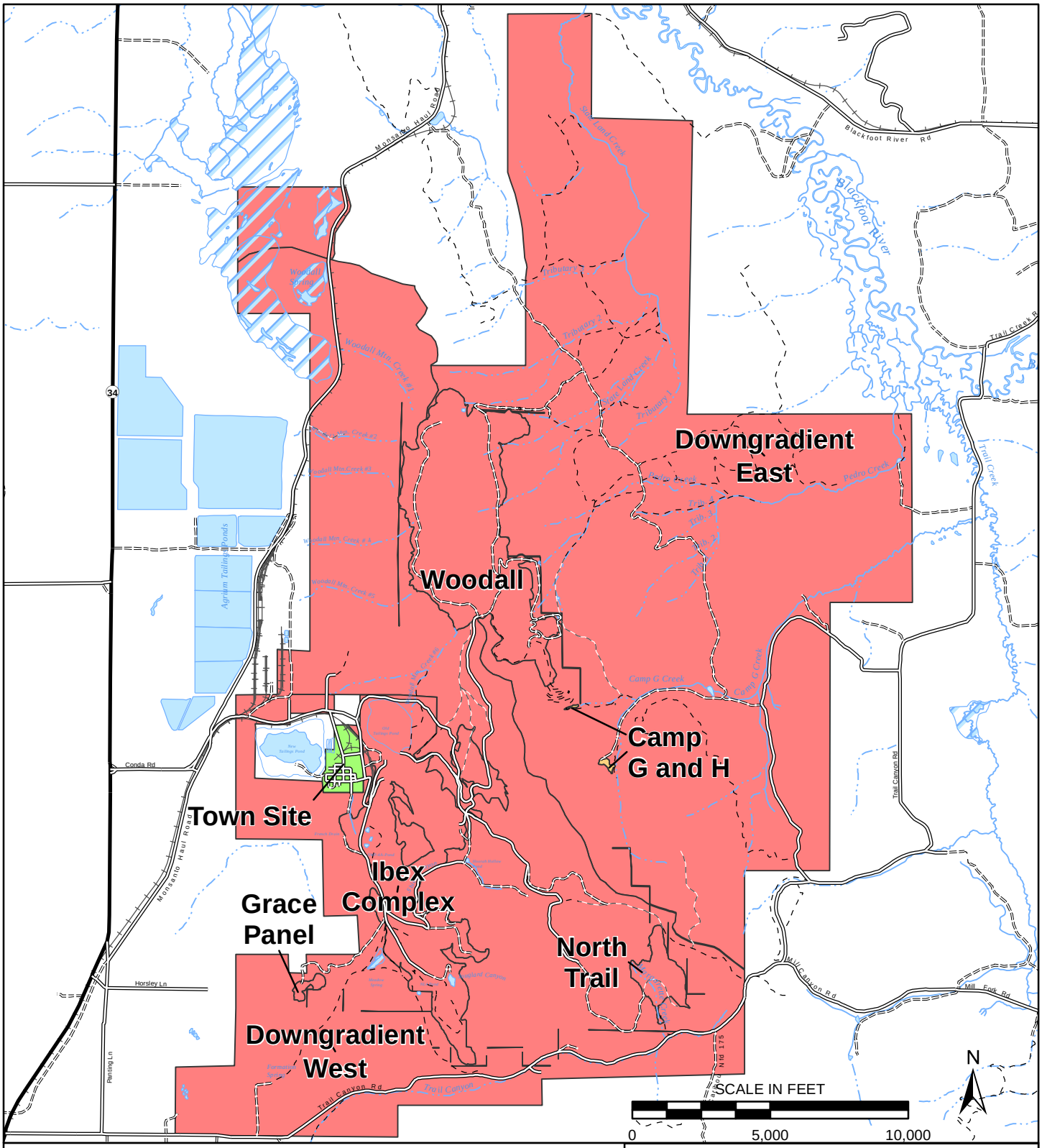
UPLAND TIER 1 HAZARD QUOTIENTS 95UCL EXPOSURE BY EU SELENIUM; COYOTE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_07_Selenium_Coyote.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-8

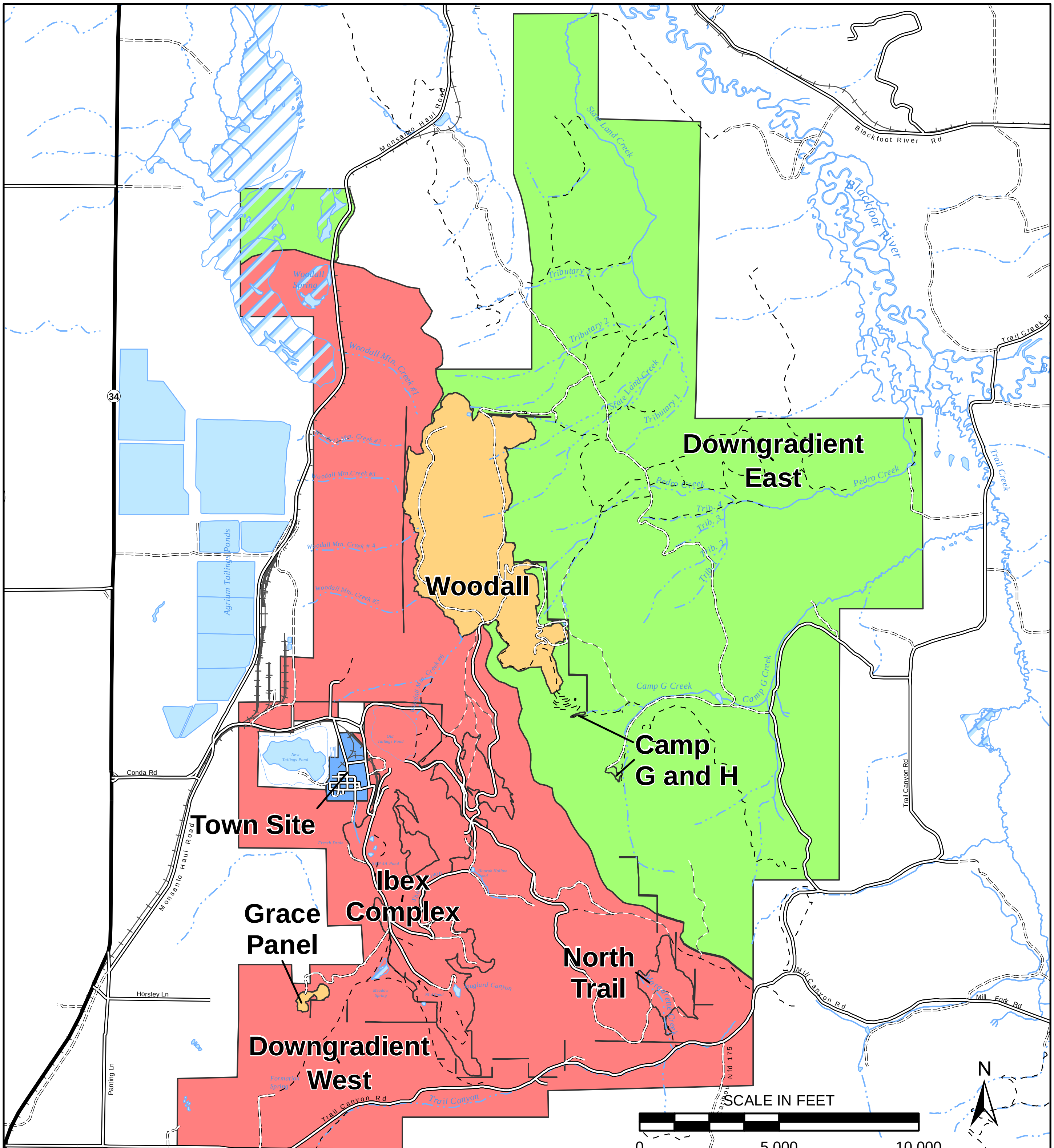
UPLAND TIER 1 HAZARD QUOTIENTS 95UCL EXPOSURE BY EU SELENIUM; DEER MOUSE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_08_Selenium_Deer_Mouse.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-9

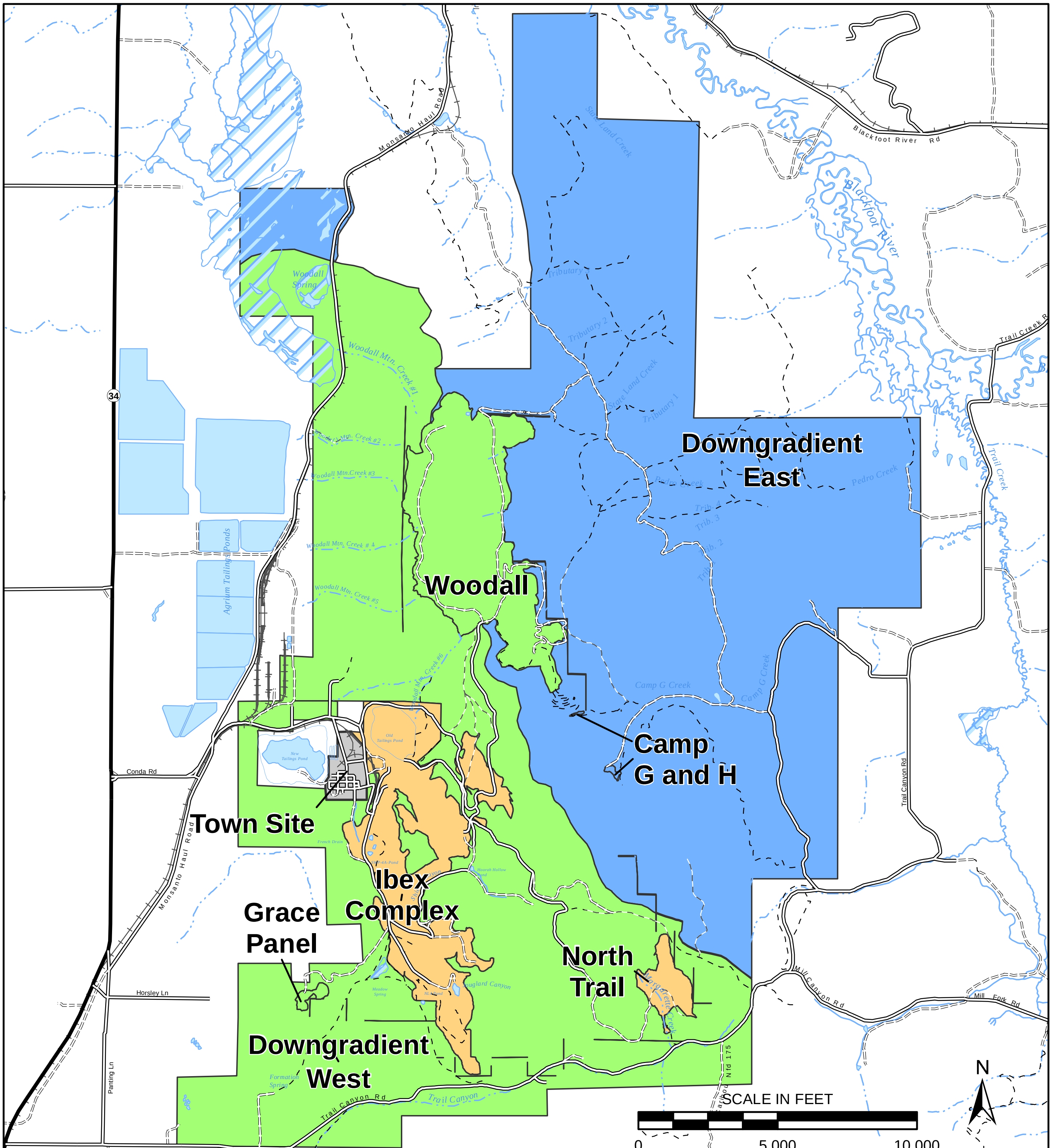
UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
SELENIUM; EASTERN COTTONTAIL

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_09_Selenium_Eastern_Cottontail.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

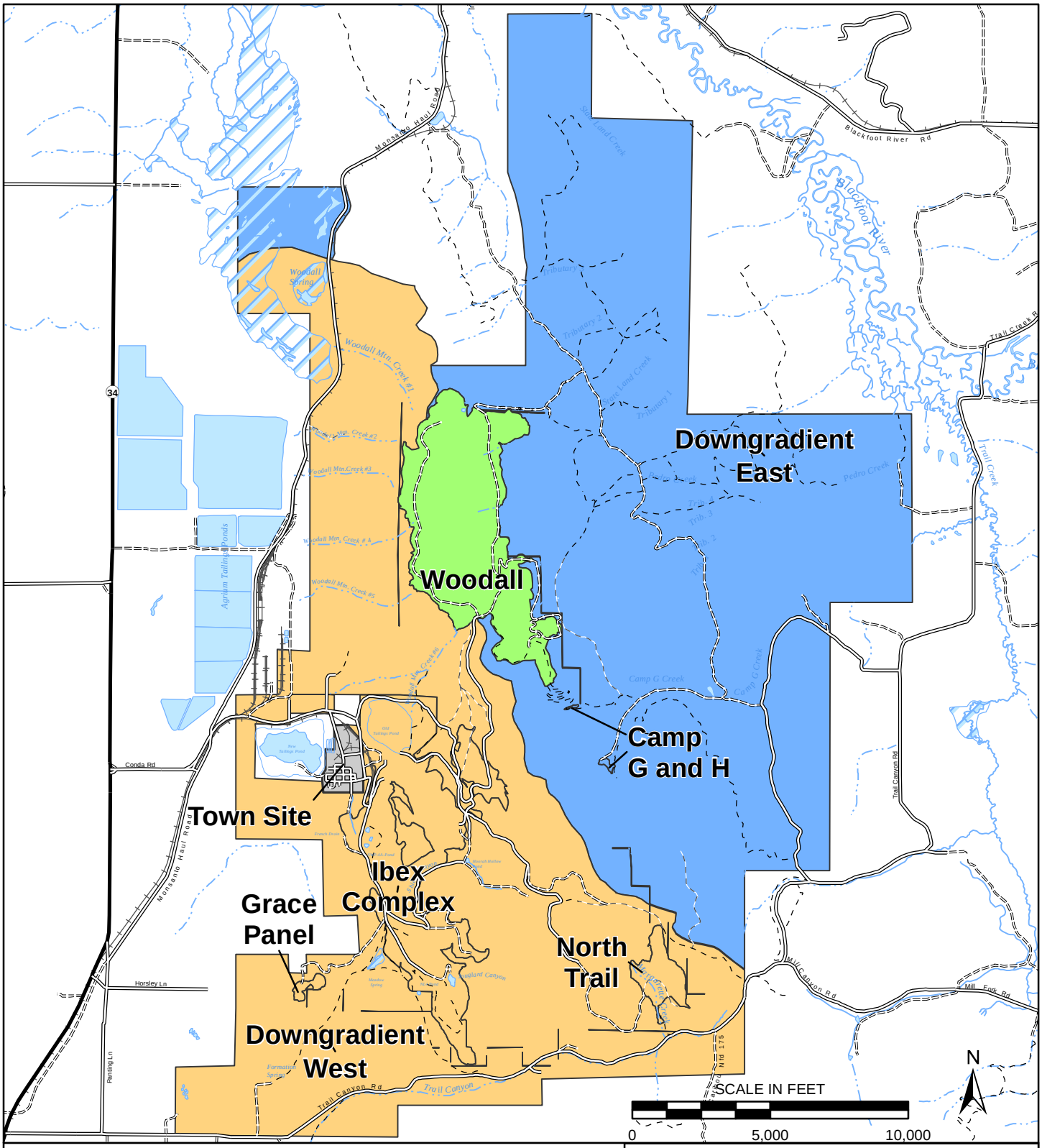
FIGURE 4.3-10

UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
SELENIUM; MULE DEER

DATE: MAR 22, 2016
BY: CRL
FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_10_Selenium_Mule_Deer.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

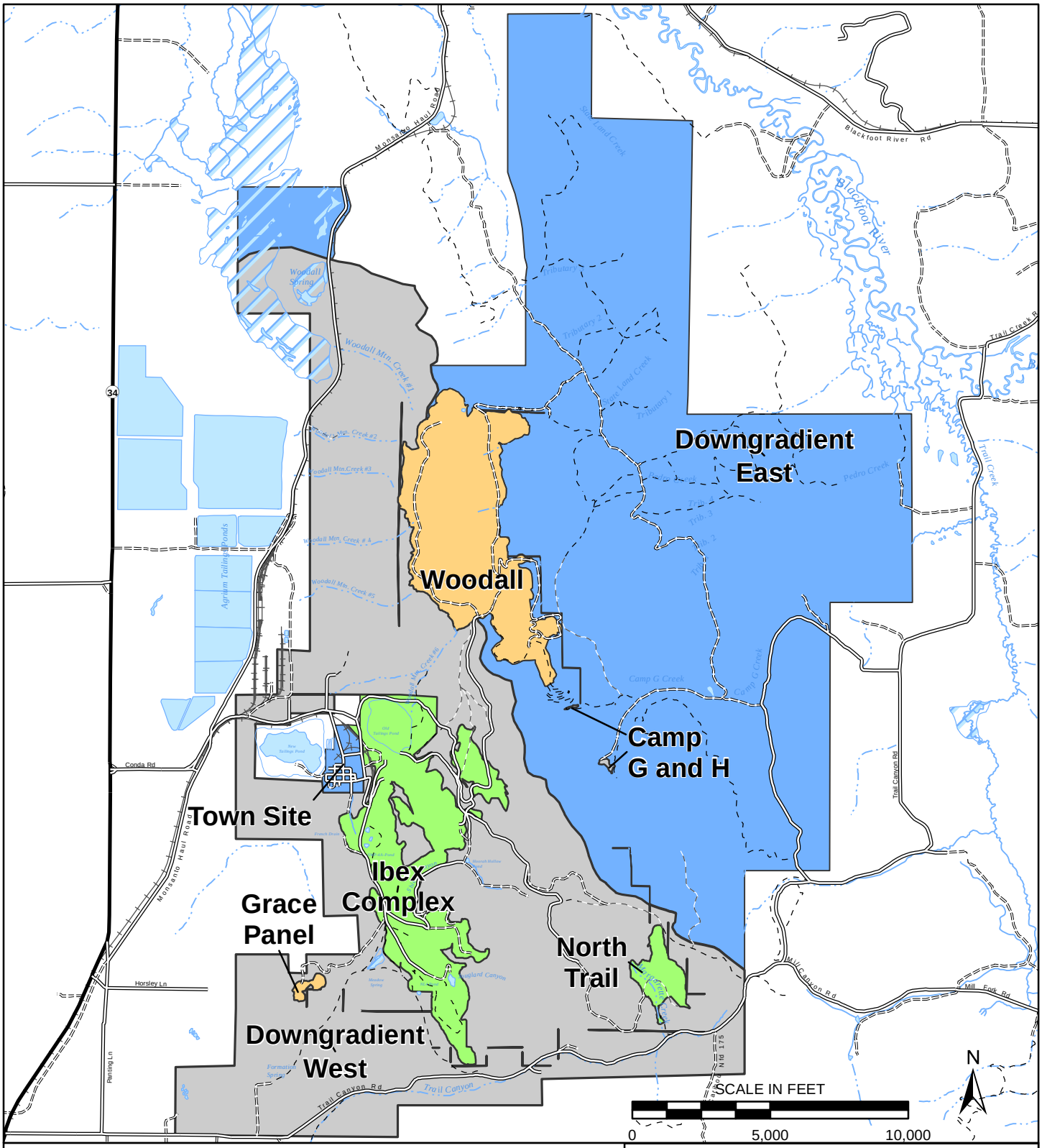
J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-11

UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
SELENIUM; NORTHERN BOBWHITE

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_11_Selenium_Northern_Bobwhite.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

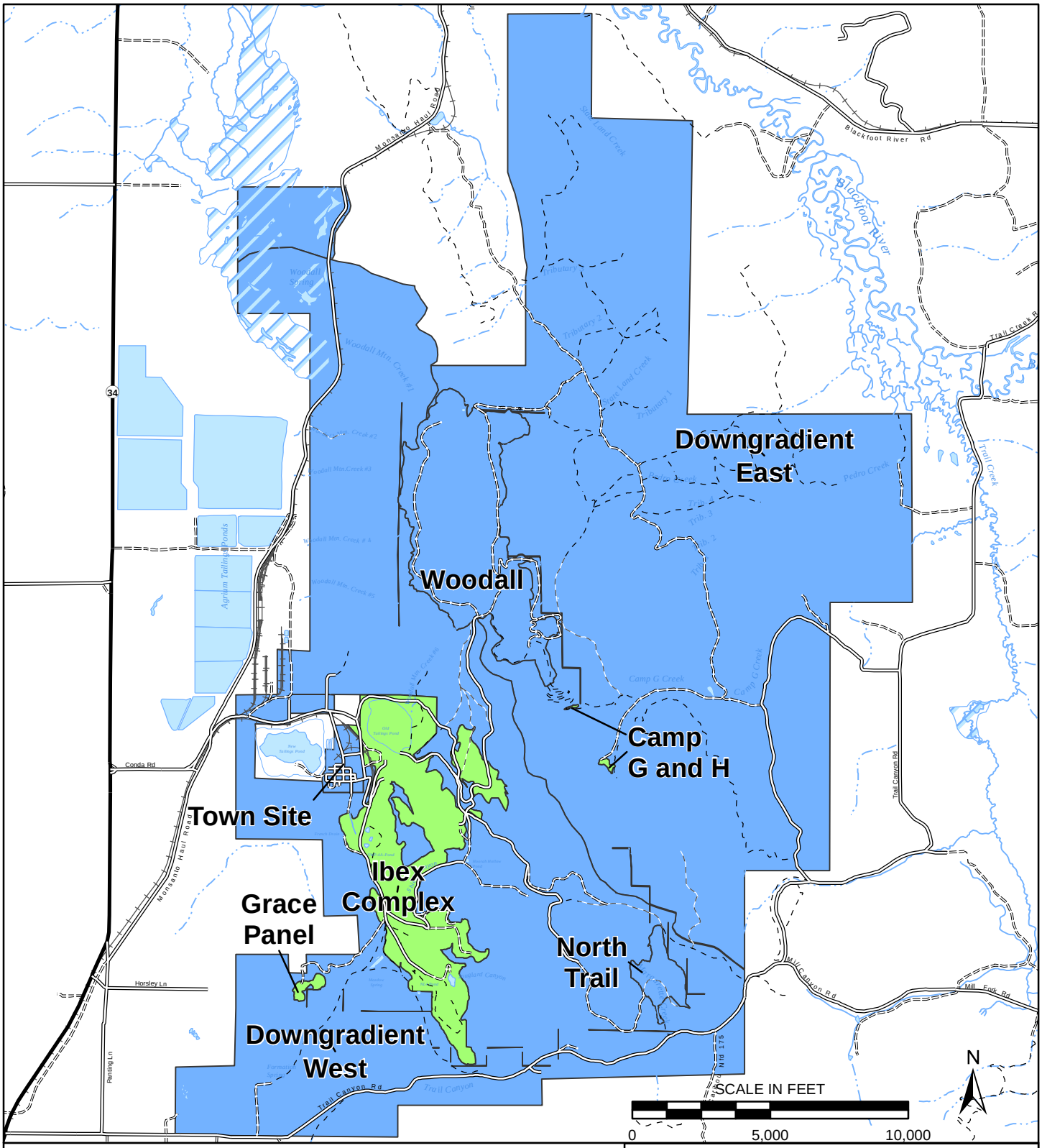
J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-12

UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
SELENIUM; NORTHERN HARRIER

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_12_Selenium_Northern_Harrier.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-13

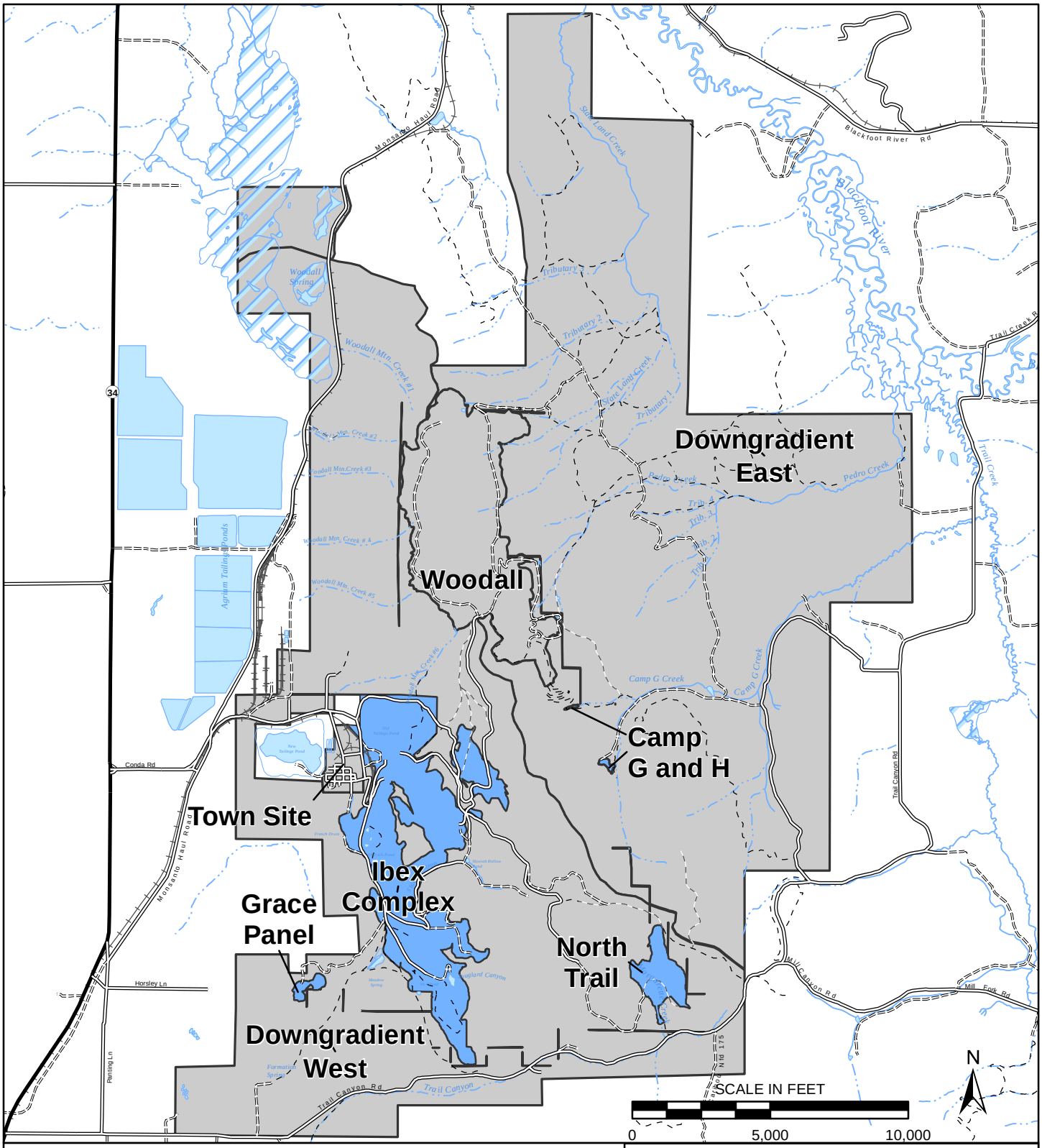
UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
VANADIUM; AMERICAN ROBIN

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_13_Vanadium_American_Robin.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-14

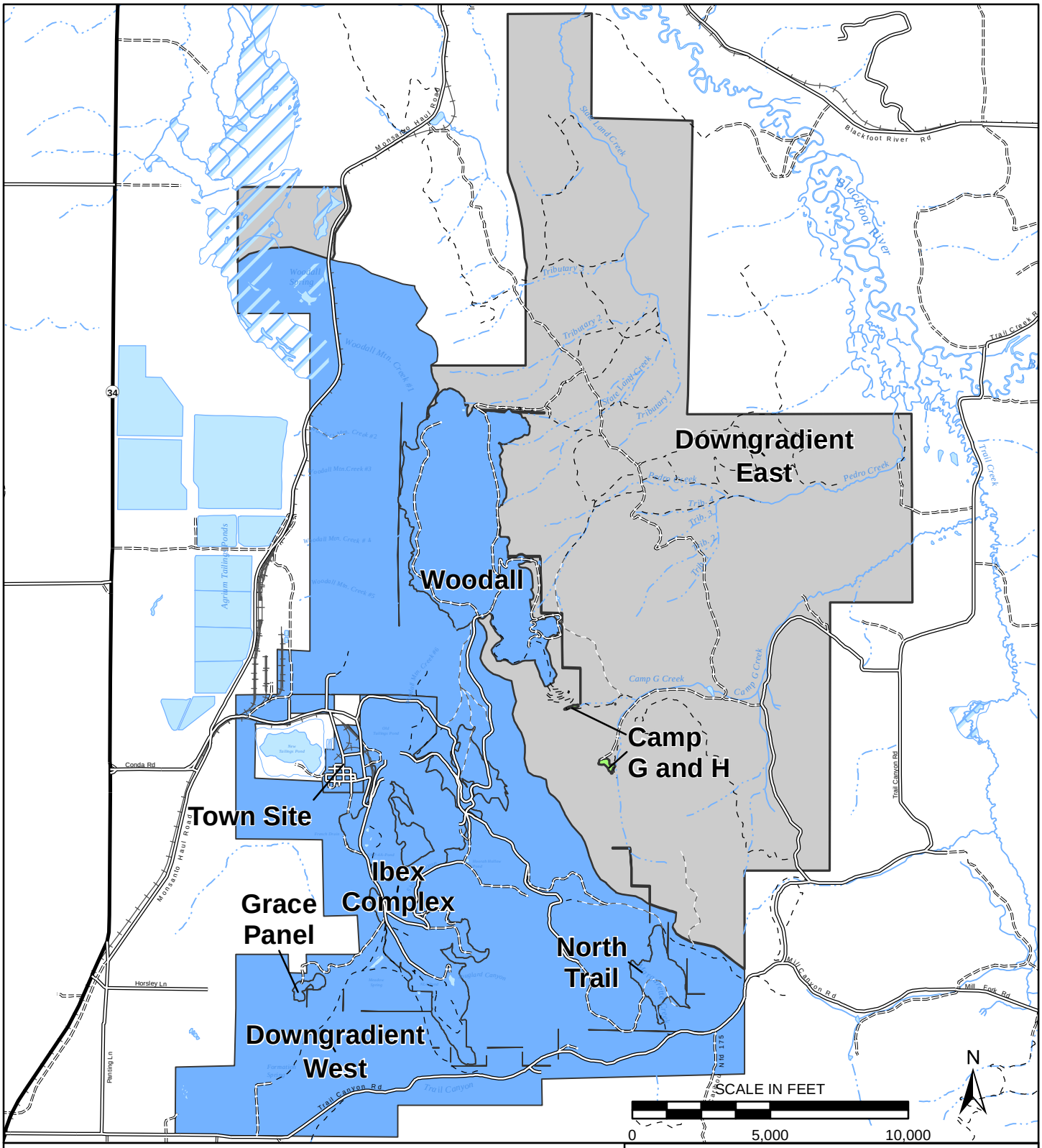
UPLAND TIER 1 HAZARD QUOTIENTS 95UCL EXPOSURE BY EU VANADIUM; DEER MOUSE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_14_Vanadium_Deer_Mouse.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

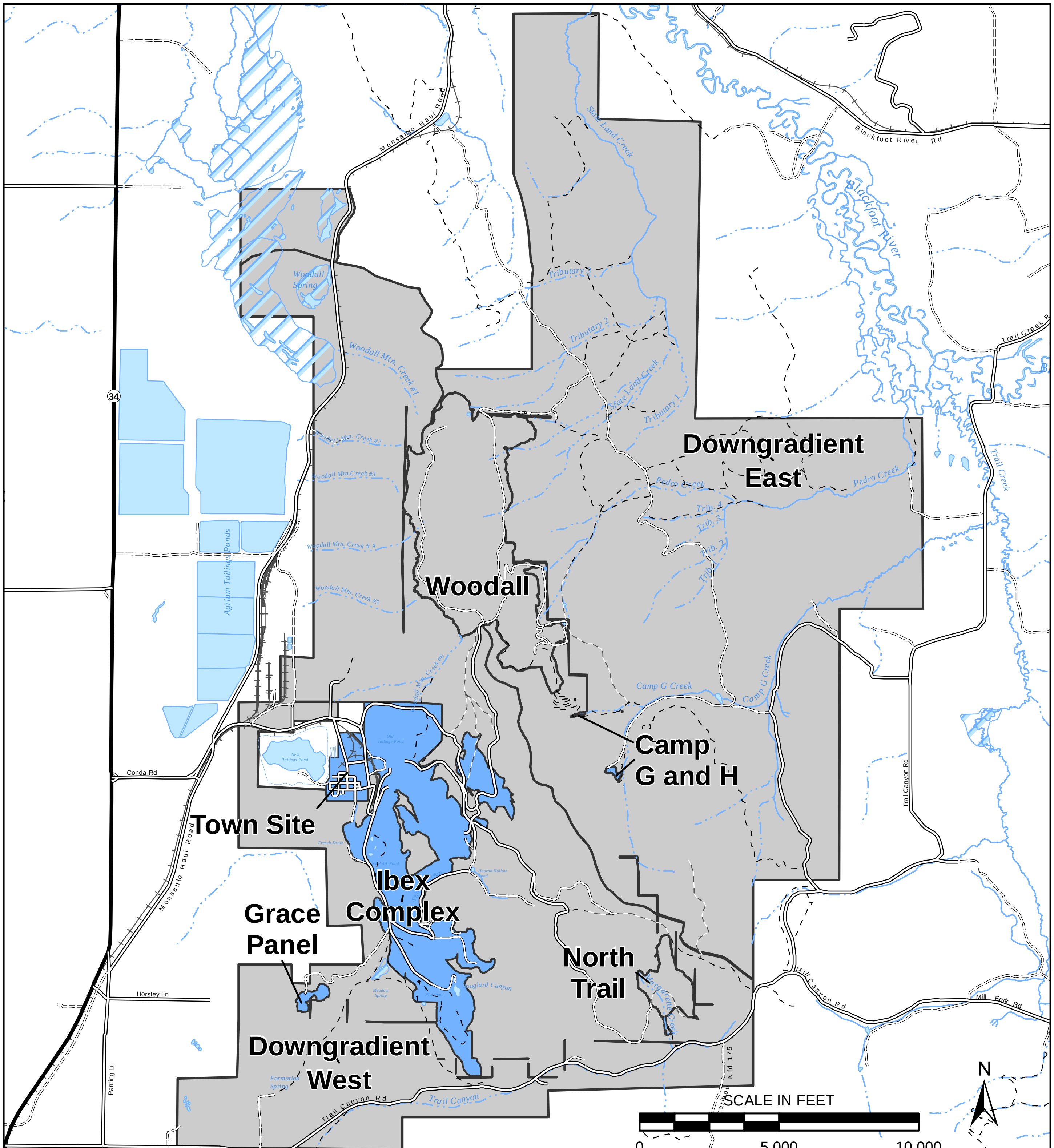
J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-15

UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
VANADIUM; NORTHERN BOBWHITE

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_15_Vanadium_Northern_Bobwhite.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

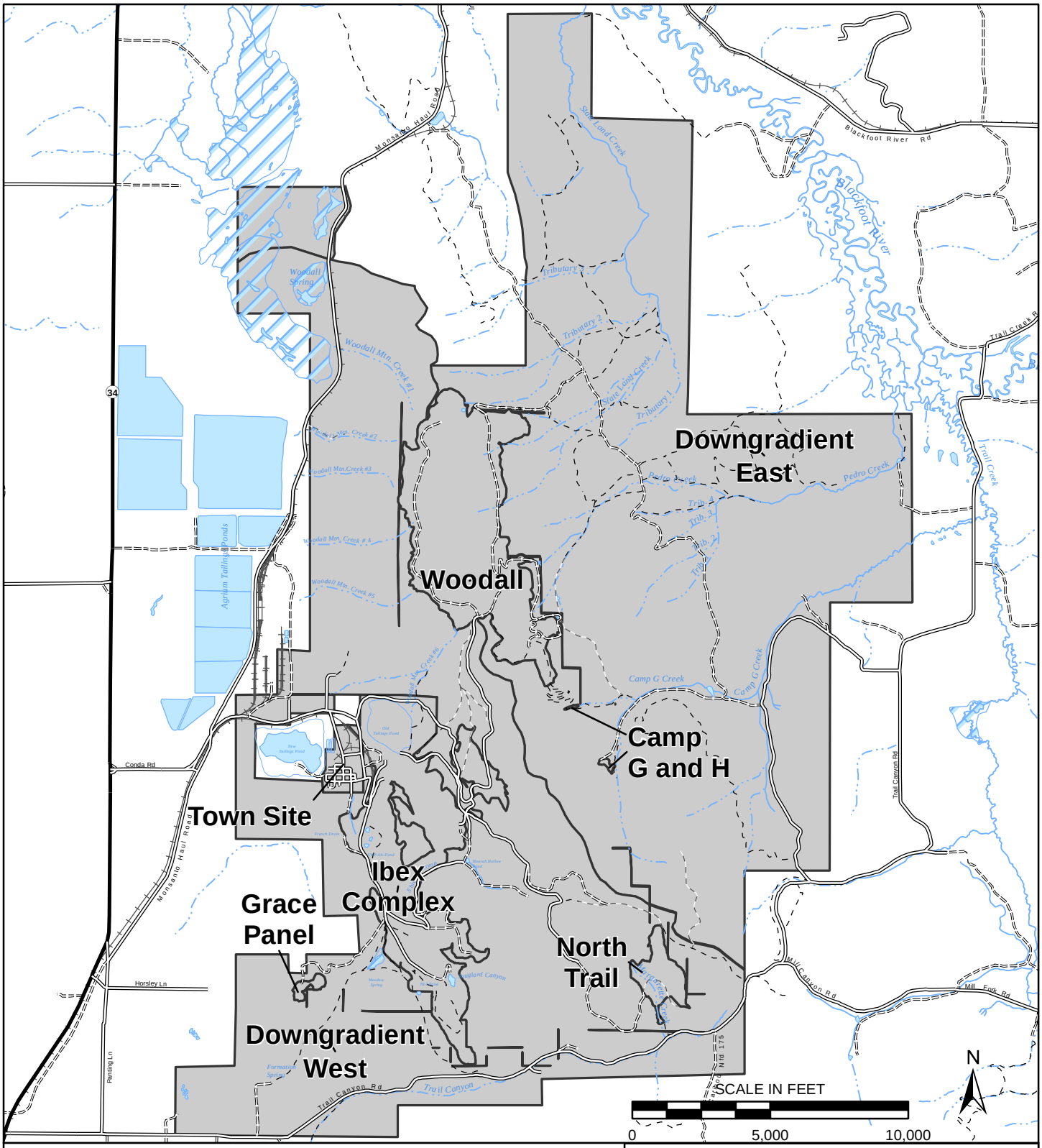
FIGURE 4.3-16

UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
VANADIUM; NORTHERN HARRIER

DATE: MAR 22, 2016
BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RiA_2015\SERA\Fig4_3_16_Vanadium_Northern_Harrier.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-17

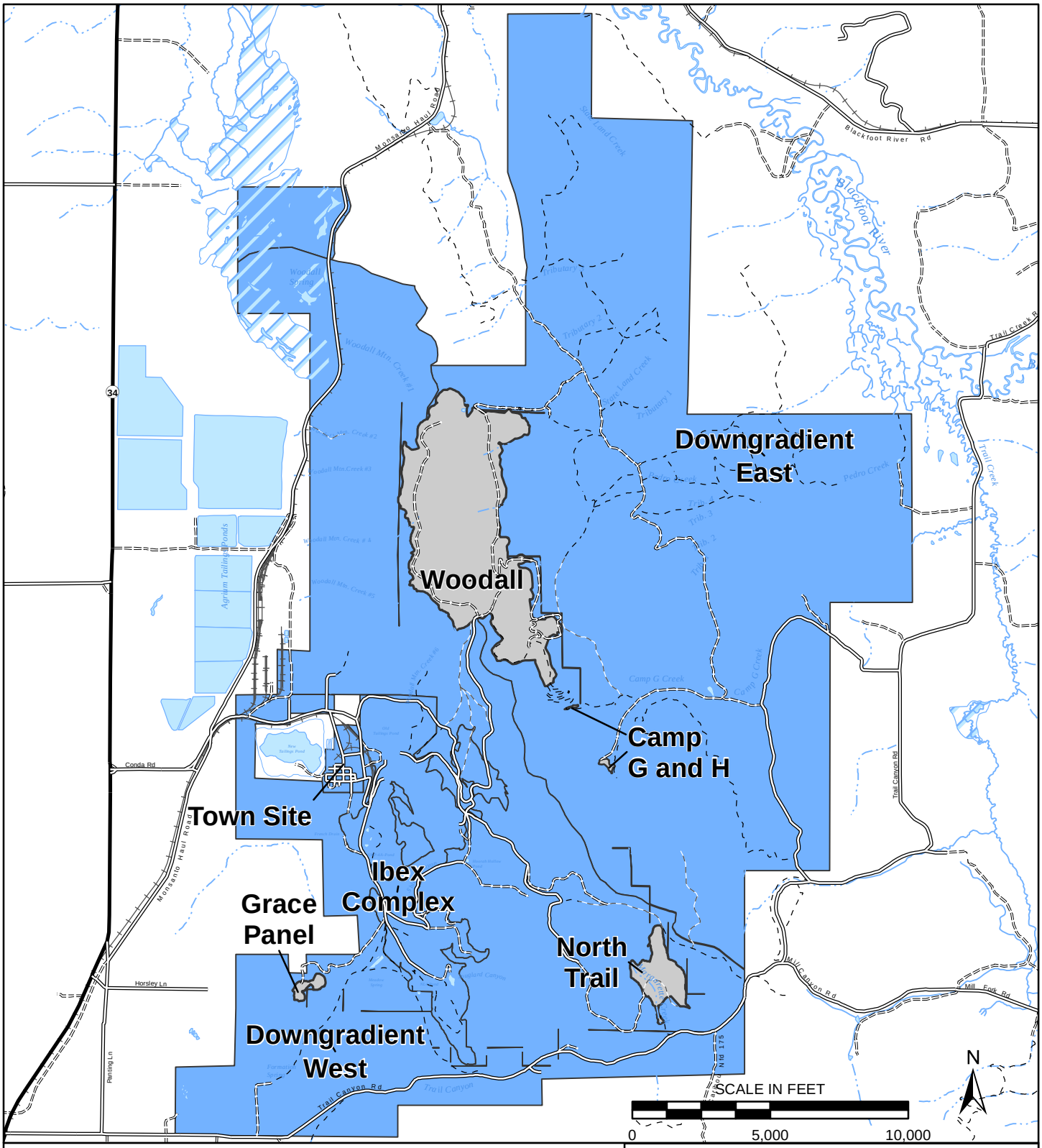
UPLAND TIER 1 HAZARD QUOTIENTS 95UCL EXPOSURE BY EU ZINC; AMERICAN ROBIN

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_17_Zinc_American_Robin.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-18

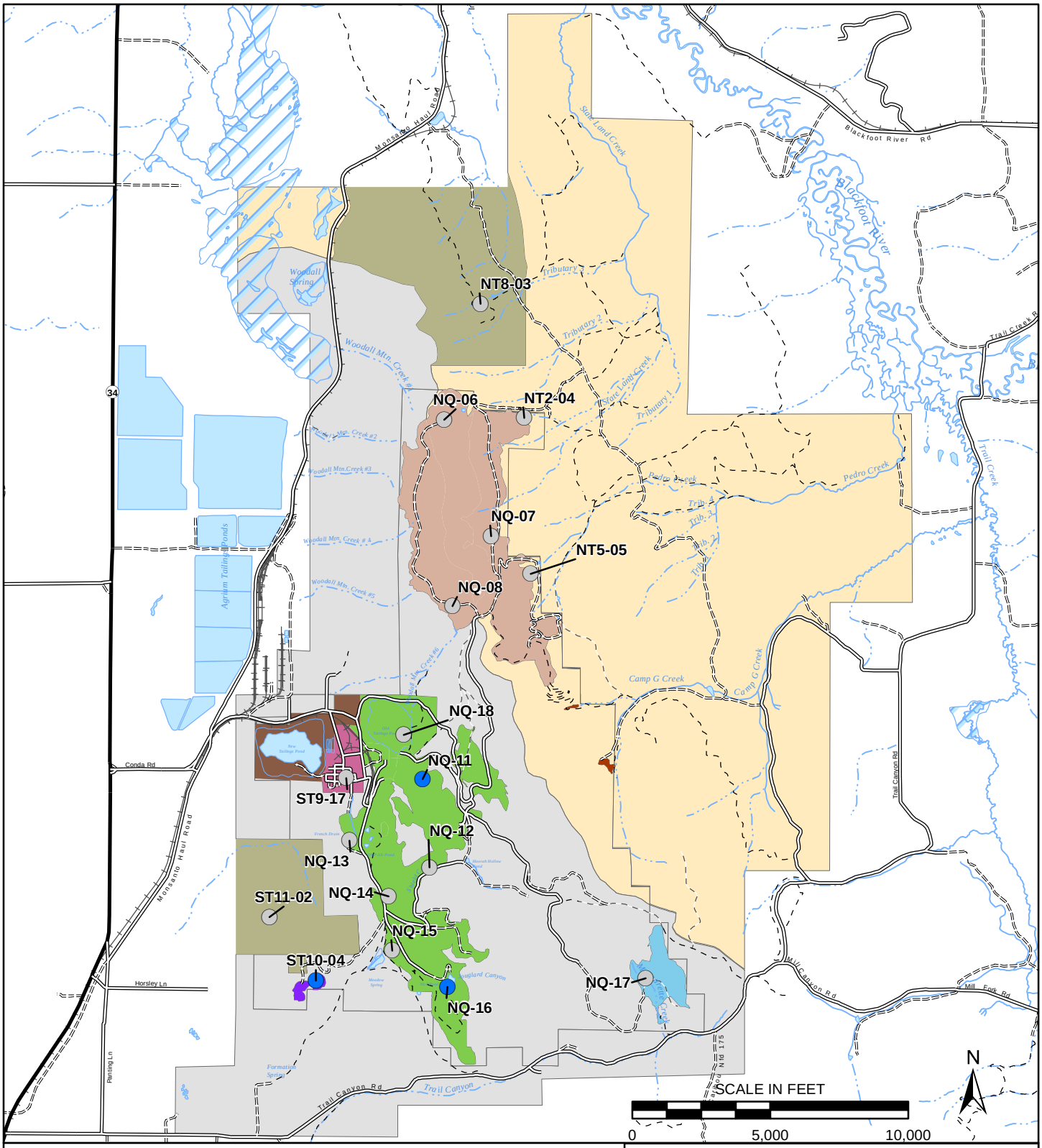
UPLAND TIER 1
HAZARD QUOTIENTS
95UCL EXPOSURE BY EU
ZINC; NORTHERN HARRIER

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_18_Zinc_Northern_Harrier.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

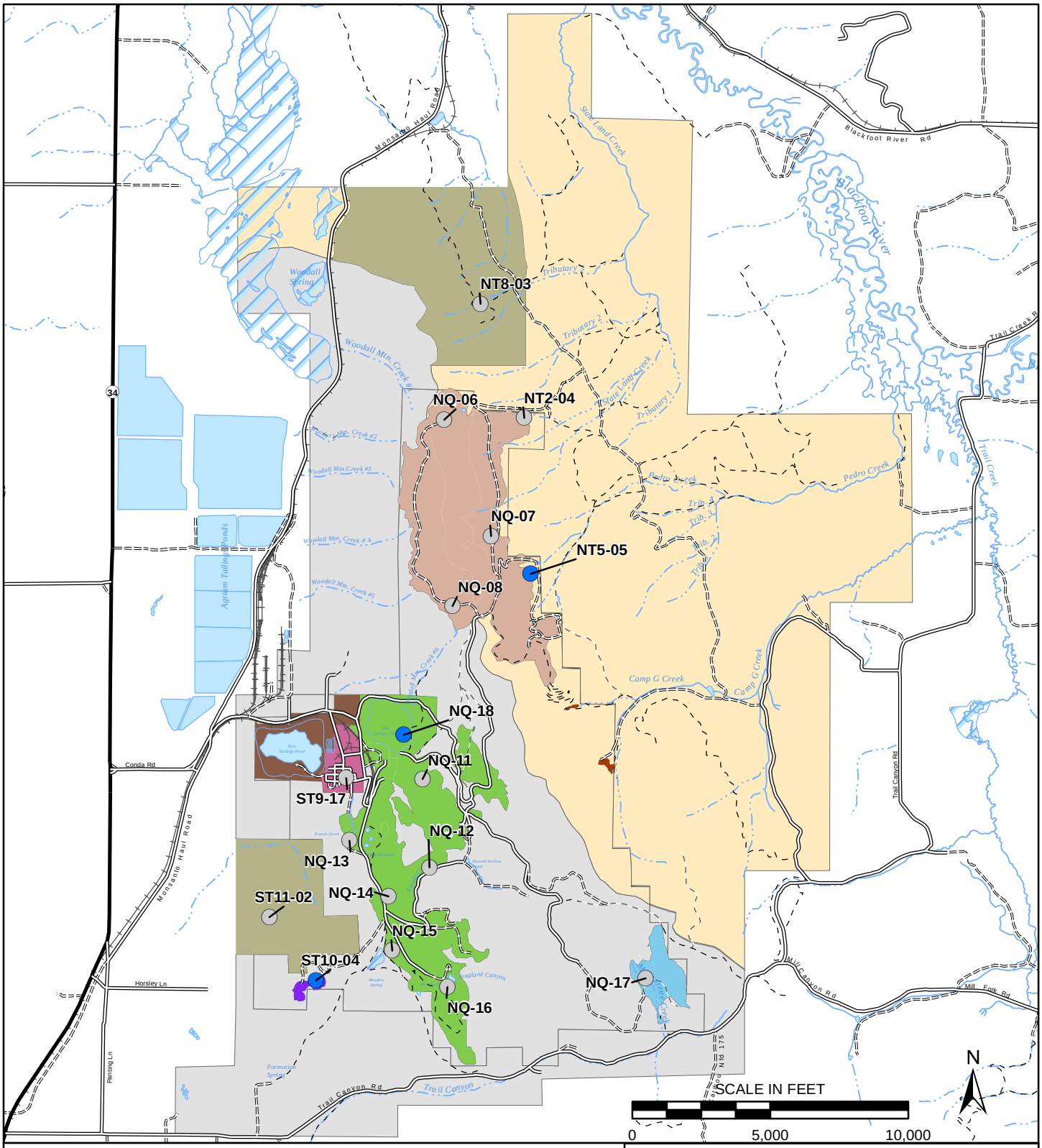
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-19

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES CADMIUM; DEER MOUSE

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

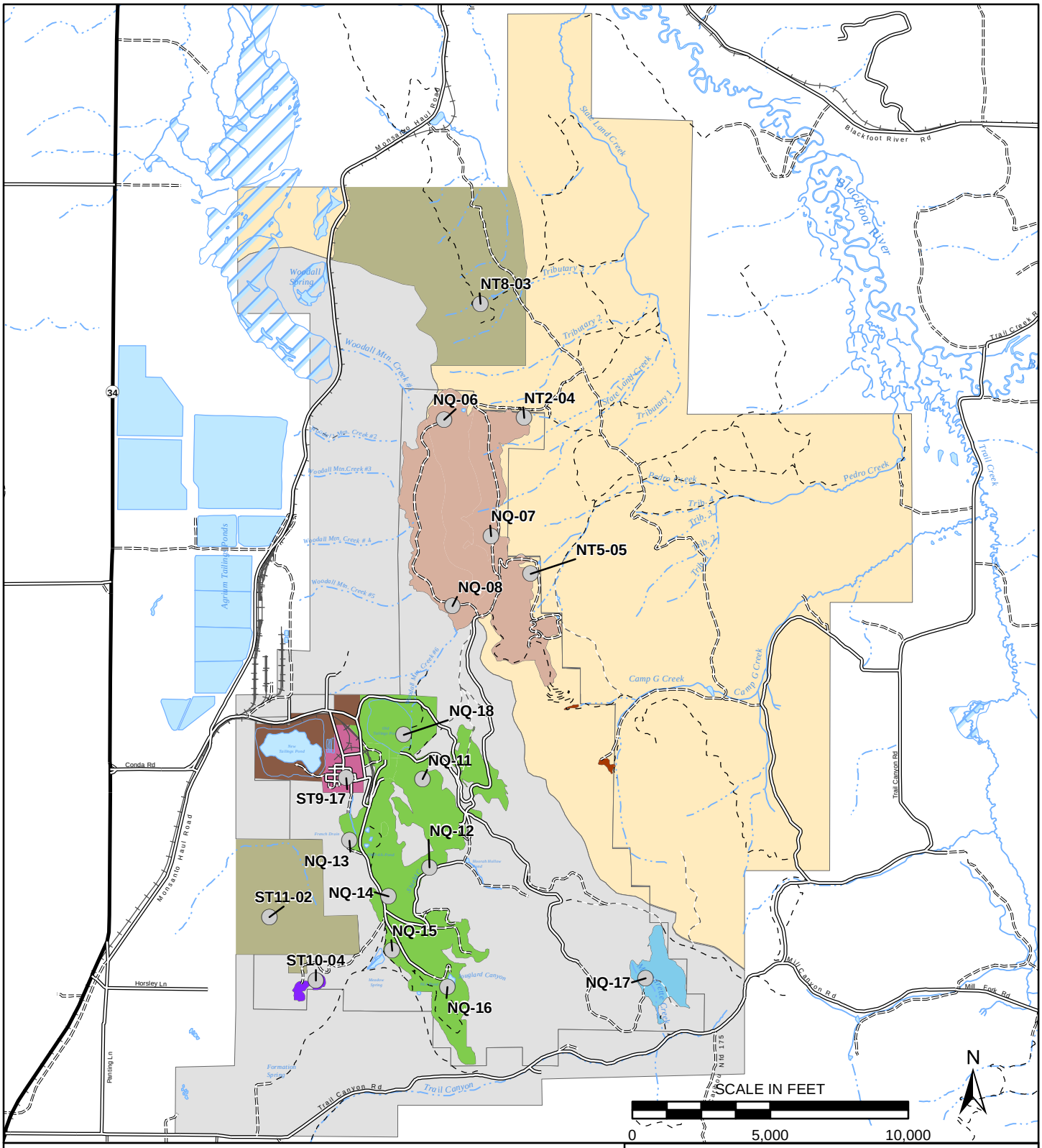
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-20

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES CHROMIUM; AMERICAN ROBIN

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

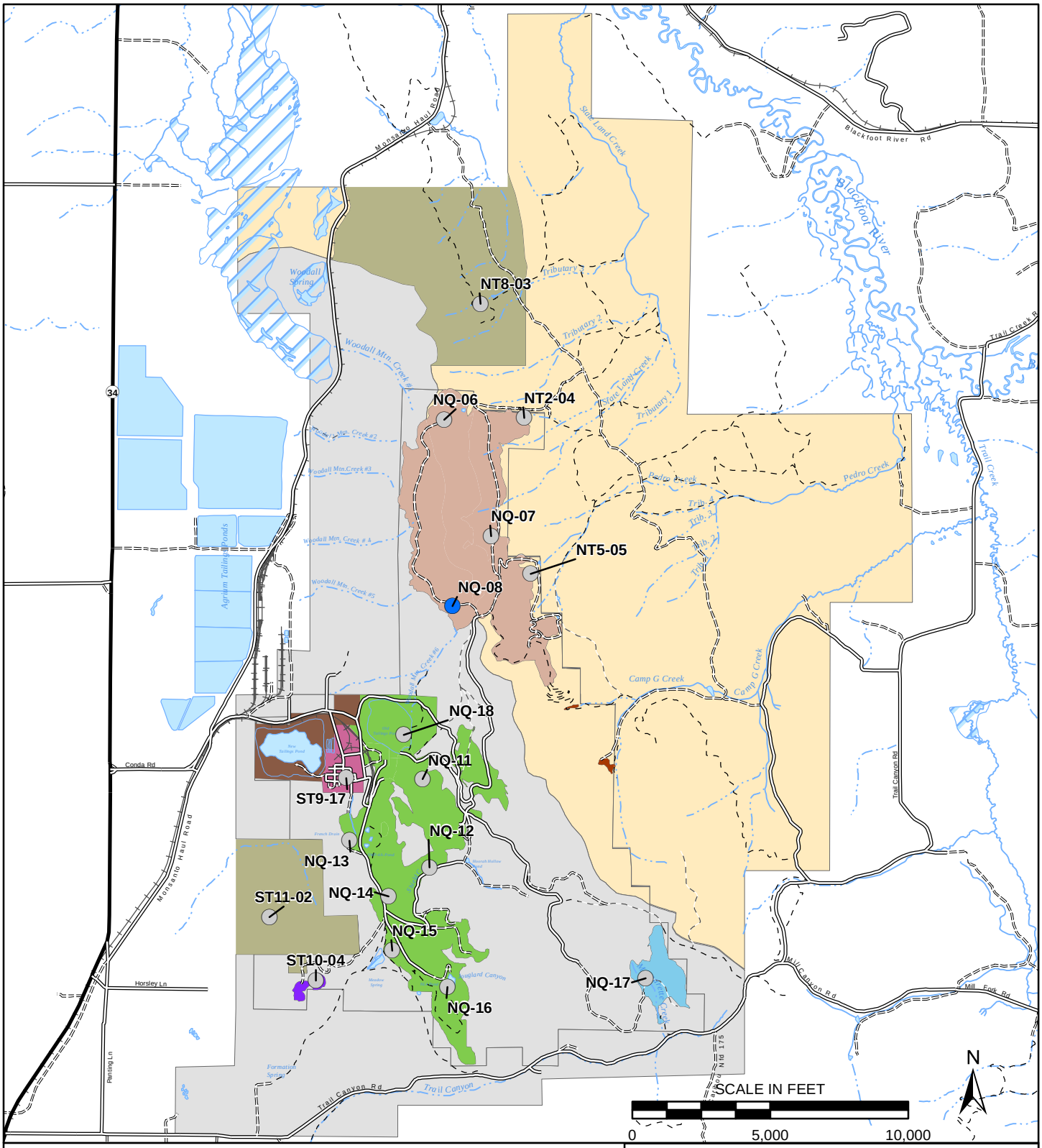
FIGURE 4.3-21

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES LEAD; AMERICAN ROBIN

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

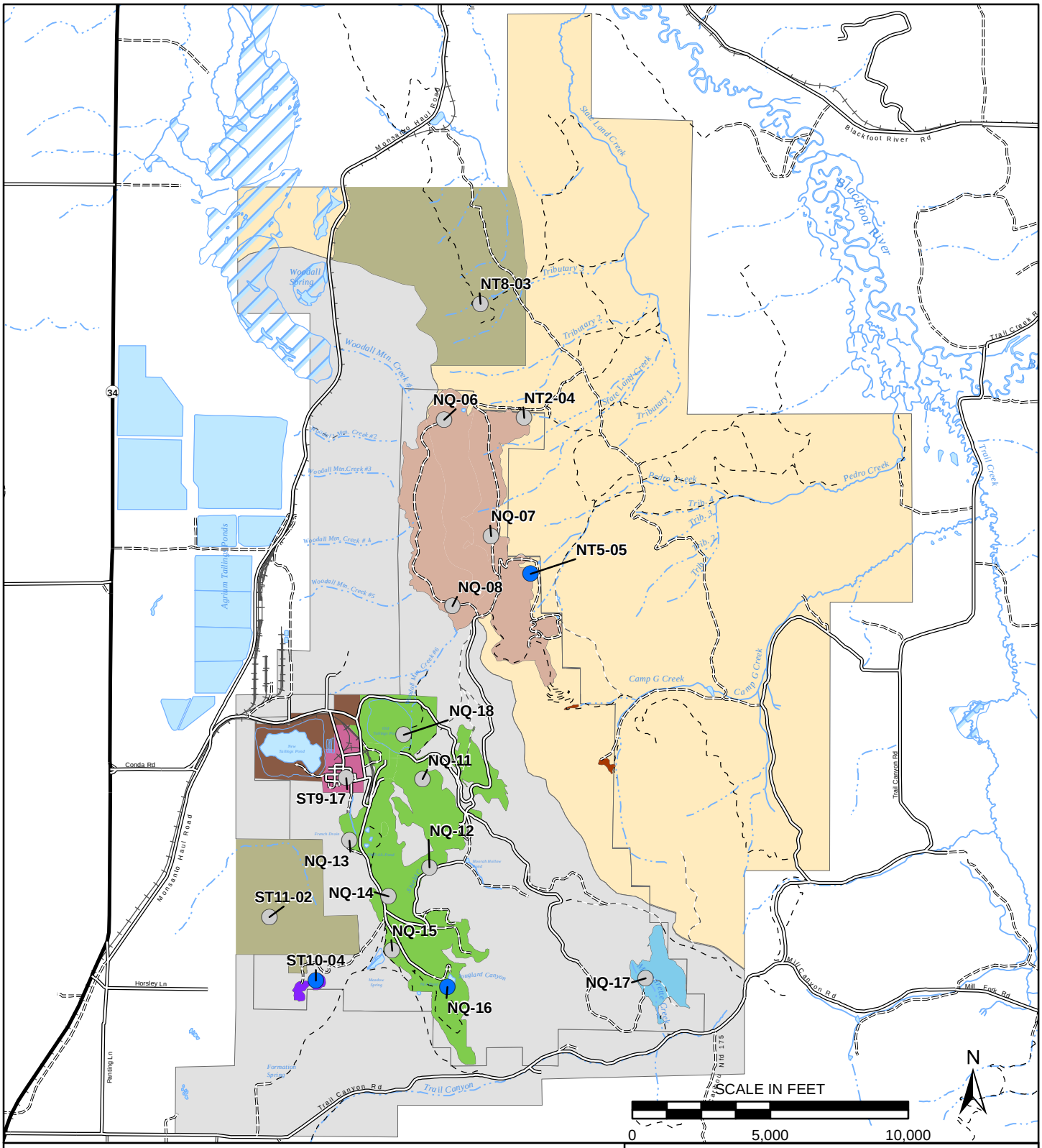
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-22

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES MOLYBDENUM; DEER MOUSE

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

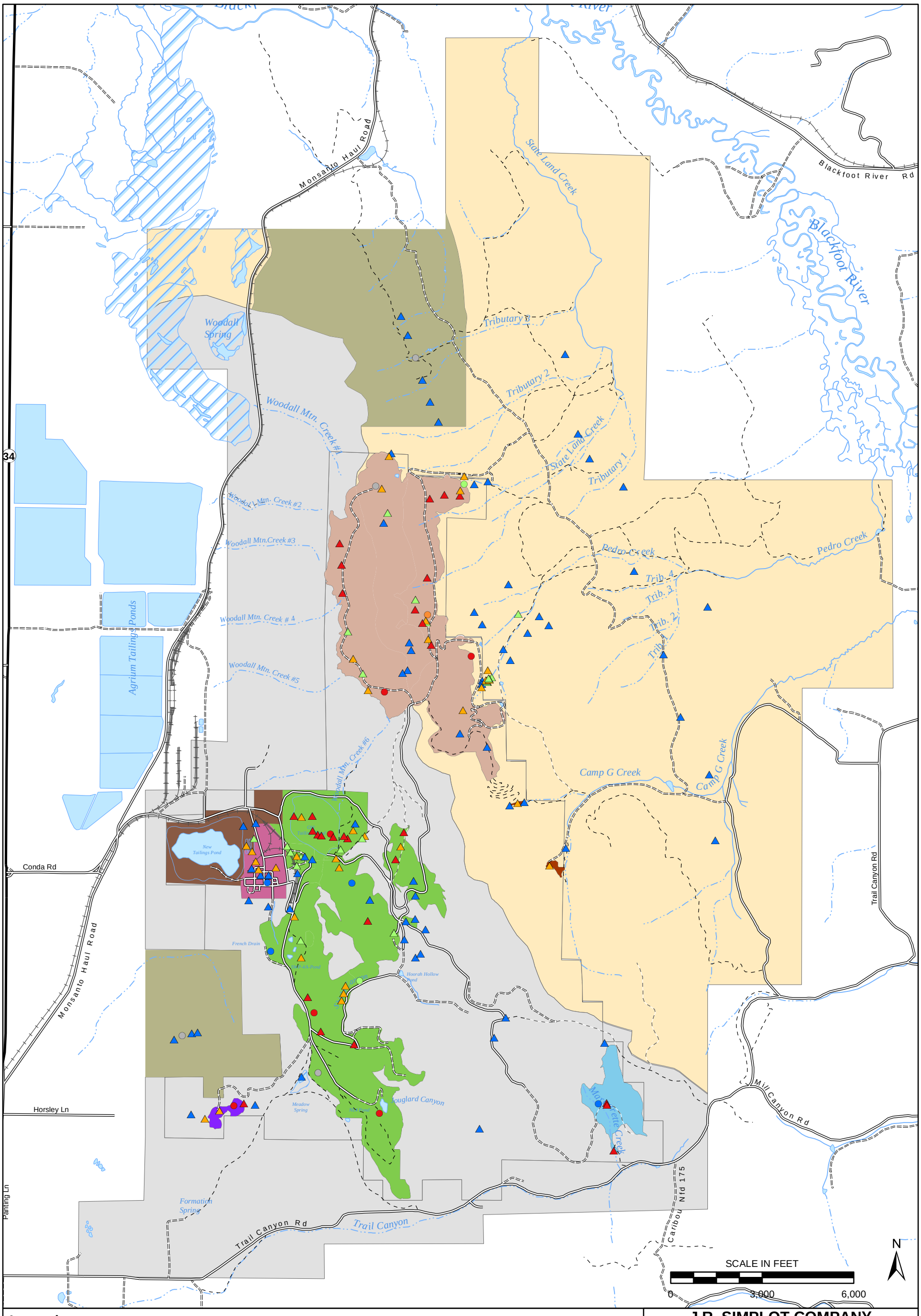
FIGURE 4.3-23

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES NICKEL; DEER MOUSE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient - All

- < 1
- 1 - 5
- 5 -10
- 10 - 20
- > 20

Hazard Quotient - Biota

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-24

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; AMERICAN ROBIN

DATE: MAR 22, 2016
BY: CRL
FOR: JMA

FORMATION ENVIRONMENTAL

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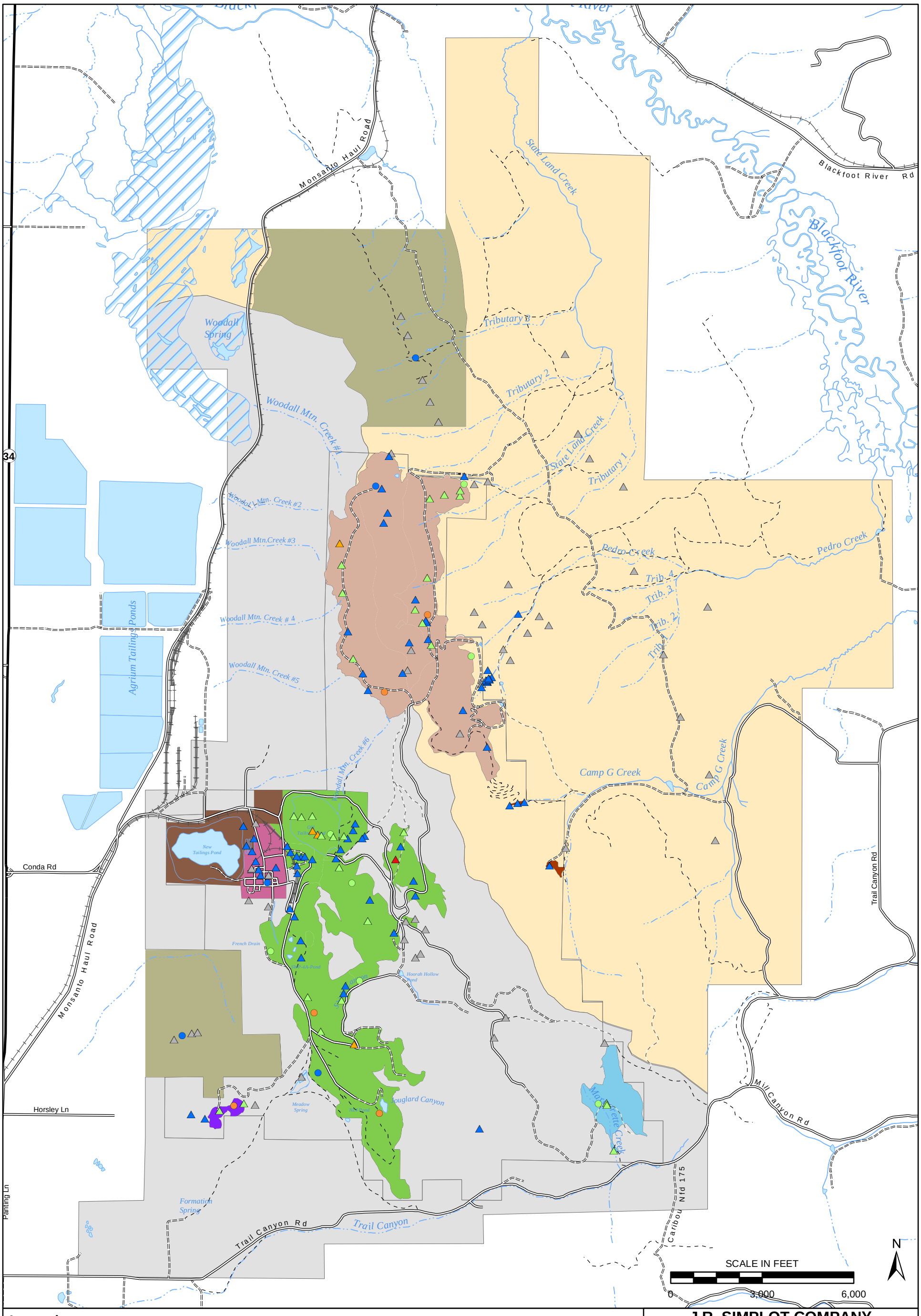

Legend

Hazard Quotient - All

- < 1
- 1 - 5
- 5 -10
- 10 - 20
- > 20

Hazard Quotient - Biota

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-25

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; COYOTE

DATE: MAR 22, 2016
BY: CRL
FOR: JMA

FORMATION ENVIRONMENTAL

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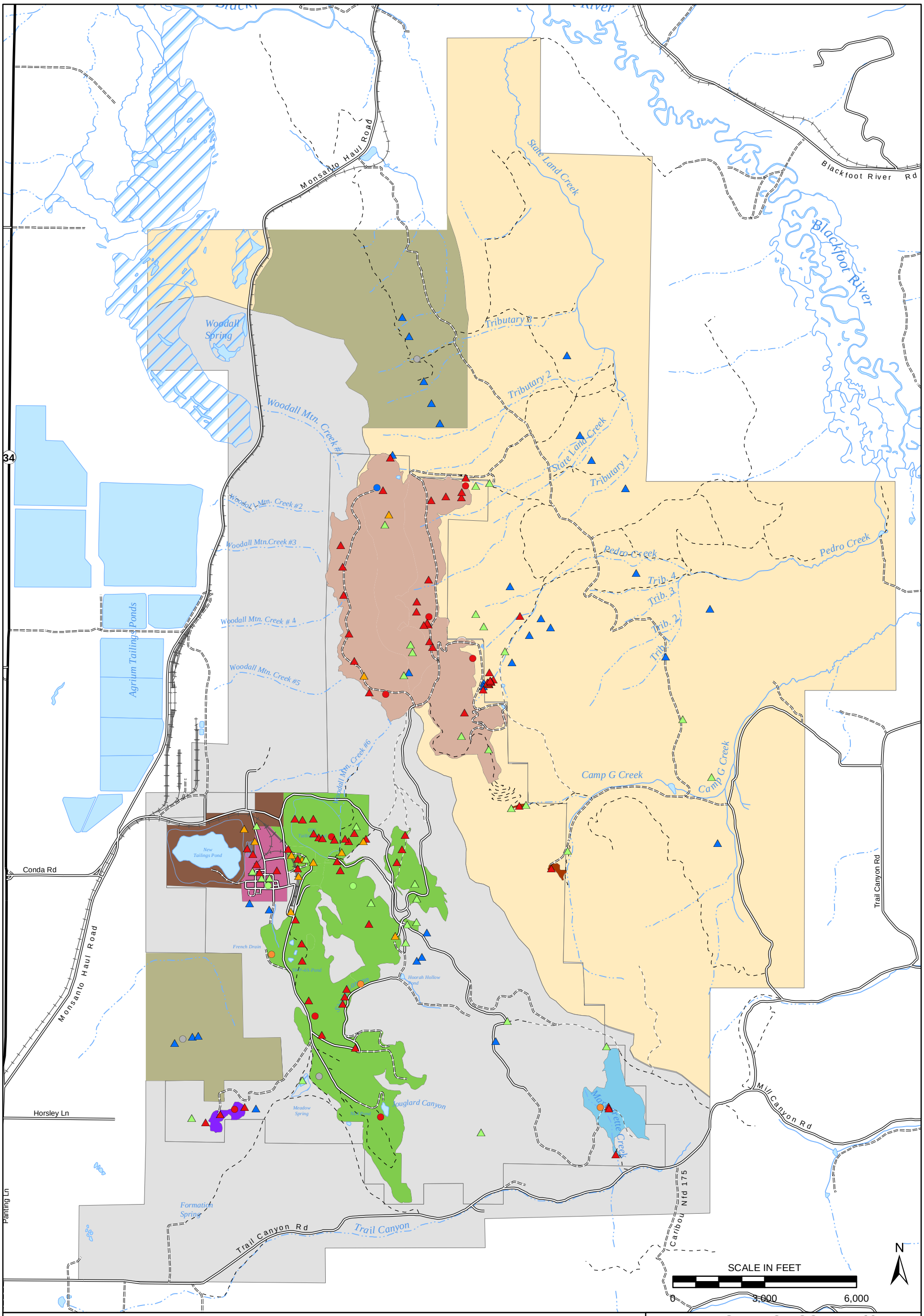

Legend

Hazard Quotient - All

- < 1
- 1 - 5
- 5 -10
- 10 - 20
- > 20

Hazard Quotient - Biota

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-26

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; DEER MOUSE

DATE: MAR 22, 2016
BY: CRL
FOR: JMA

FORMATION ENVIRONMENTAL

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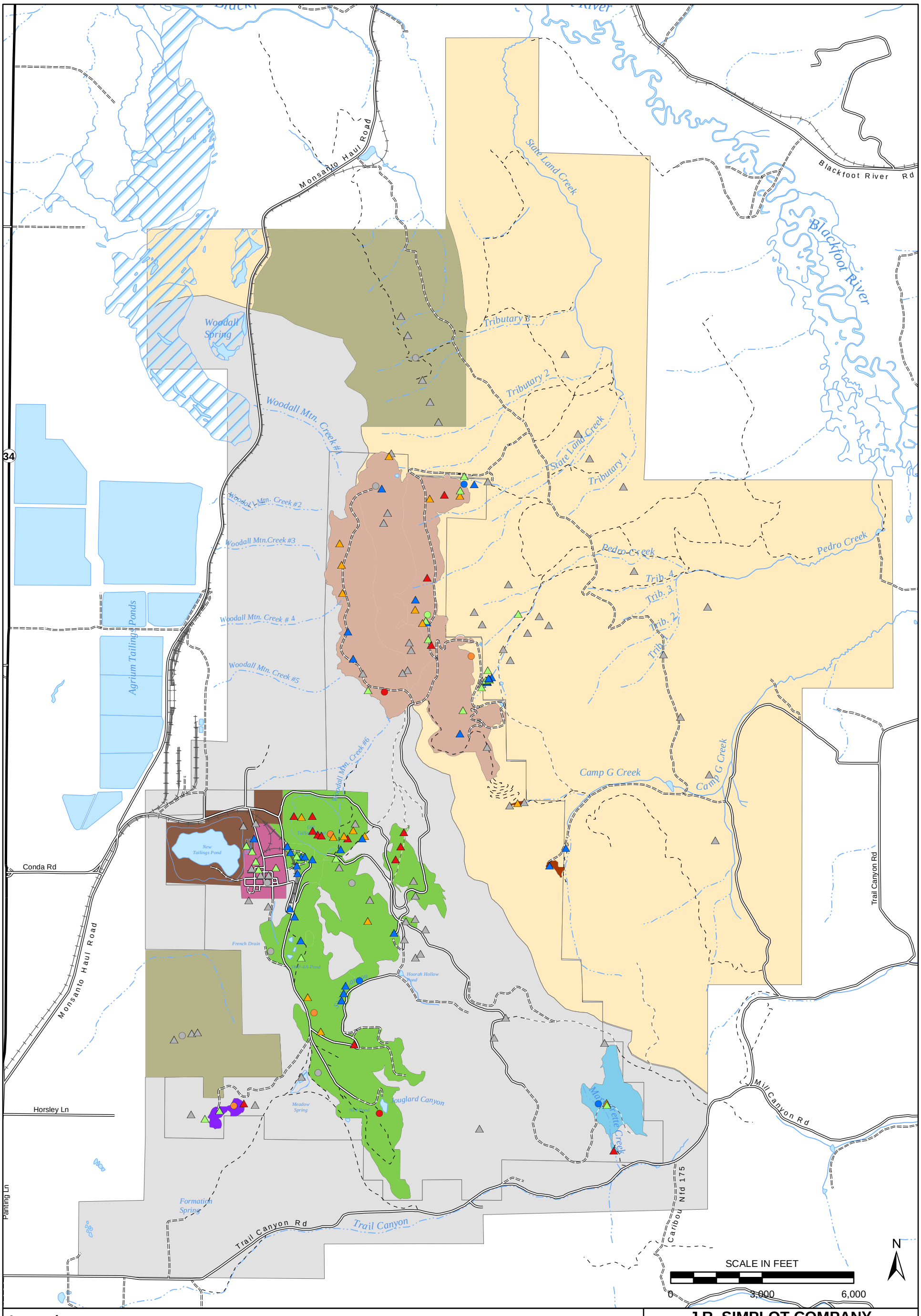


Legend

Hazard Quotient - All	Hazard Quotient - Biota	Exposure Units
< 1	< 1	Woodall/E. Woodall/S. Woodall panels EU
1 - 5	1 - 5	Camp G and H Areas EU
5 -10	5 - 10	Ibex/M. Limb/W. Limb panels & OTP area EU
10 - 20	10 - 20	North Trail Panel EU
> 20	> 20	Grace Panel EU
		Former Townsite EU
		Background EUs
		Active Mine features

Downgradient EU - Eastside
Downgradient EU - Westside

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

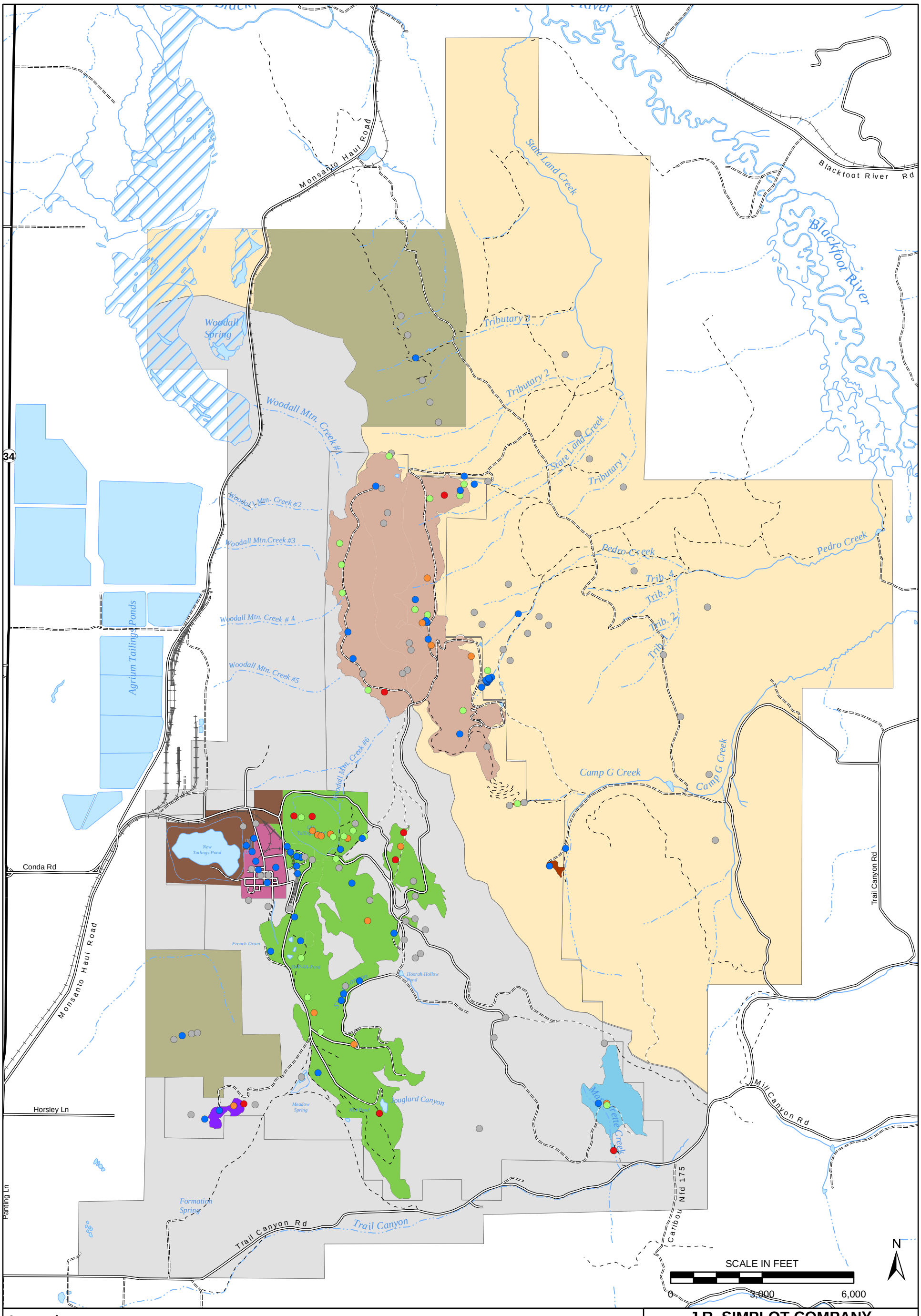
FIGURE 4.3-27

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; EASTERN COTTONTAIL

DATE: MAR 22, 2016
BY: CRL
FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_27_Selenium_Eastern_Cottontail.mxd



Legend

Hazard Quotient - All

- < 1
- 1 - 5
- 5 -10
- 10 - 20
- > 20

Hazard Quotient - Biota

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

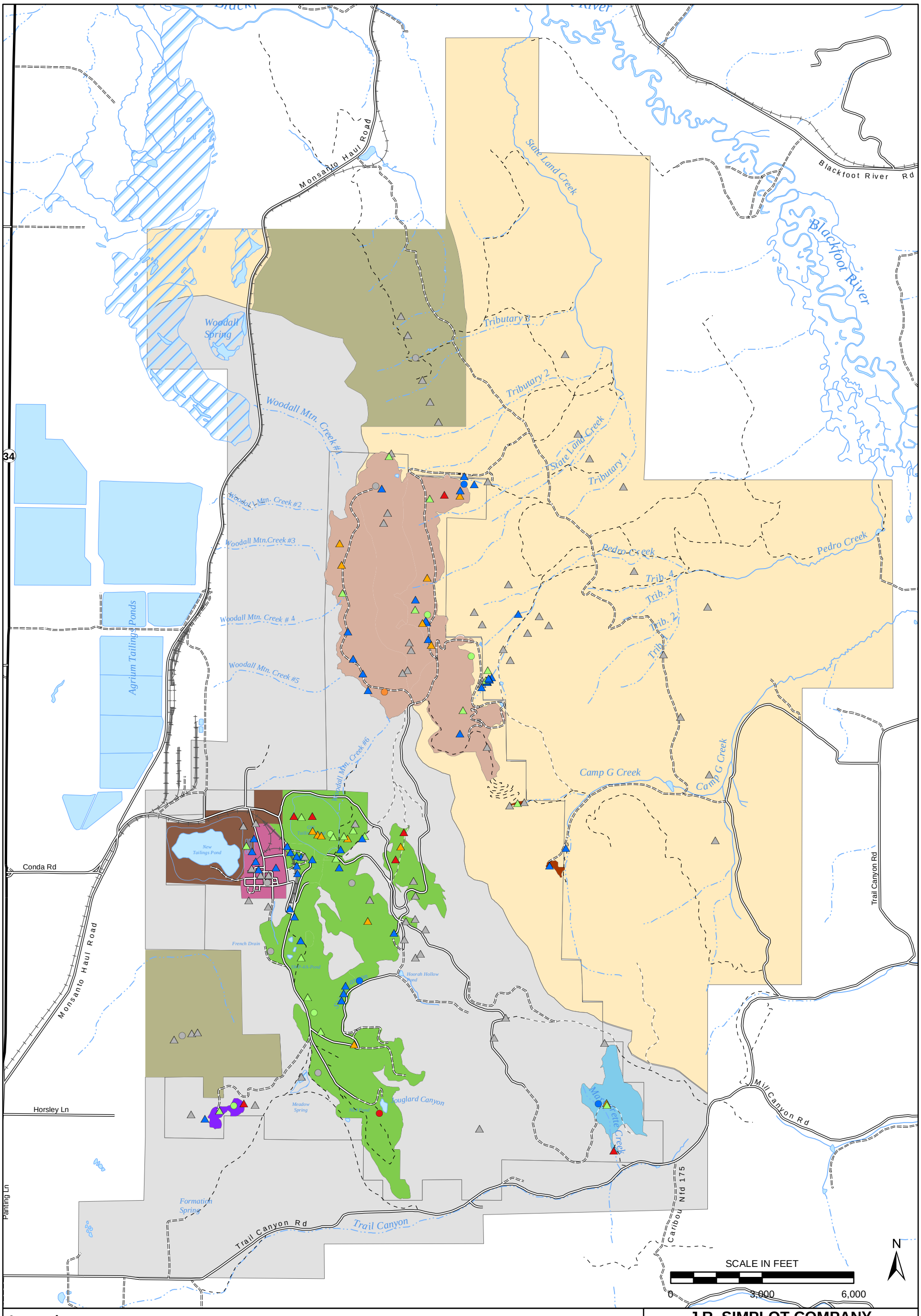
FIGURE 4.3-28

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; MULE DEER

DATE: MAR 22, 2016
BY: CRL
FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_28_Selenium_Mule_Deer.mxd



Legend

Hazard Quotient - All	Hazard Quotient - Biota	Exposure Units
< 1	< 1	Woodall/E. Woodall/S. Woodall panels EU
1 - 5	1 - 5	Camp G and H Areas EU
5 -10	5 - 10	Ibex/M. Limb/W. Limb panels & OTP area EU
10 - 20	10 - 20	North Trail Panel EU
> 20	> 20	Grace Panel EU
		Former Townsite EU
		Background EUs
		Active Mine features

Downgradient EU - Eastside
Downgradient EU - Westside

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

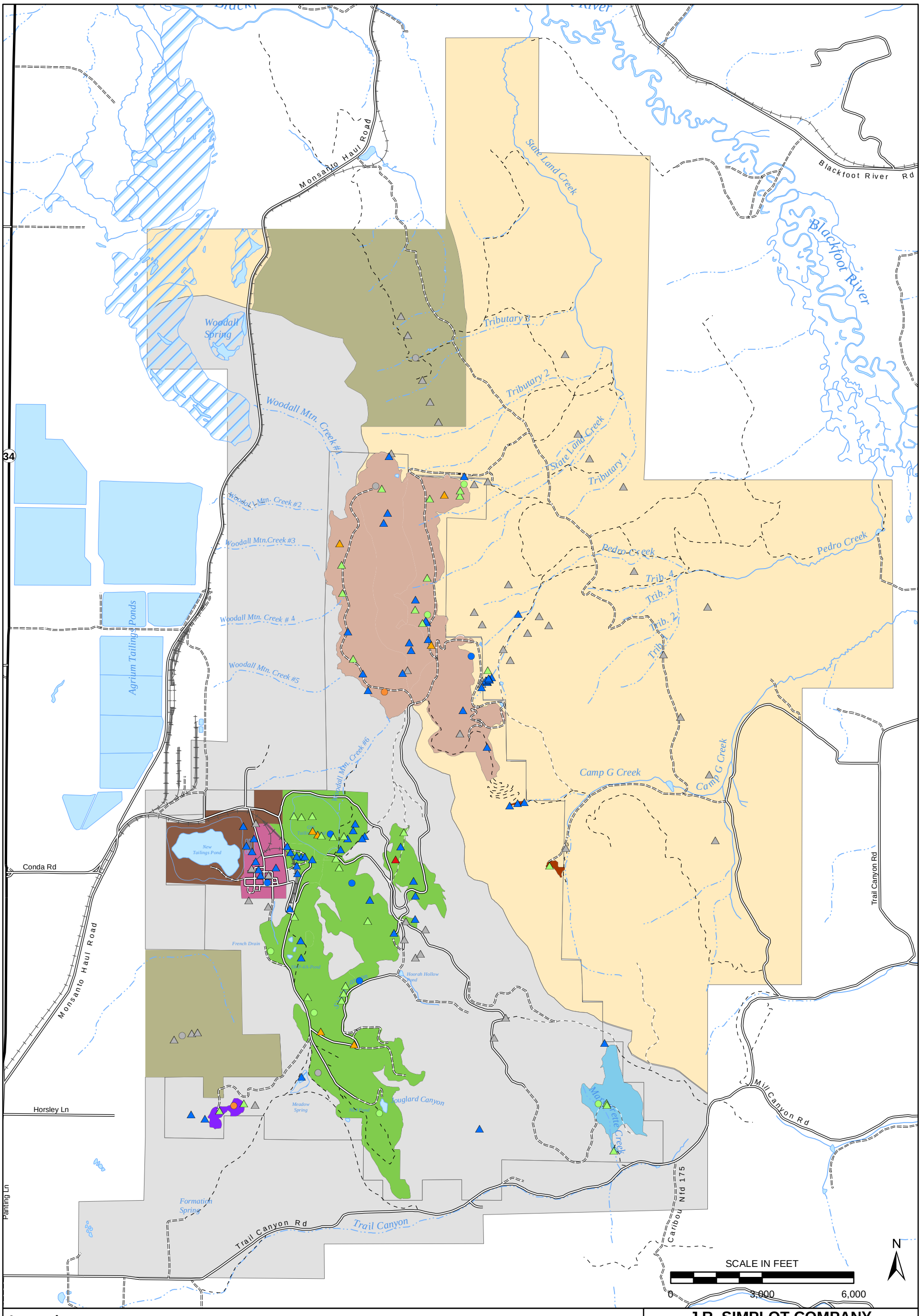
FIGURE 4.3-29

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; NORTHERN BOBWHITE

DATE: MAR 22, 2016
BY: CRL
FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_29_Selenium_Northern_Bobwhite.mxd



Legend

Hazard Quotient - All

- < 1
- 1 - 5
- 5 -10
- 10 - 20
- > 20

Hazard Quotient - Biota

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

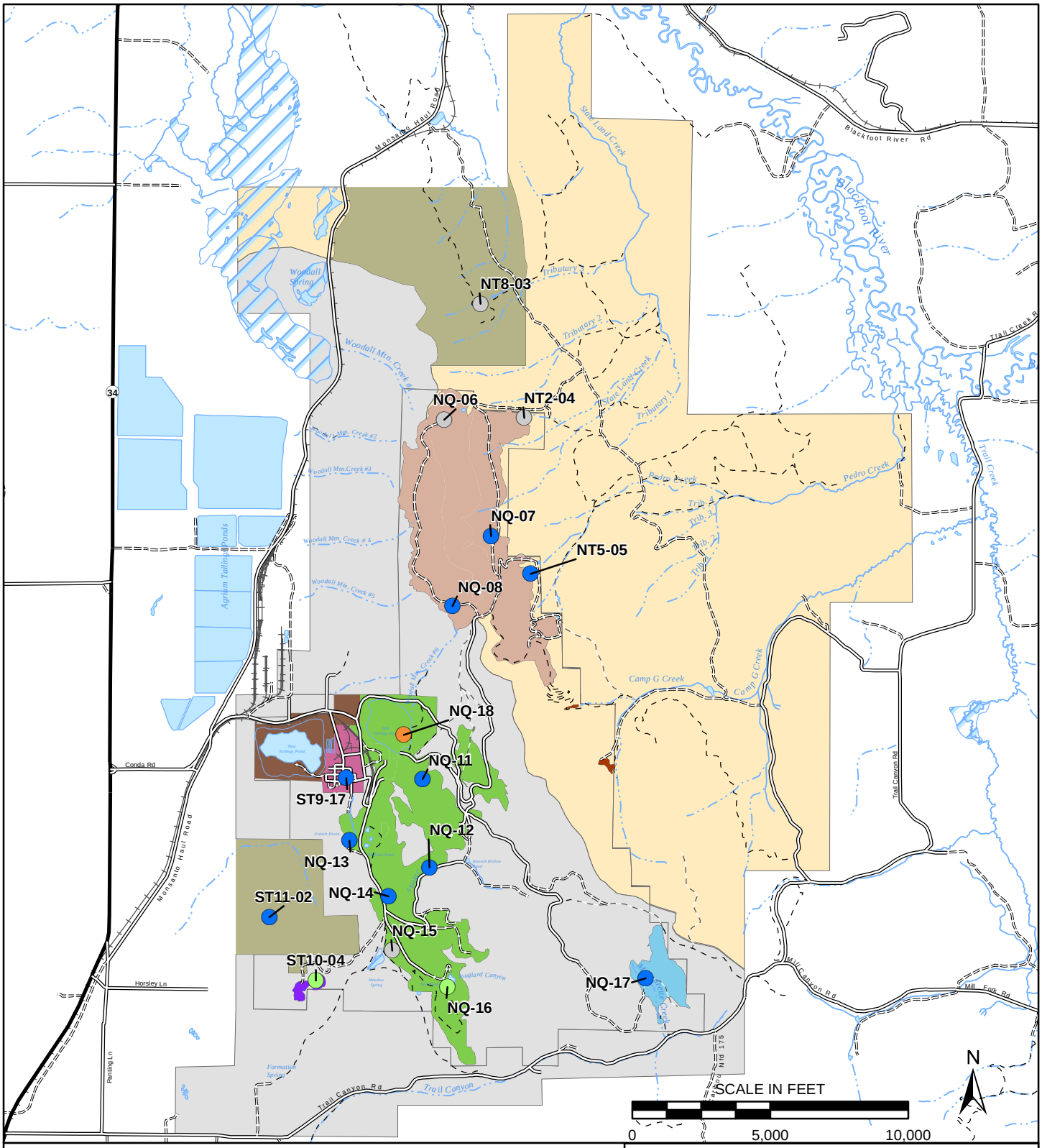
FIGURE 4.3-30

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; NORTHERN HARRIER

DATE: MAR 22, 2016
BY: CRL
FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_3_30_Selenium_Northern_Harrier.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

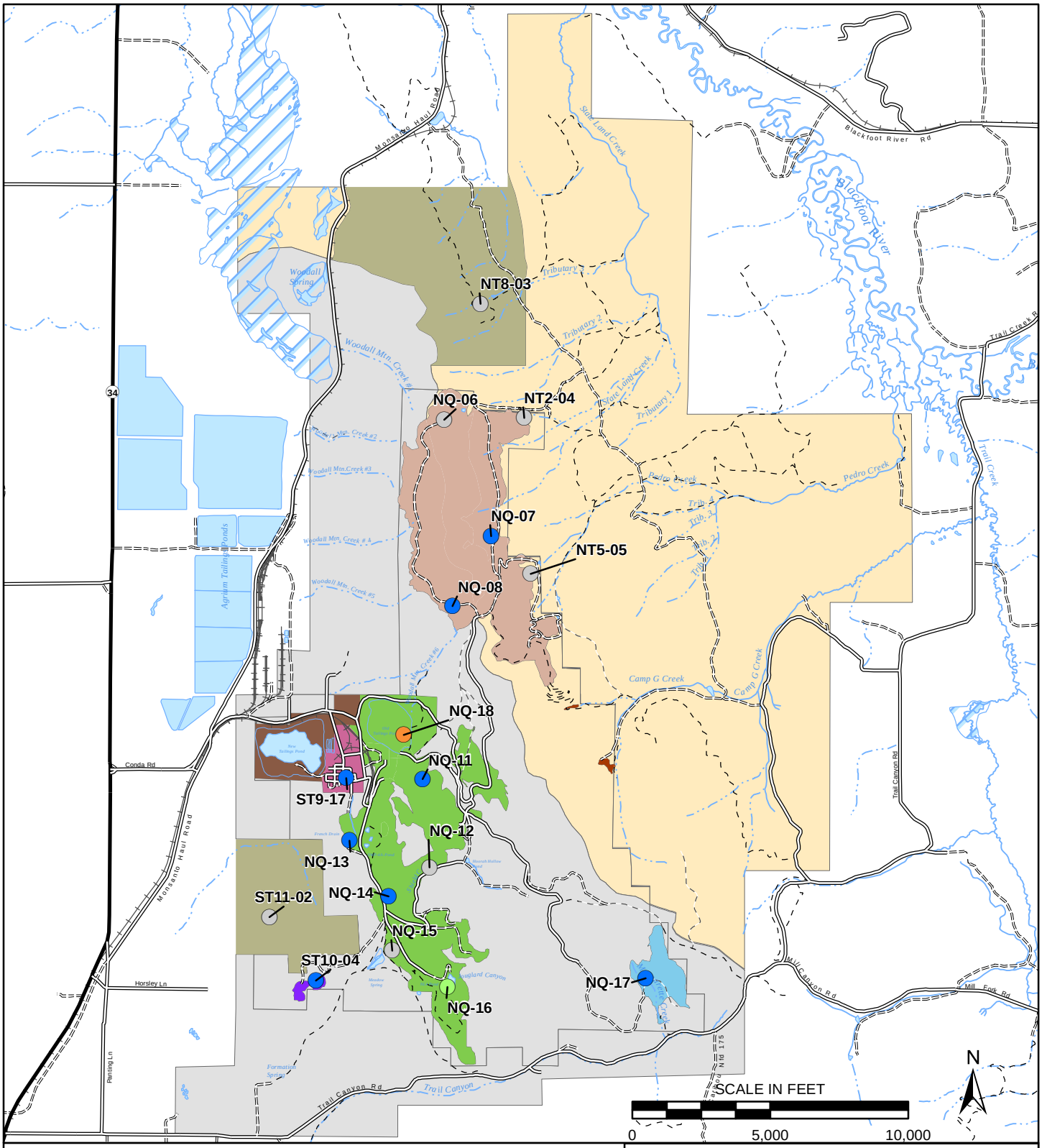
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-31

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES VANADIUM; AMERICAN ROBIN

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

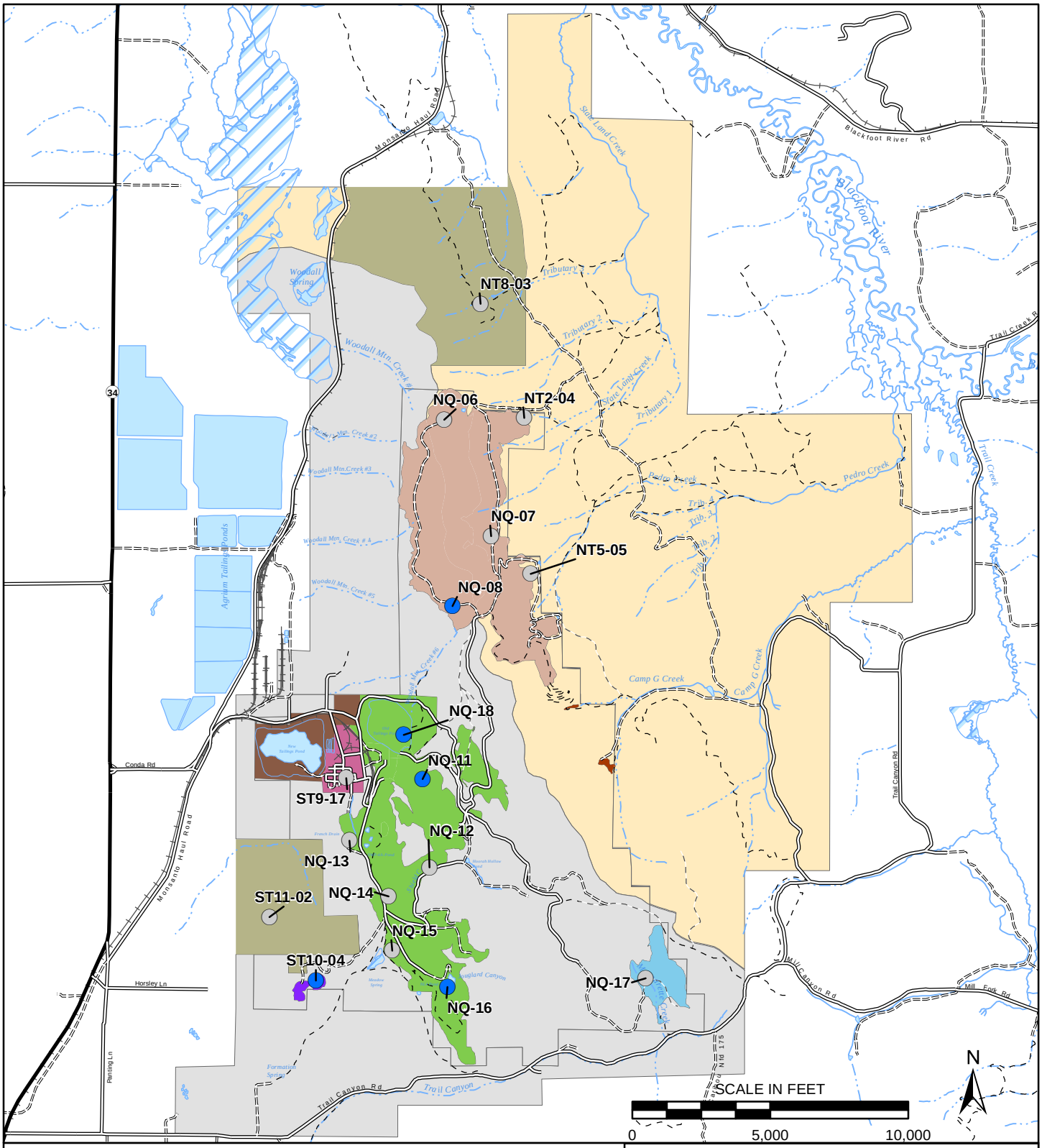
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-32

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES VANADIUM; NORTHERN BOBWHITE

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

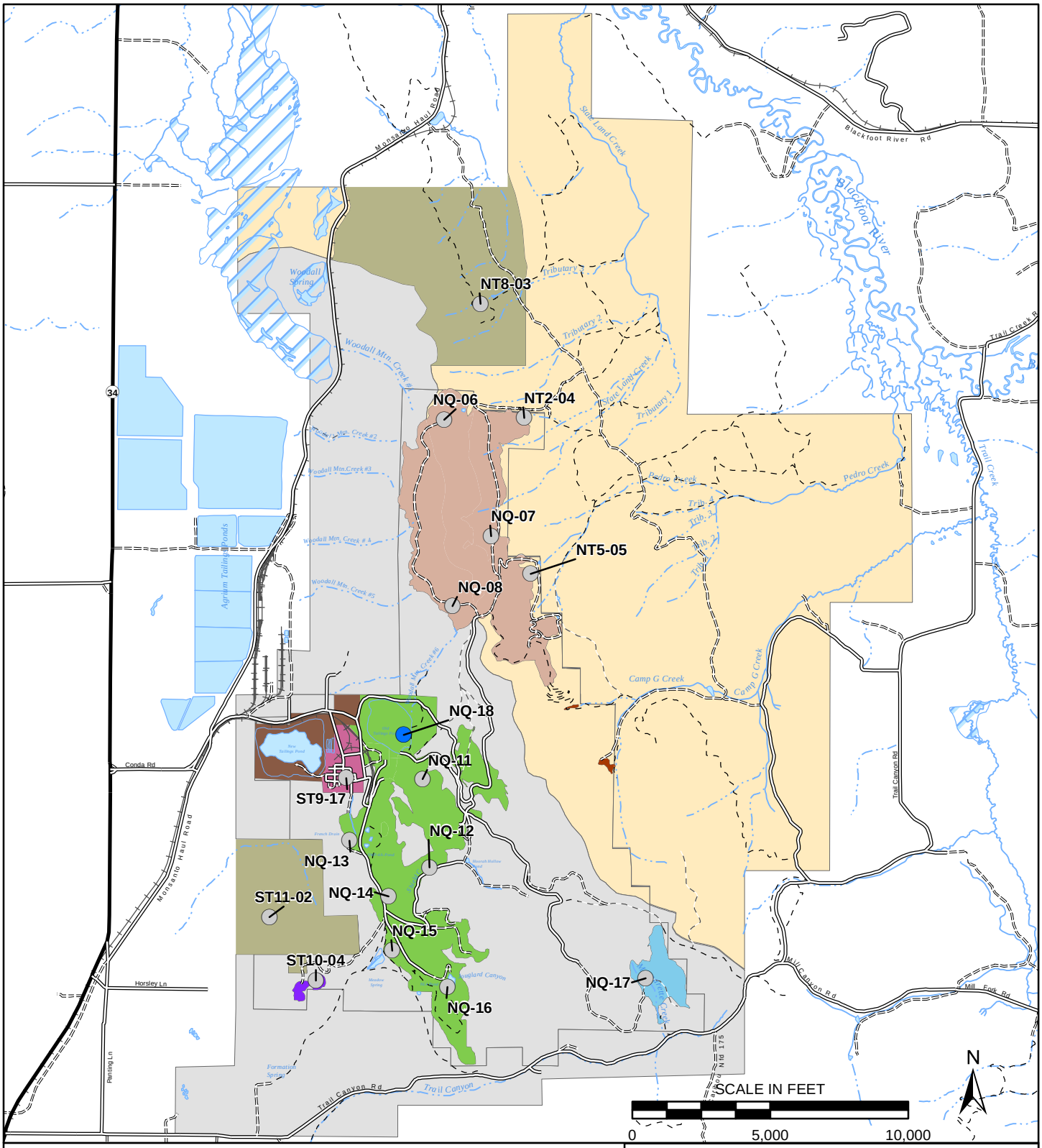
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-33

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES VANADIUM; NORTHERN HARRIER

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

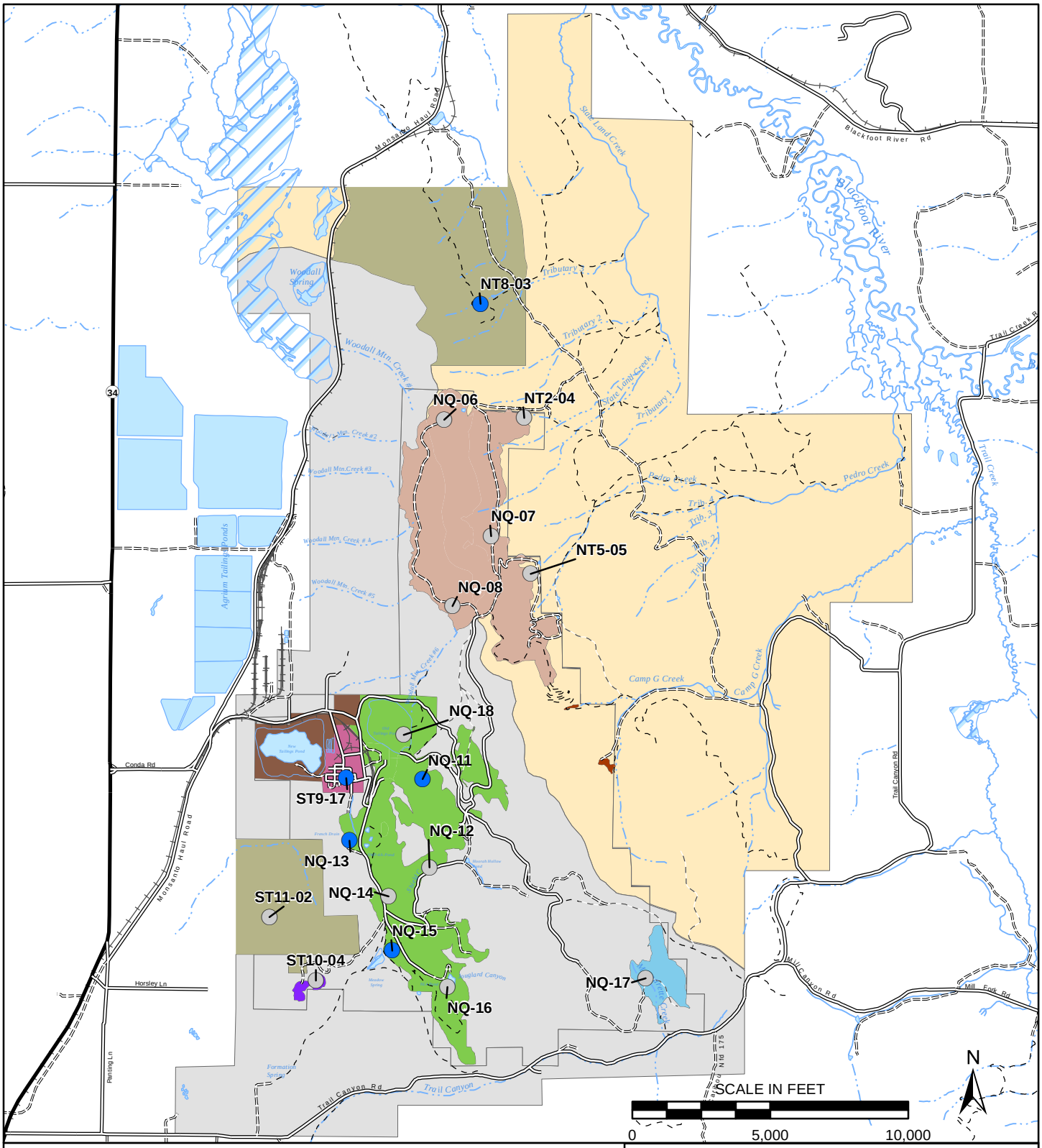
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-34

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES VANADIUM; DEER MOUSE

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

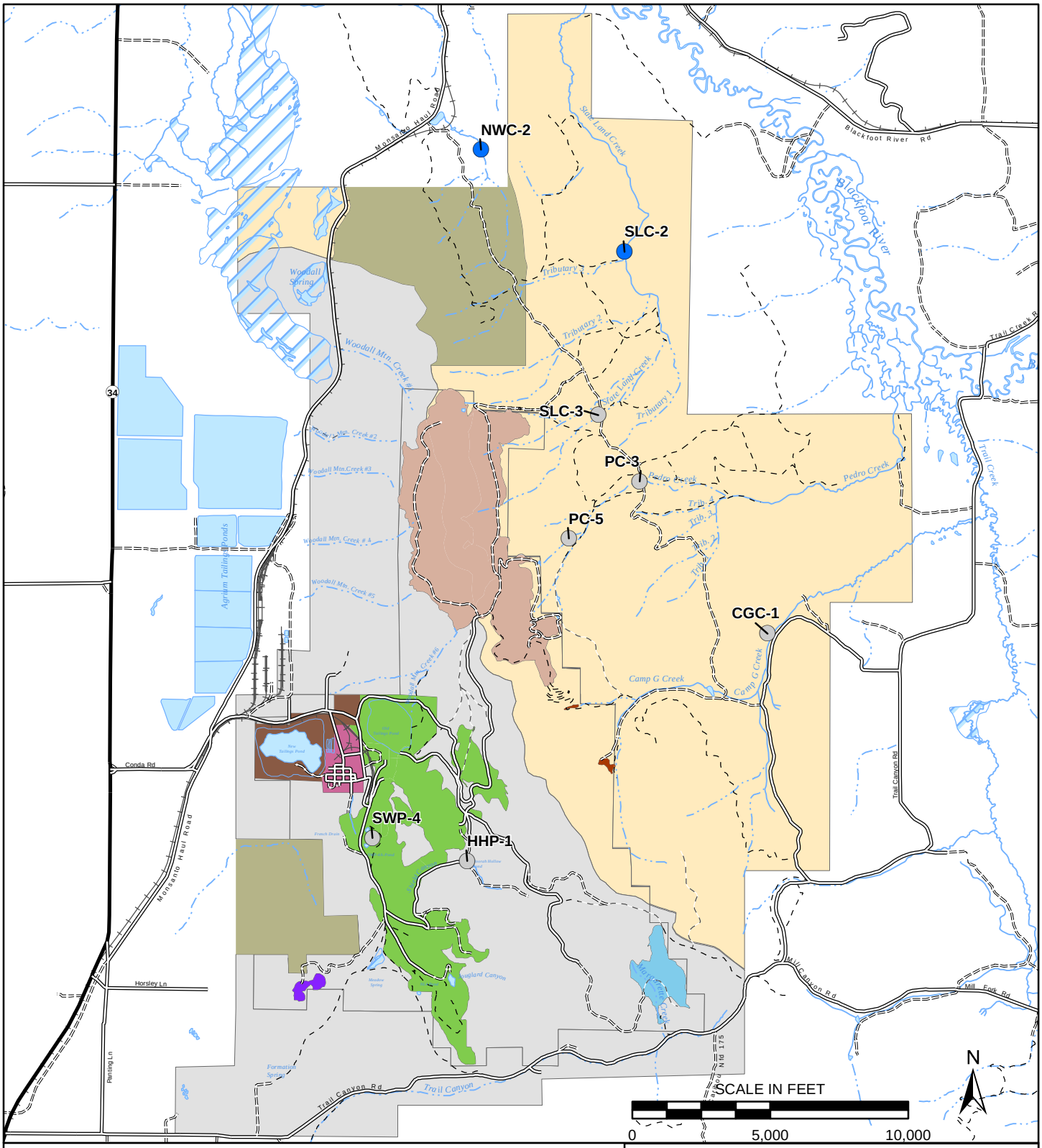
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-35

UPLAND TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES ZINC; NORTHERN HARRIER

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

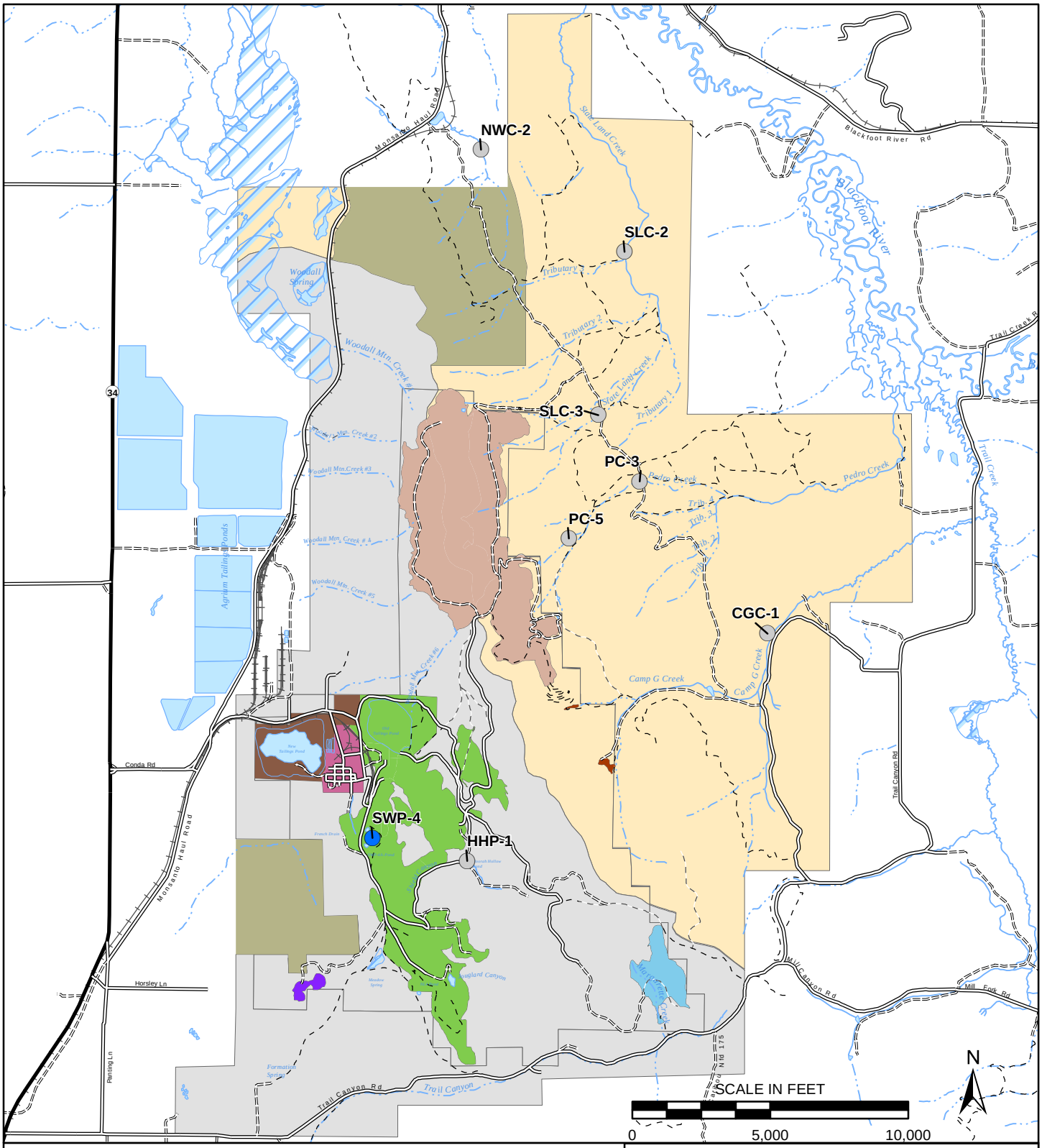
FIGURE 4.3-36

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES BARIUM; MEADOW VOLE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

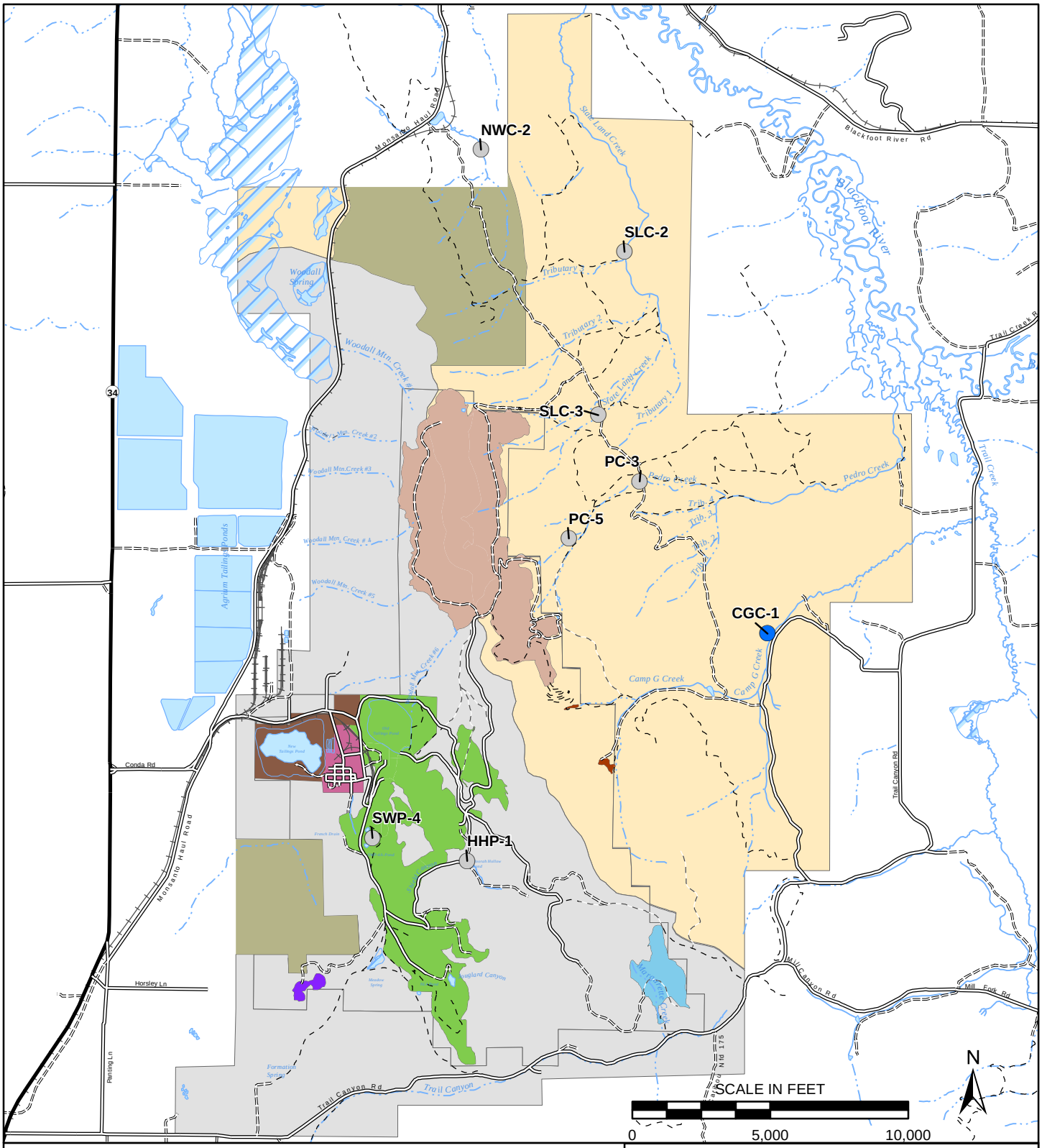
FIGURE 4.3-37

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES CHROMIUM; MALLARD

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

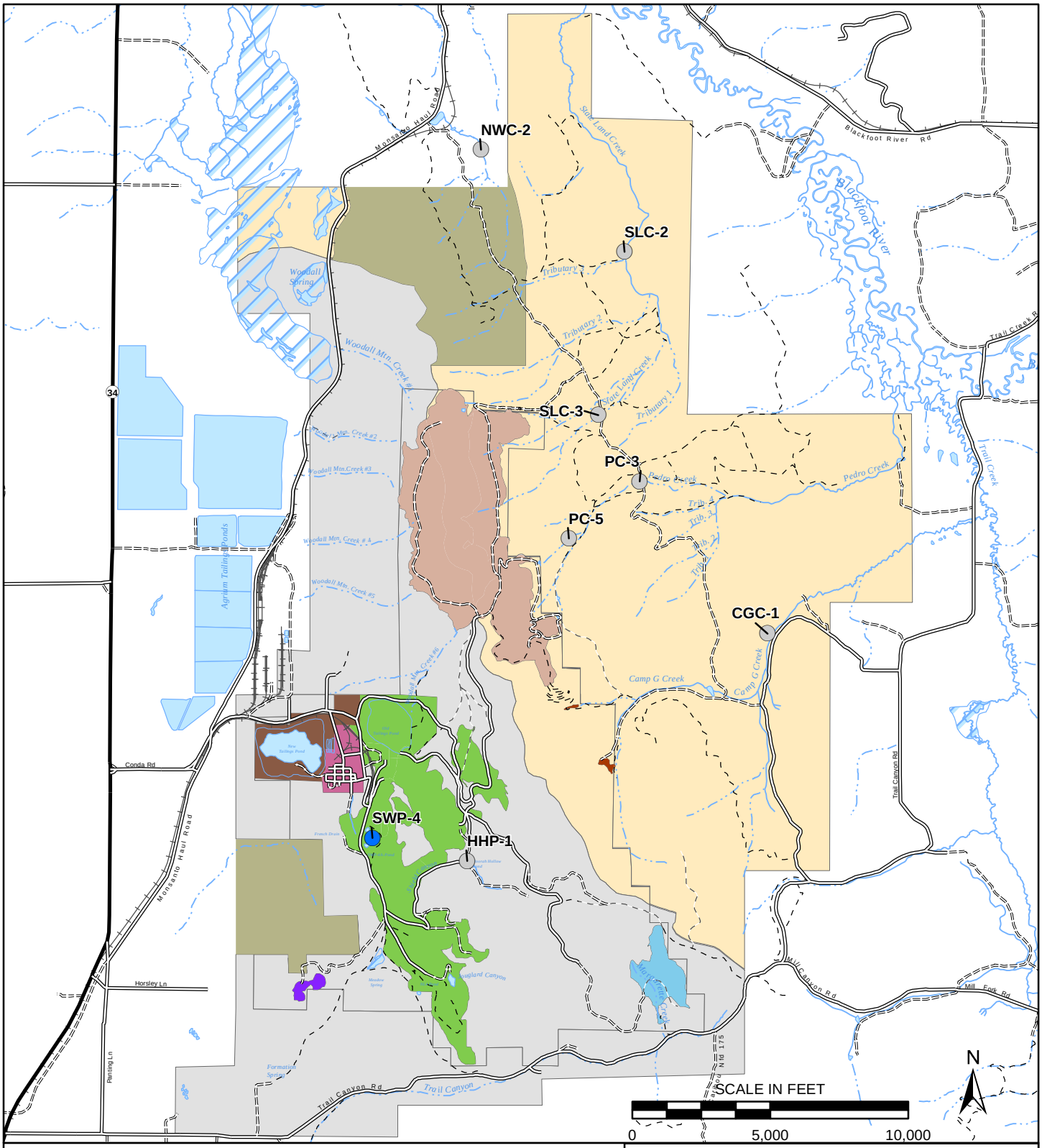
FIGURE 4.3-38

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES MANGANESE; MEADOW VOLE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

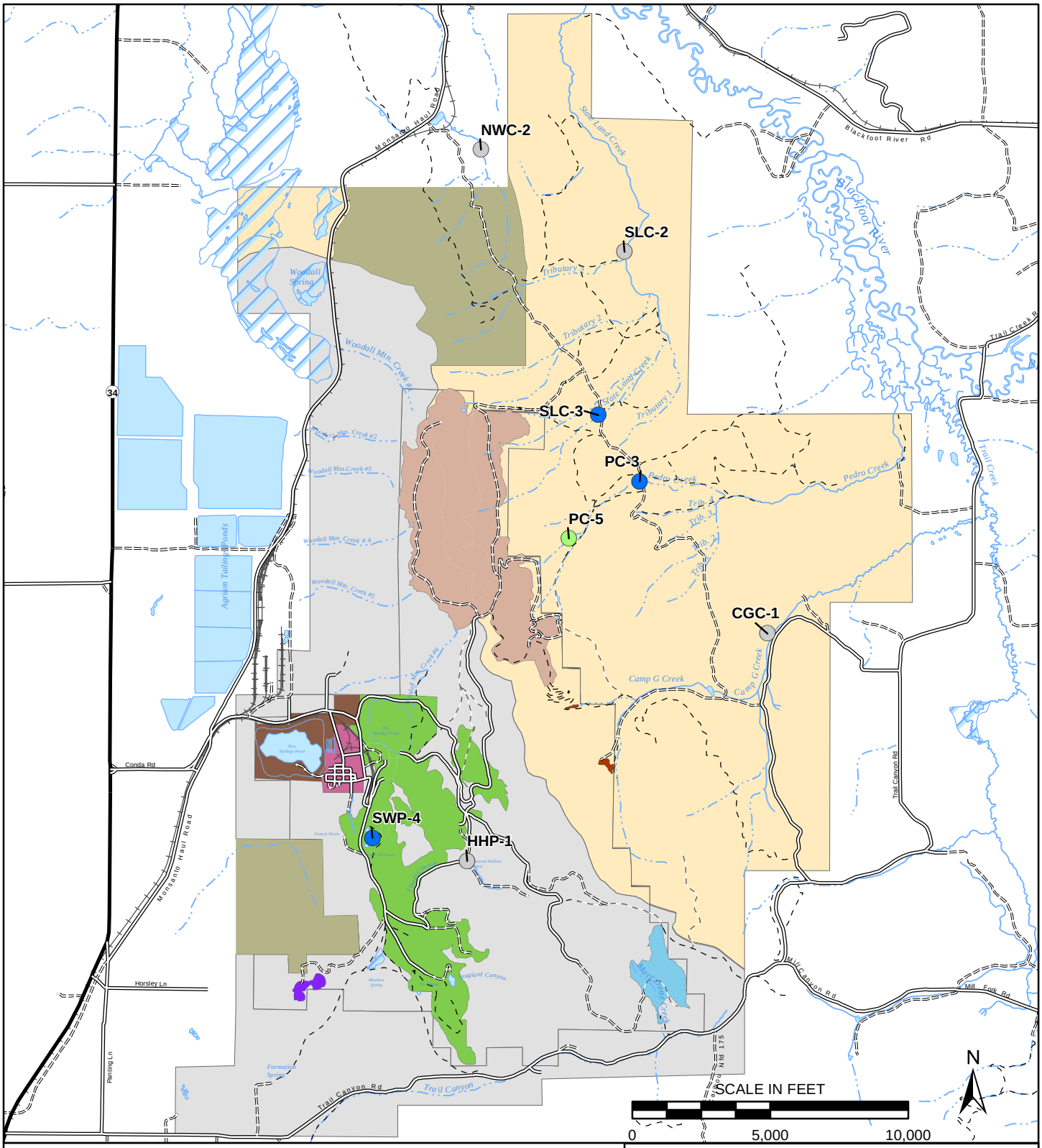
FIGURE 4.3-39

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES NICKEL; DEER MOUSE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

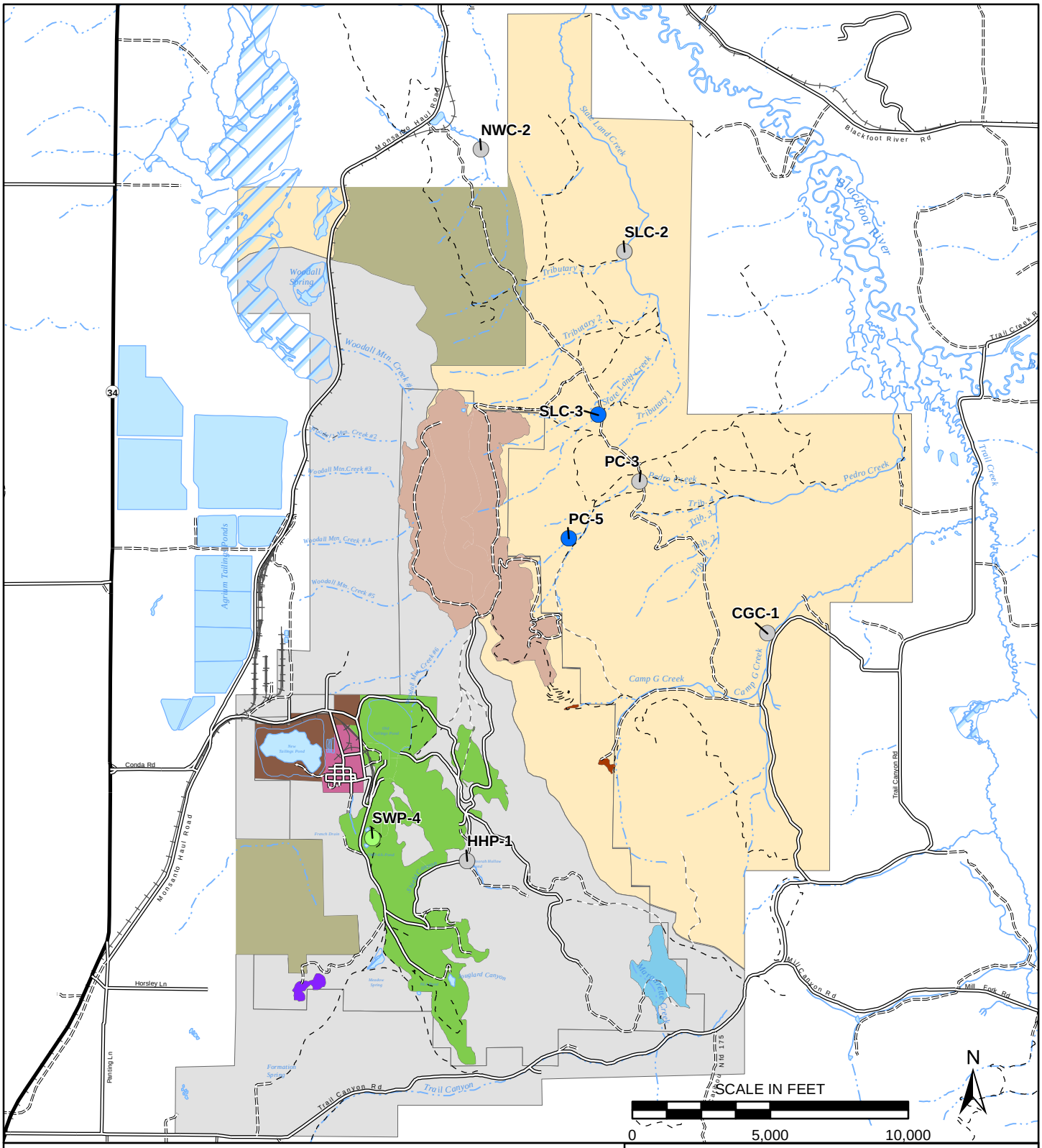
FIGURE 4.3-40

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; AMERICAN ROBIN

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

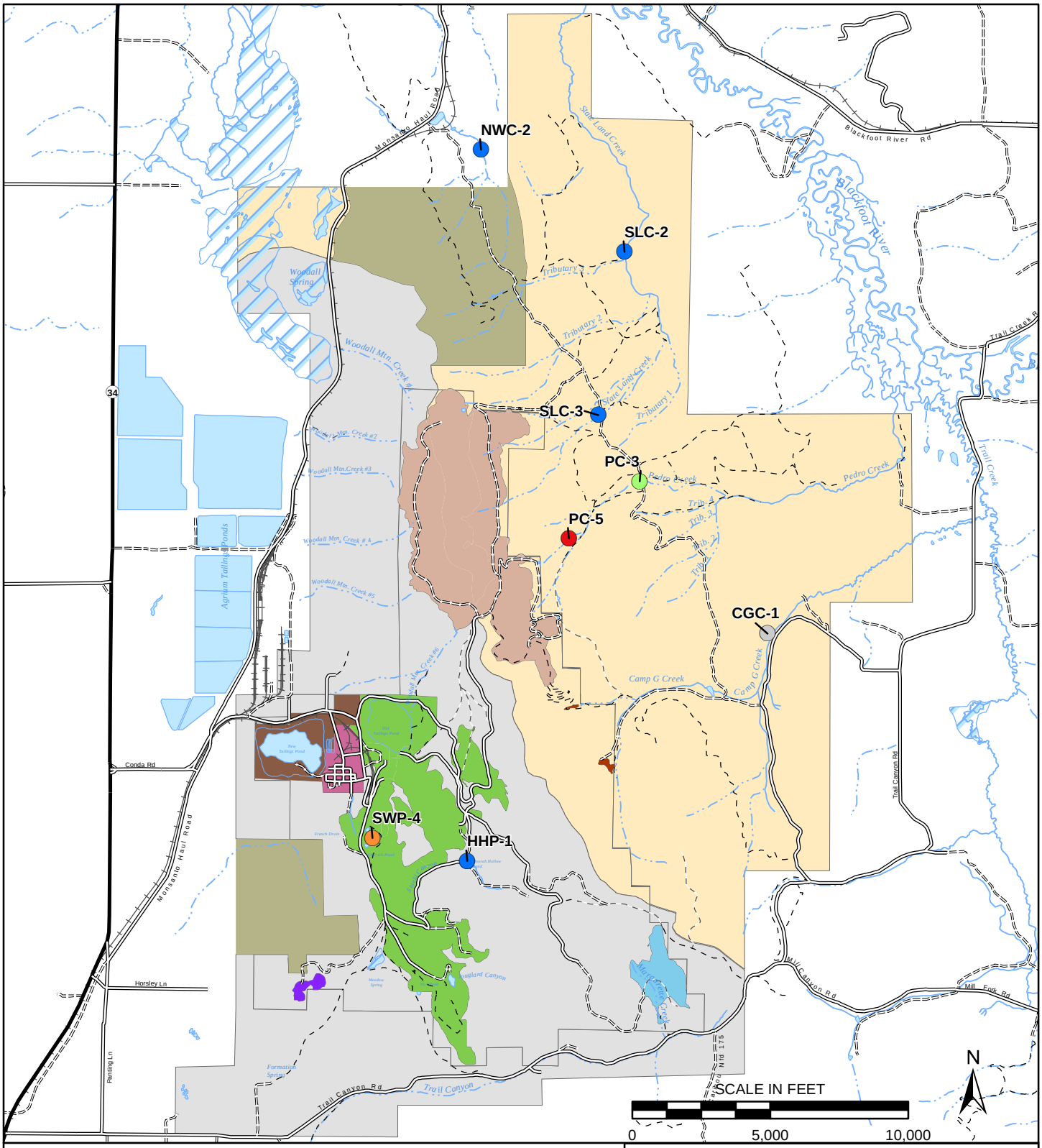
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-41

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; COYOTE

DATE: MAR 22, 2016	FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

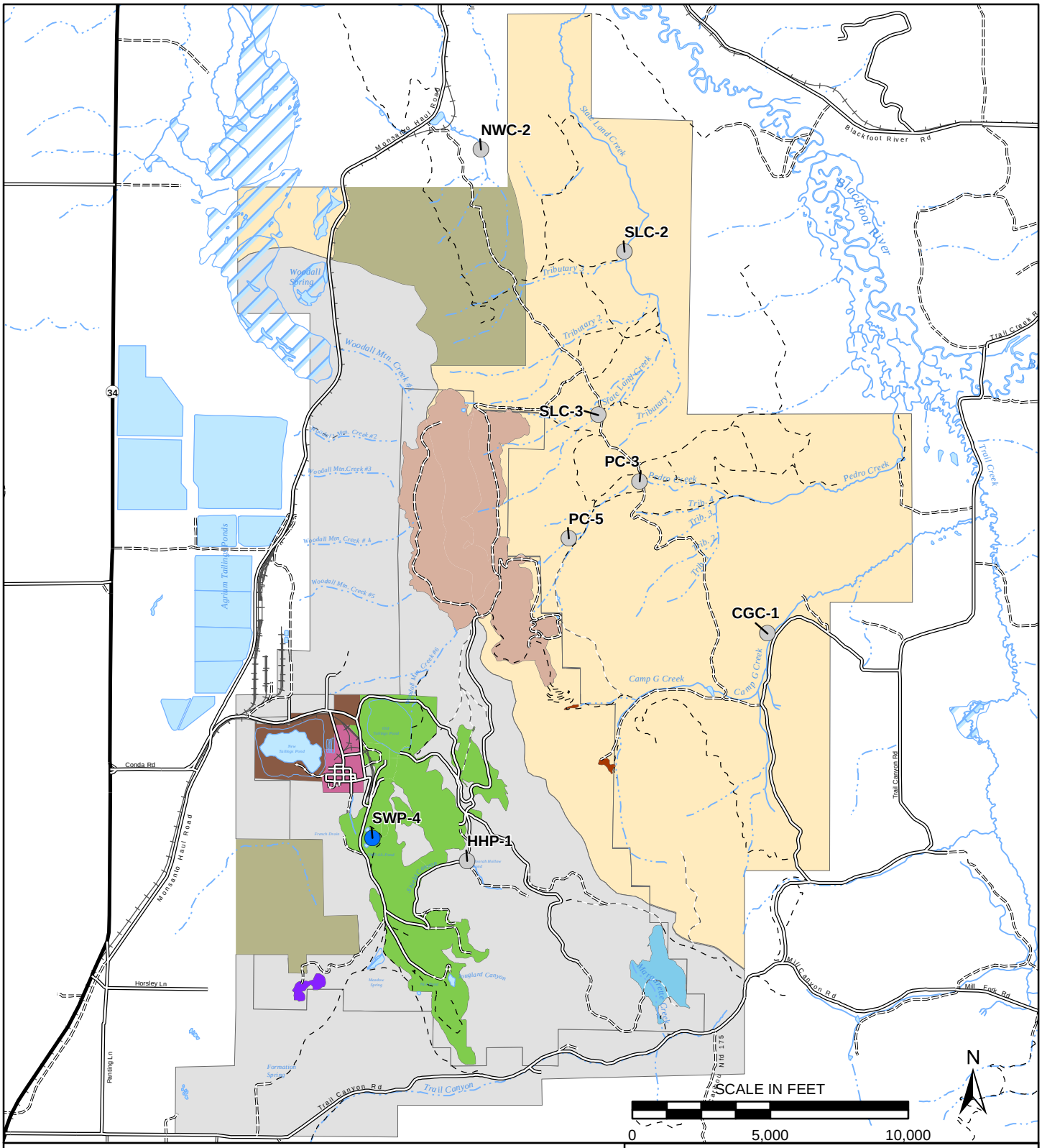
FIGURE 4.3-42

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; DEER MOUSE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

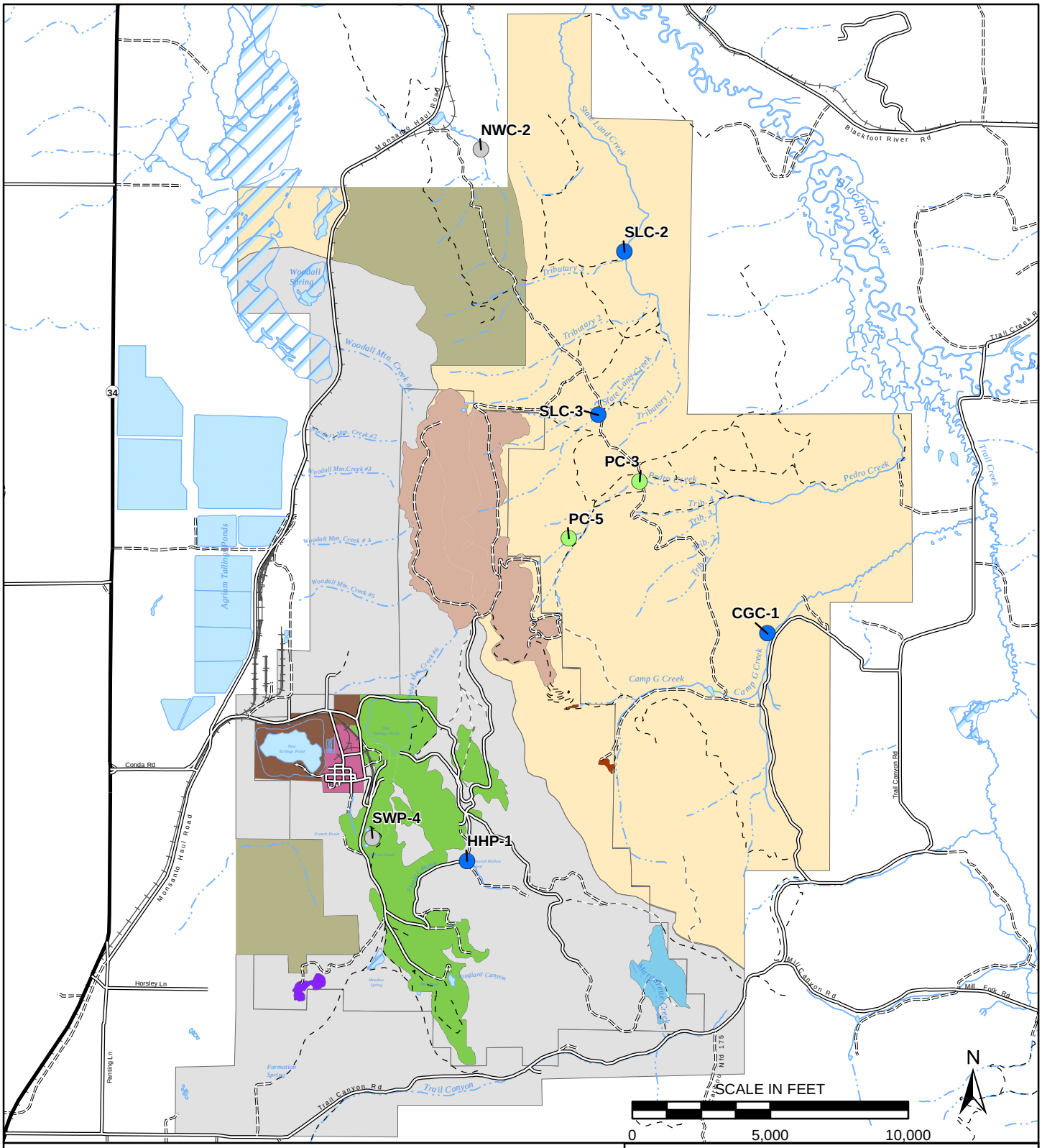
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-43

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; EASTERN COTTONTAIL

DATE: MAR 22, 2016		FORMATION ENVIRONMENTAL
BY: CRL	FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

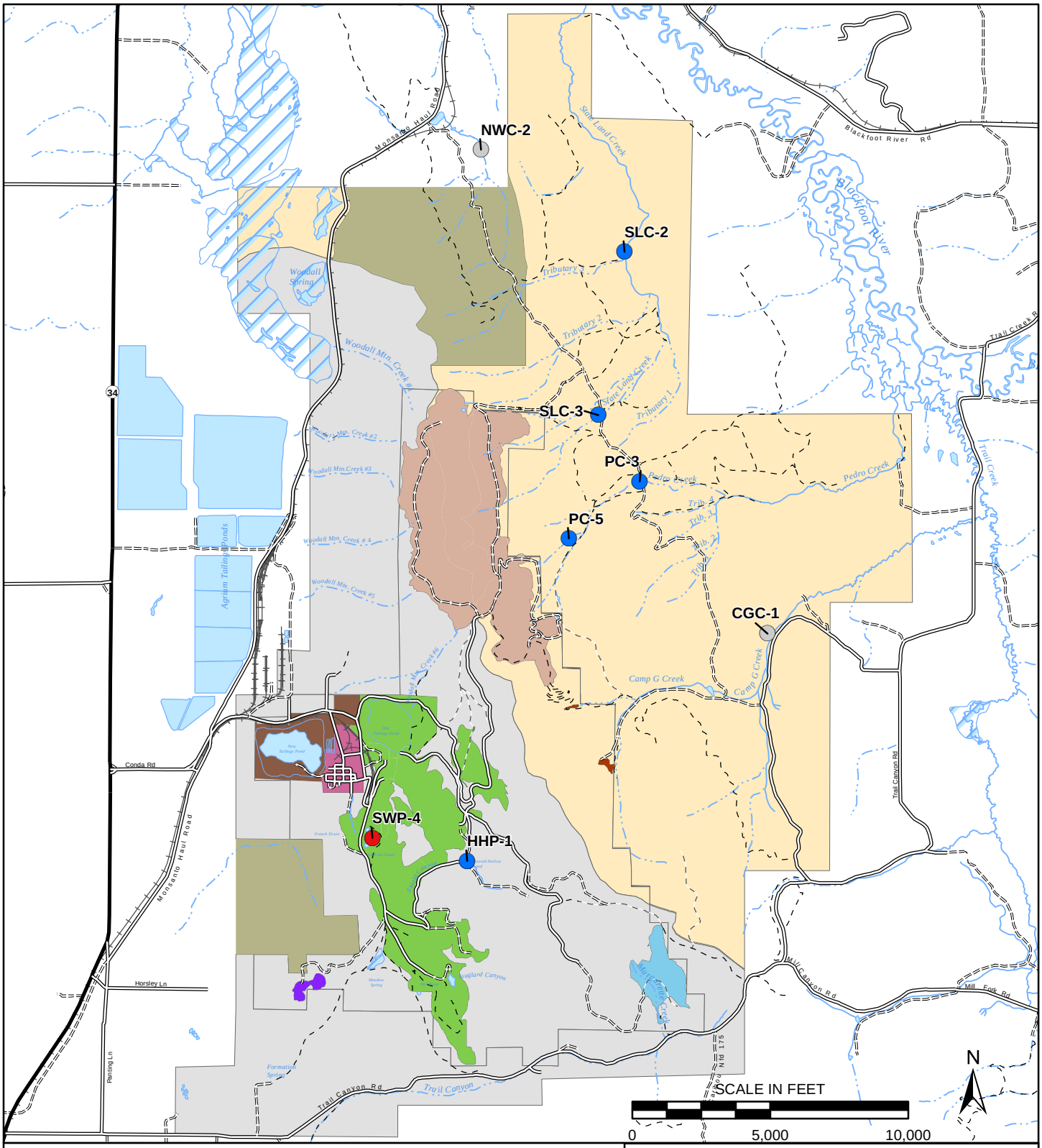
FIGURE 4.3-44

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; GREAT BLUE HERON

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

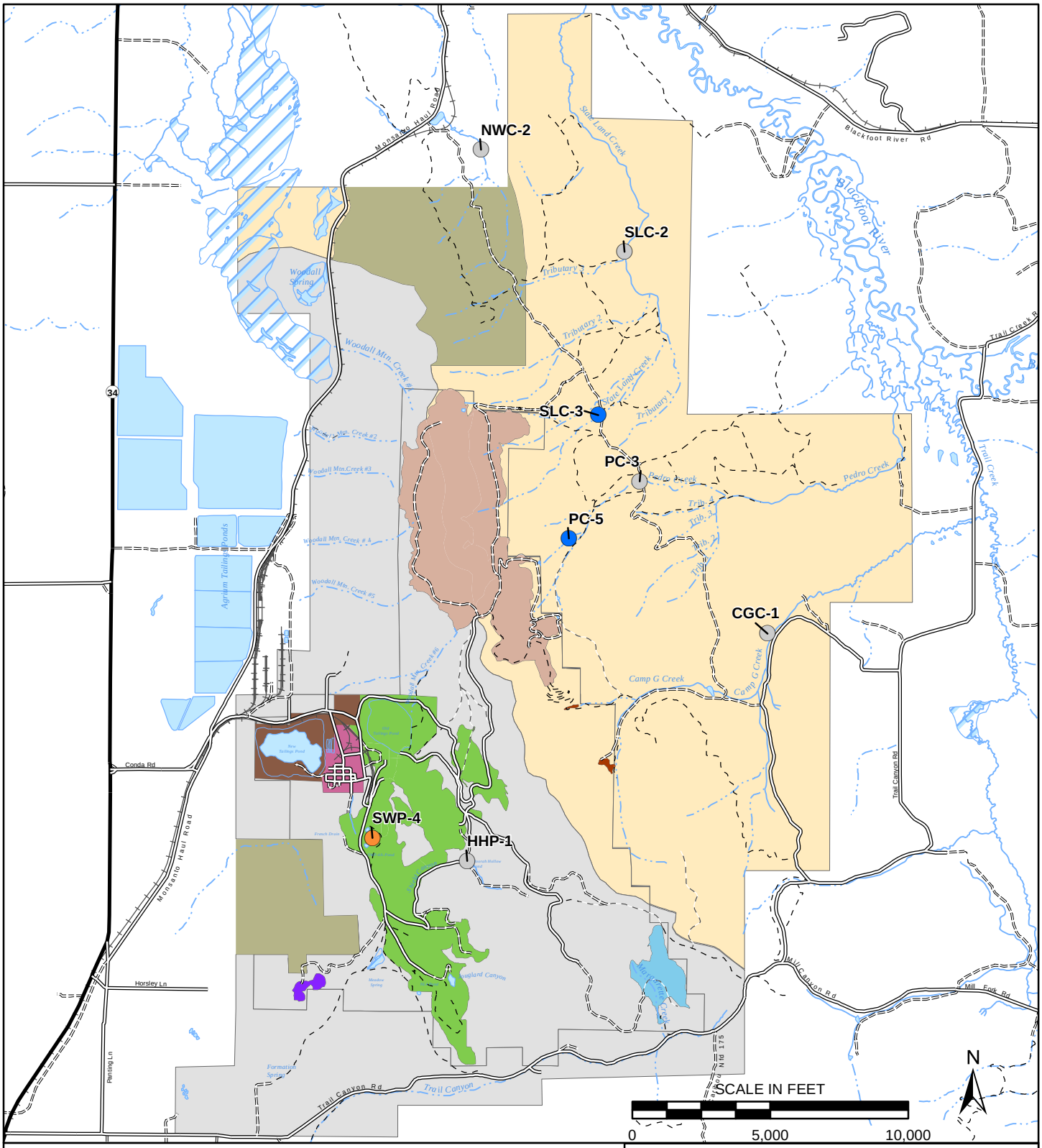
FIGURE 4.3-45

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; MALLARD

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

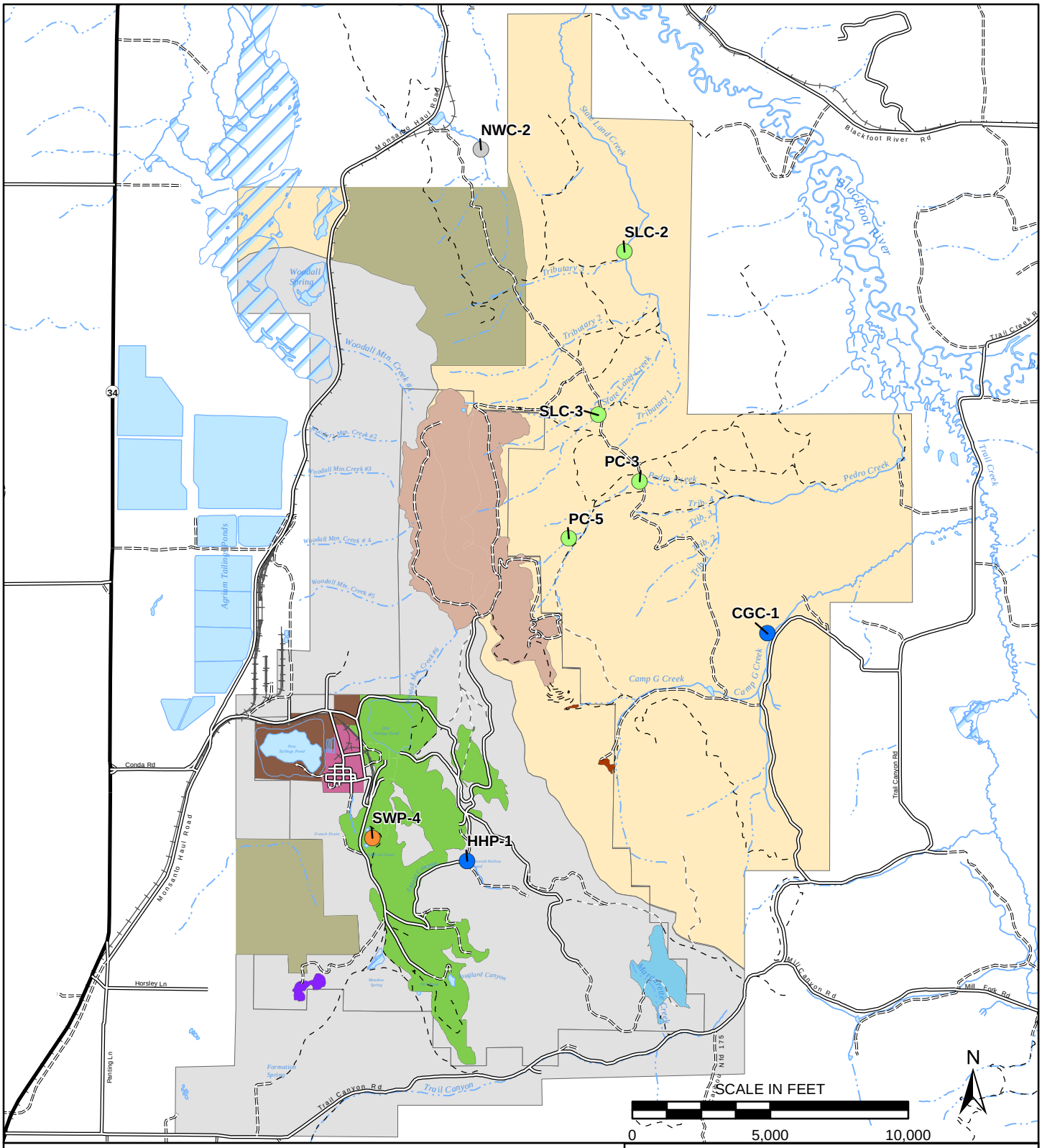
FIGURE 4.3-46

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; MEADOW VOLE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

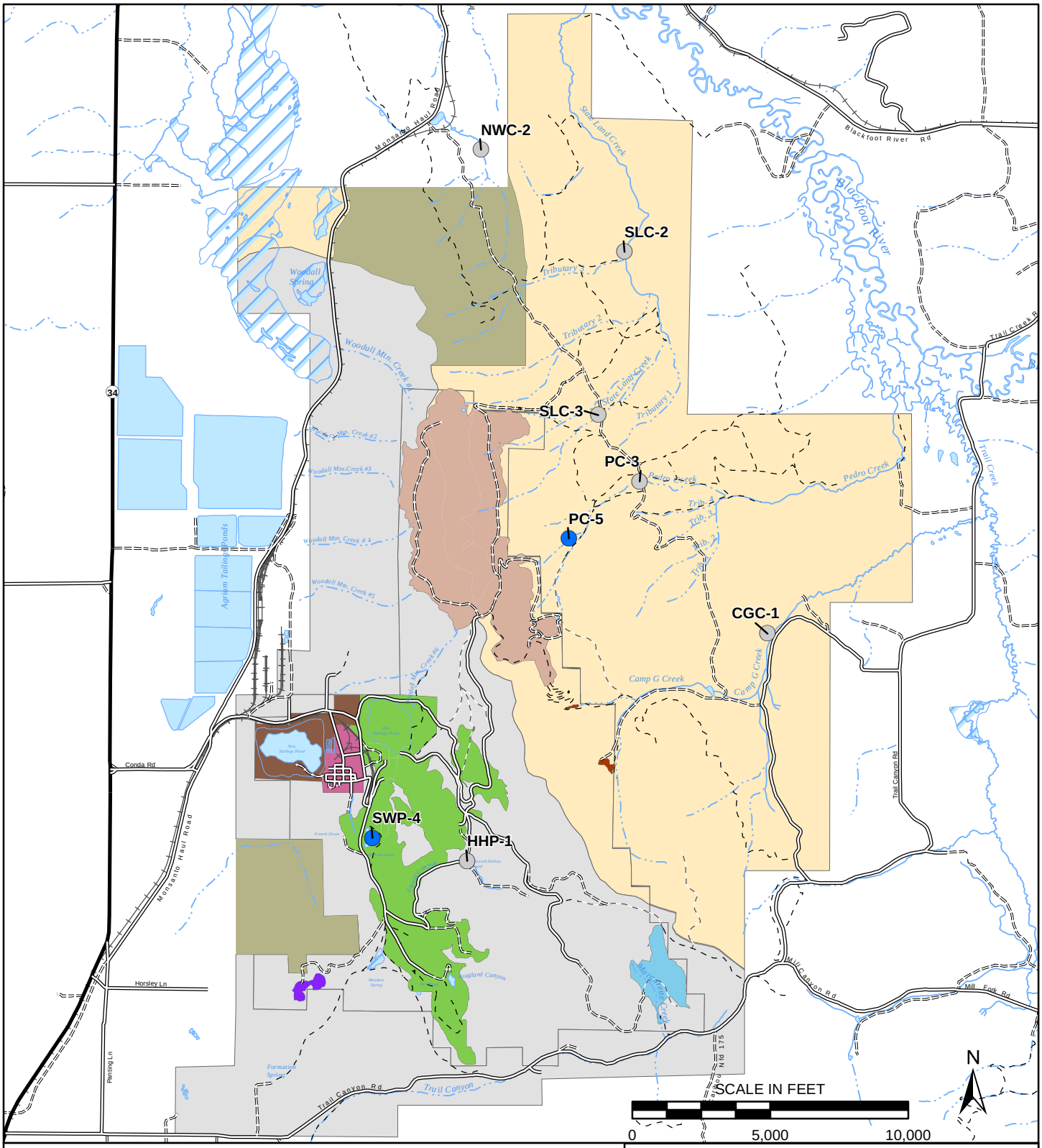
FIGURE 4.3-47

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; MINK

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

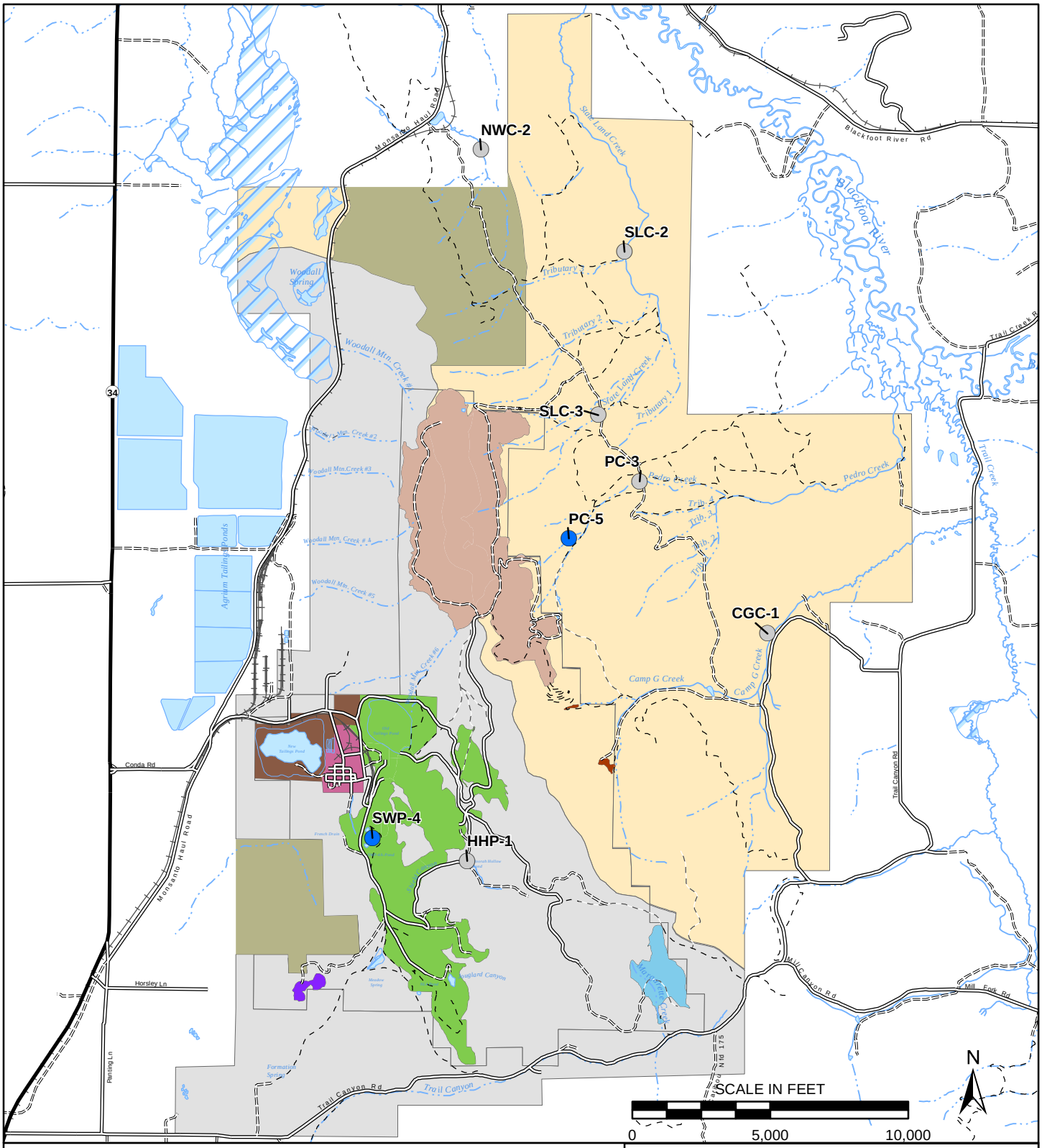
J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.3-48

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; MULE DEER

DATE: MAR 22, 2016	FORMATION ENVIRONMENTAL
BY: CRL FOR: JMA	



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

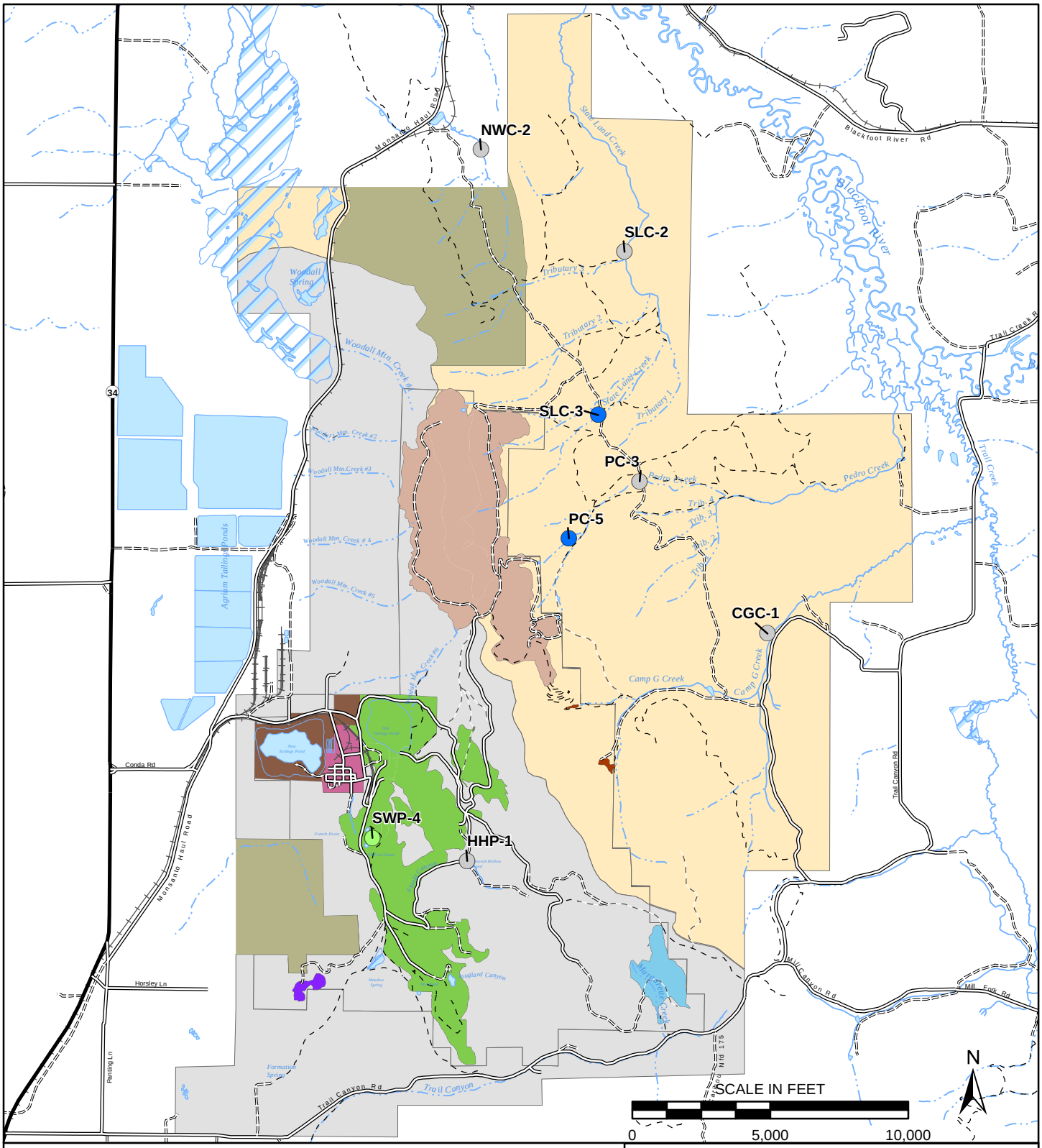
FIGURE 4.3-49

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; NORTHERN BOBWHITE

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

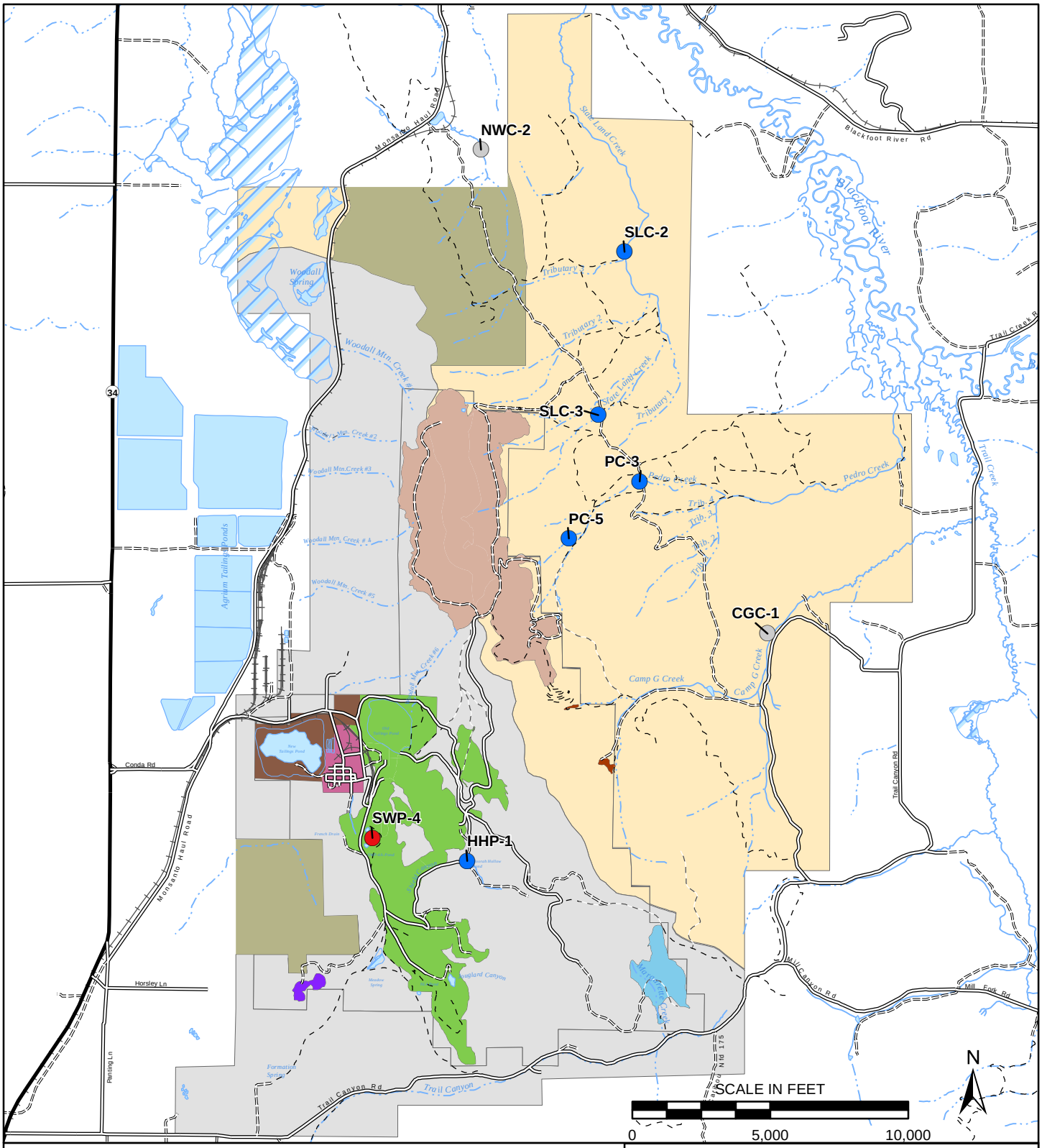
FIGURE 4.3-50

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; NORTHERN HARRIER

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

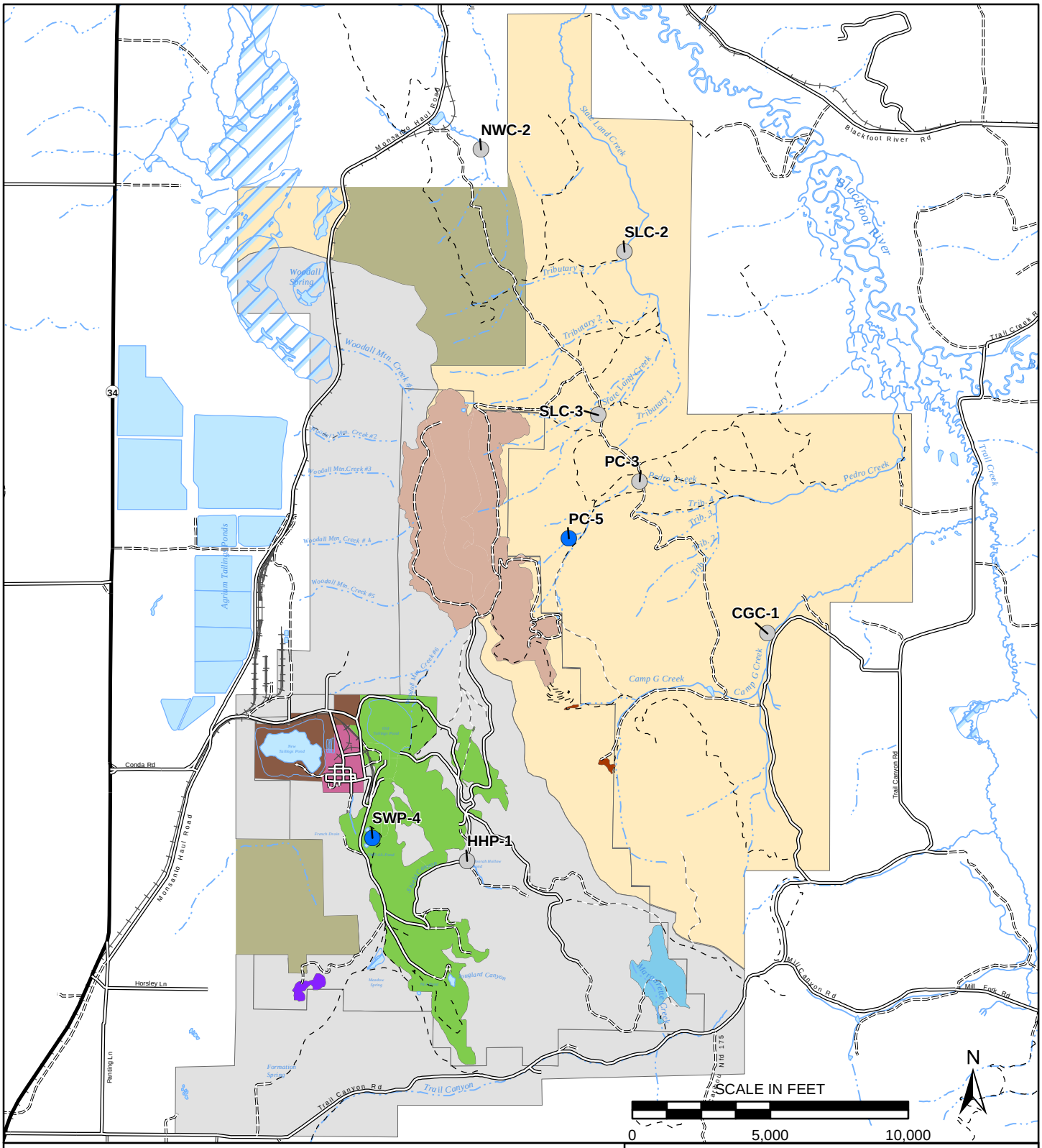
FIGURE 4.3-51

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; RACCOON

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

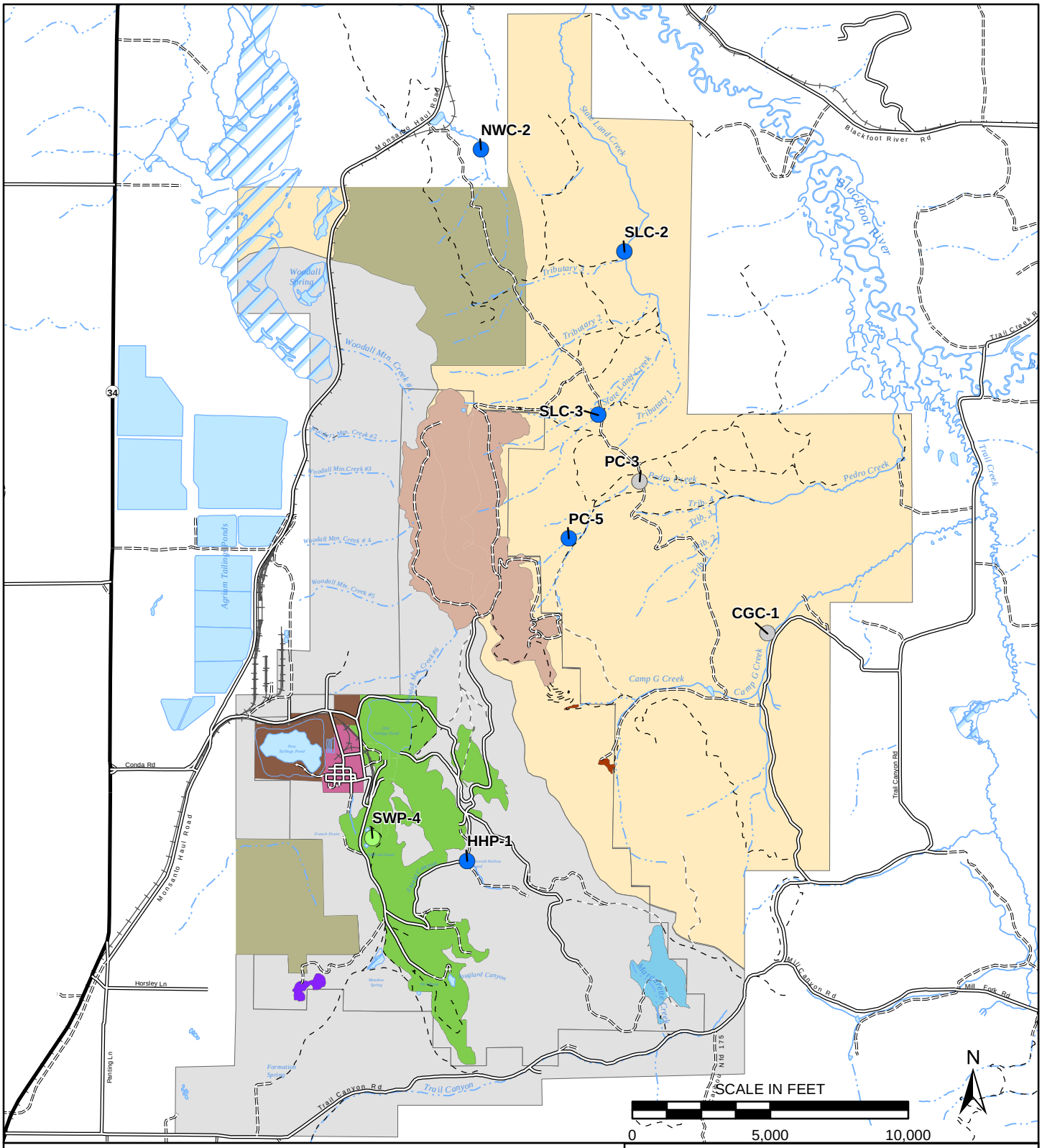
FIGURE 4.3-52

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES SELENIUM; RED-WINGED BLACKBIRD

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

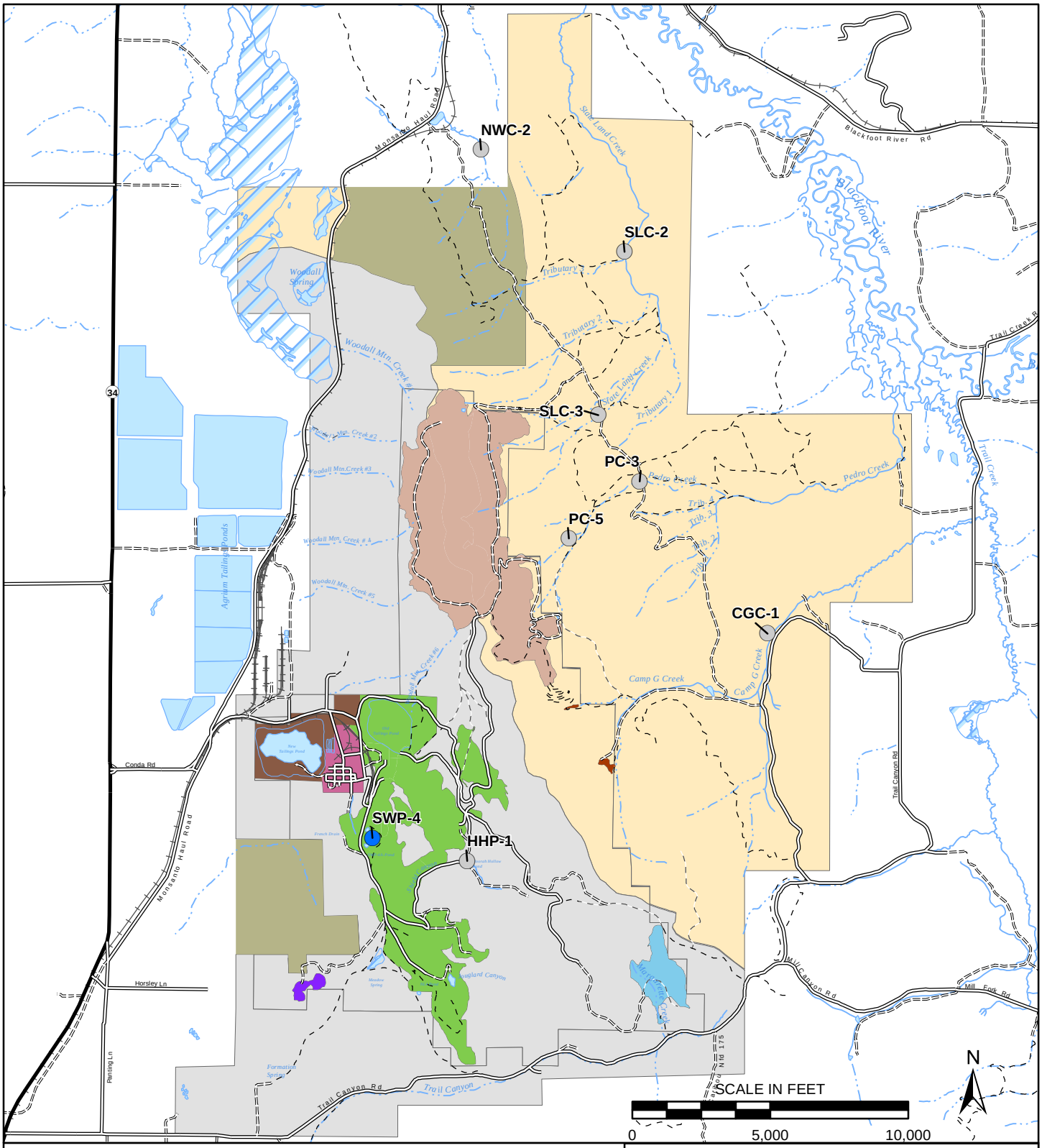
FIGURE 4.3-53

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES VANADIUM; MALLARD

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

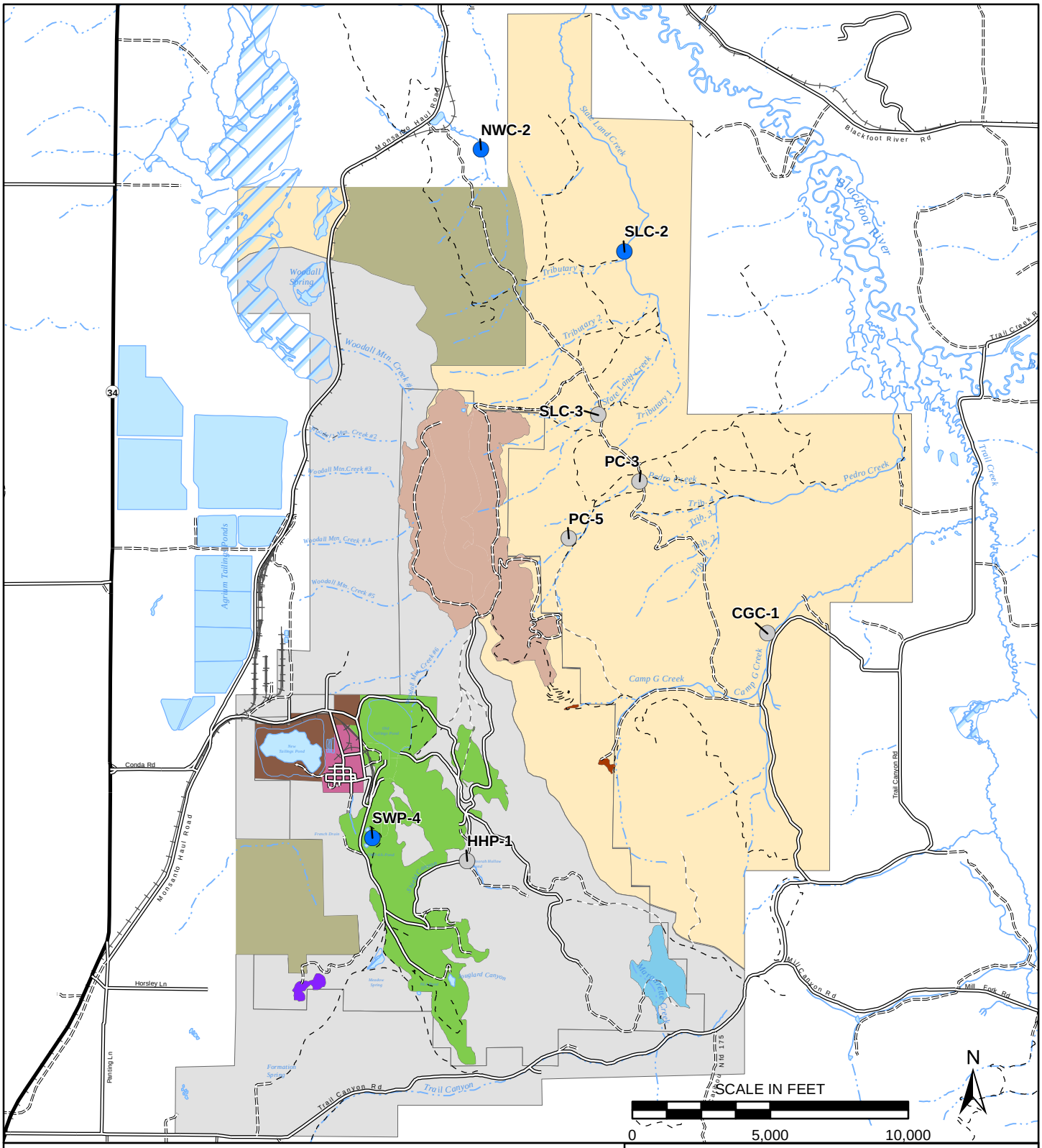
FIGURE 4.3-54

RIPARIAN TIER 2
HAZARD QUOTIENTS
LOCATIONS WITH BIOTA SAMPLES
VANADIUM; RED-WINGED BLACKBIRD

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

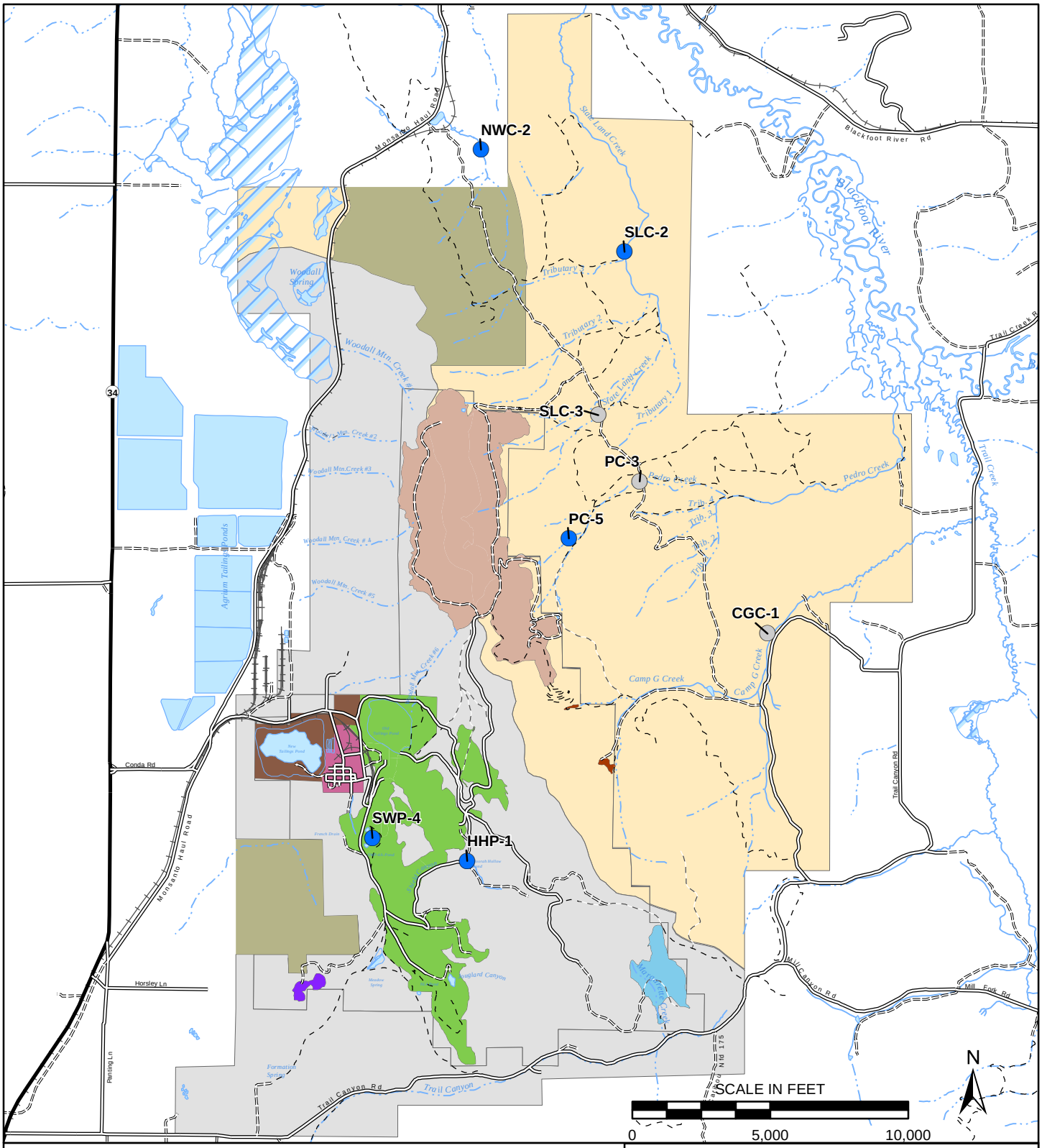
FIGURE 4.3-55

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES VANADIUM; AMERICAN ROBIN

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

Exposure Units

- Woodall/E. Woodall/S. Woodall panels EU
- Camp G and H Areas EU
- Ibex/M. Limb/W. Limb panels & OTP area EU
- North Trail Panel EU
- Grace Panel EU
- Former Townsite EU
- Background EUs
- Active Mine features
- Downgradient EU - Eastside
- Downgradient EU - Westside

J.R. SIMPLOT COMPANY

CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

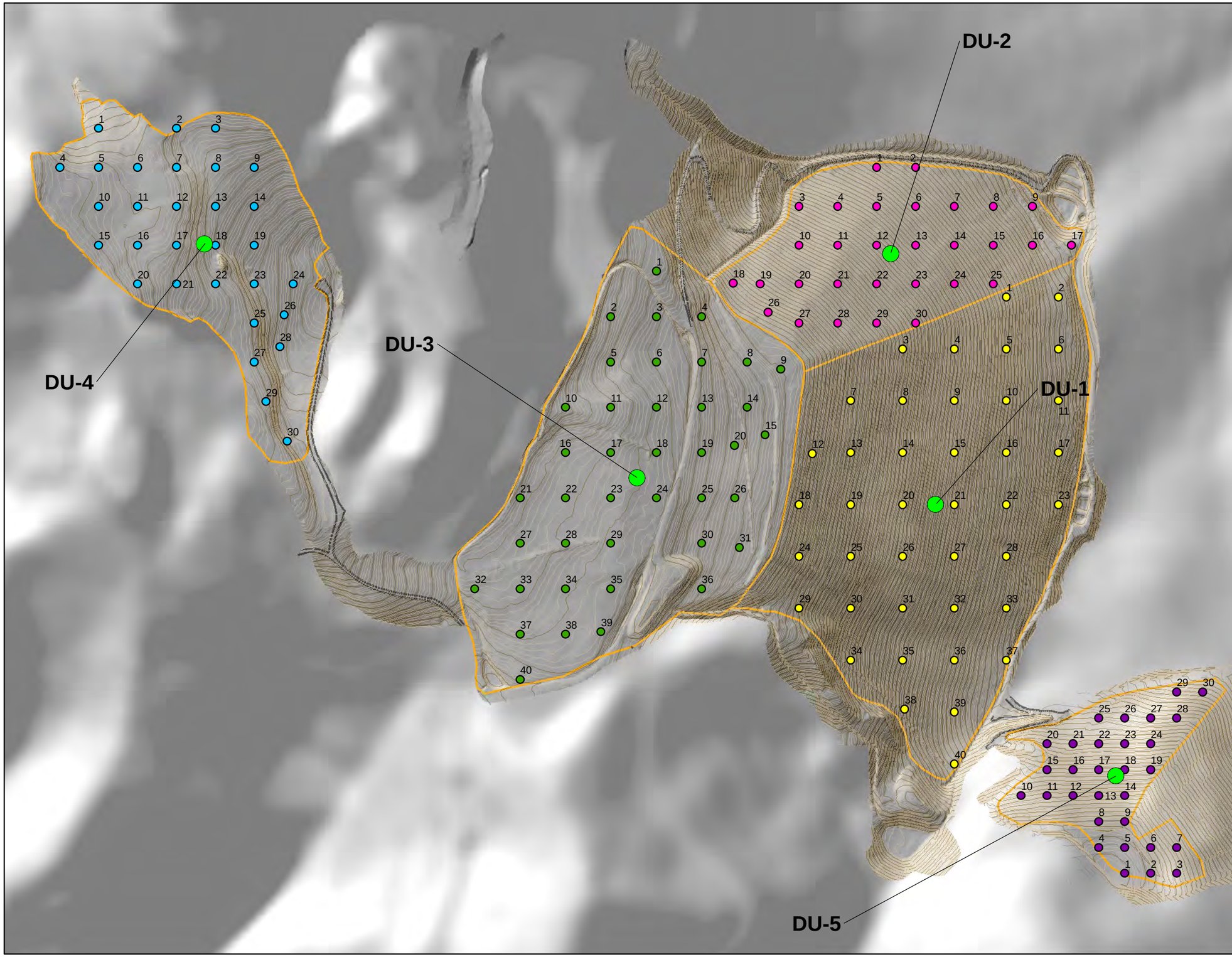
FIGURE 4.3-56

RIPARIAN TIER 2 HAZARD QUOTIENTS LOCATIONS WITH BIOTA SAMPLES ZINC; NORTHERN HARRIER

DATE: MAR 22, 2016

BY: CRL | FOR: JMA

FORMATION ENVIRONMENTAL



Legend

- NTCRA Decision Units

2015 FINAL As-Built Survey

- Edge of Gravel
- Edge of Dirt Road
- Index Contour (5 ft)
- Non-index Contour (1 ft)
- NTCRA Decision Units (DUs)

Note:
Three replicate samples were collected at DU-5 (Sample numbers 1, 2, 3).

N

0 200 400 800
Feet

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

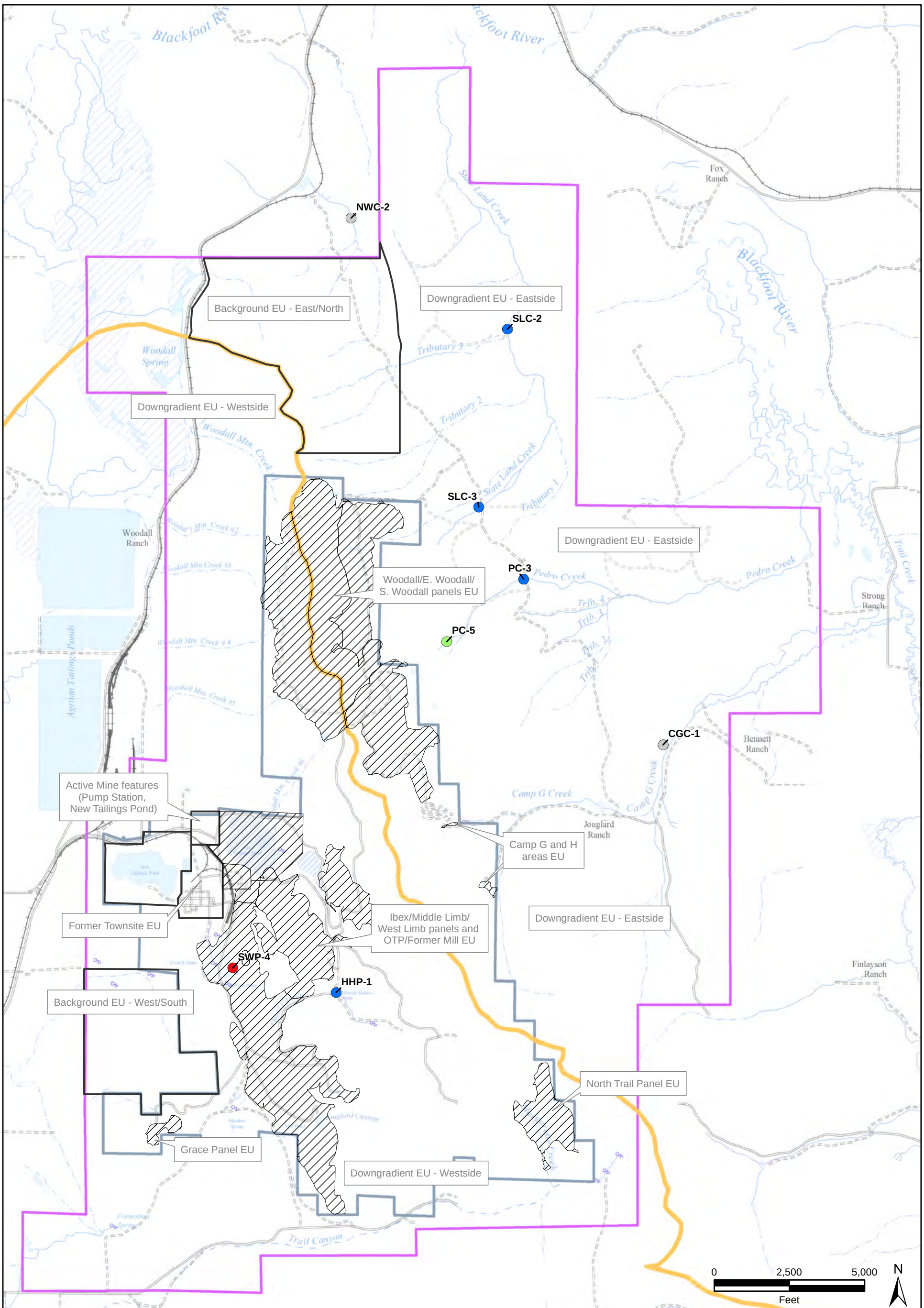
FIGURE 4.3-57

DECISION UNITS AND 2015 SOIL AND VEGETATION SAMPLING INCRIMENTS

DATE: MAR 08, 2016
BY: DDZ | FOR: RPS

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RiA_2015\SSERA\Fig4_3_57_PRSC_DecisionUnits.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

- Major Watershed Boundary
- Mine Area
- Non-Mine Area

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

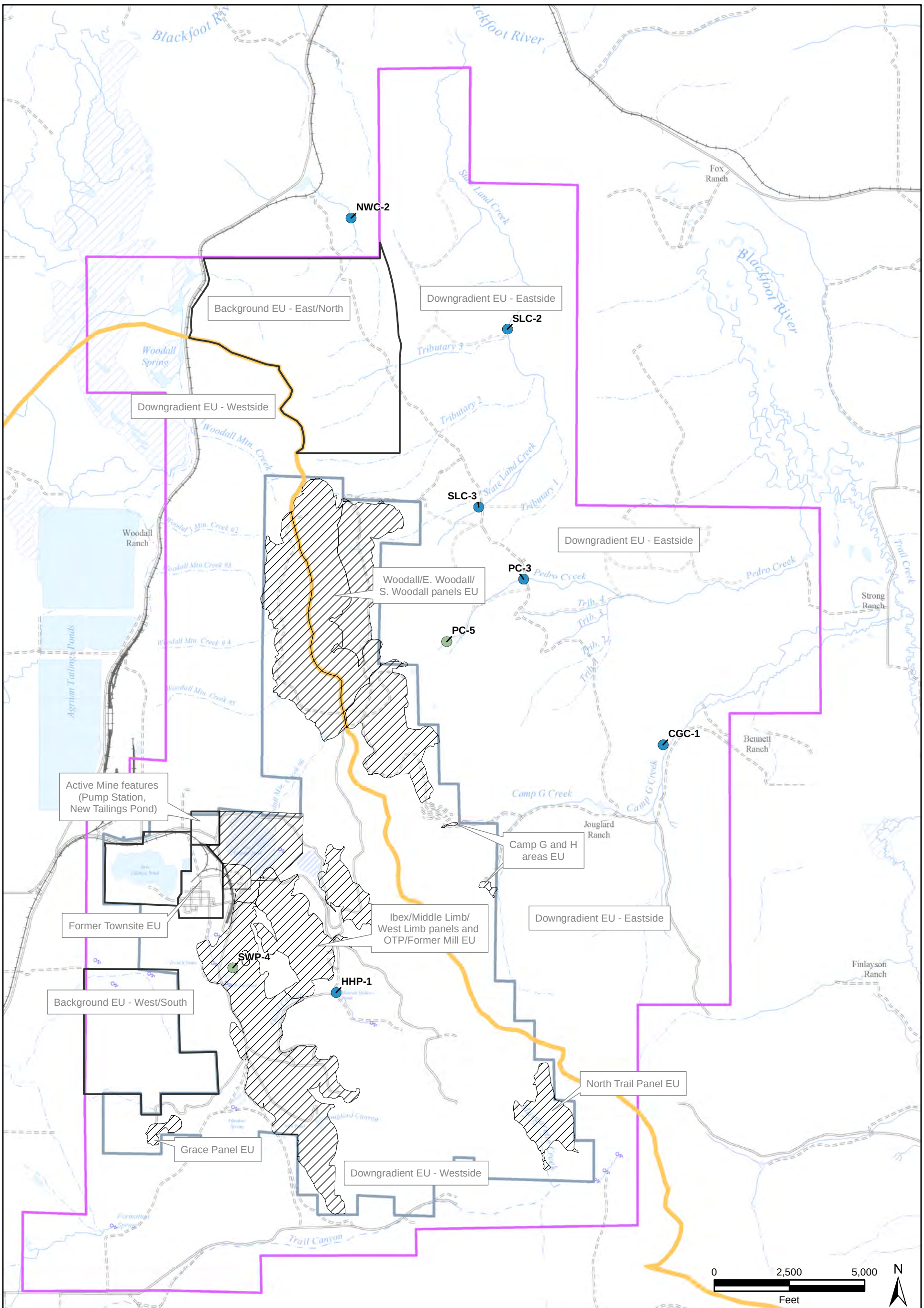
FIGURE 4.4-1

RIPARIAN TIER 2 HQs
SELENIUM;MALLARD;
GEOMETRIC MEAN NOAEL TRV

DATE: MAR 08, 2016
BY: CRL
FOR: RPS

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_4_01_Selenium_Mallard_rev.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 -10
- 10 - 20
- > 20

- Major Watershed Boundary
- Mine Area
- Non-Mine Area

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

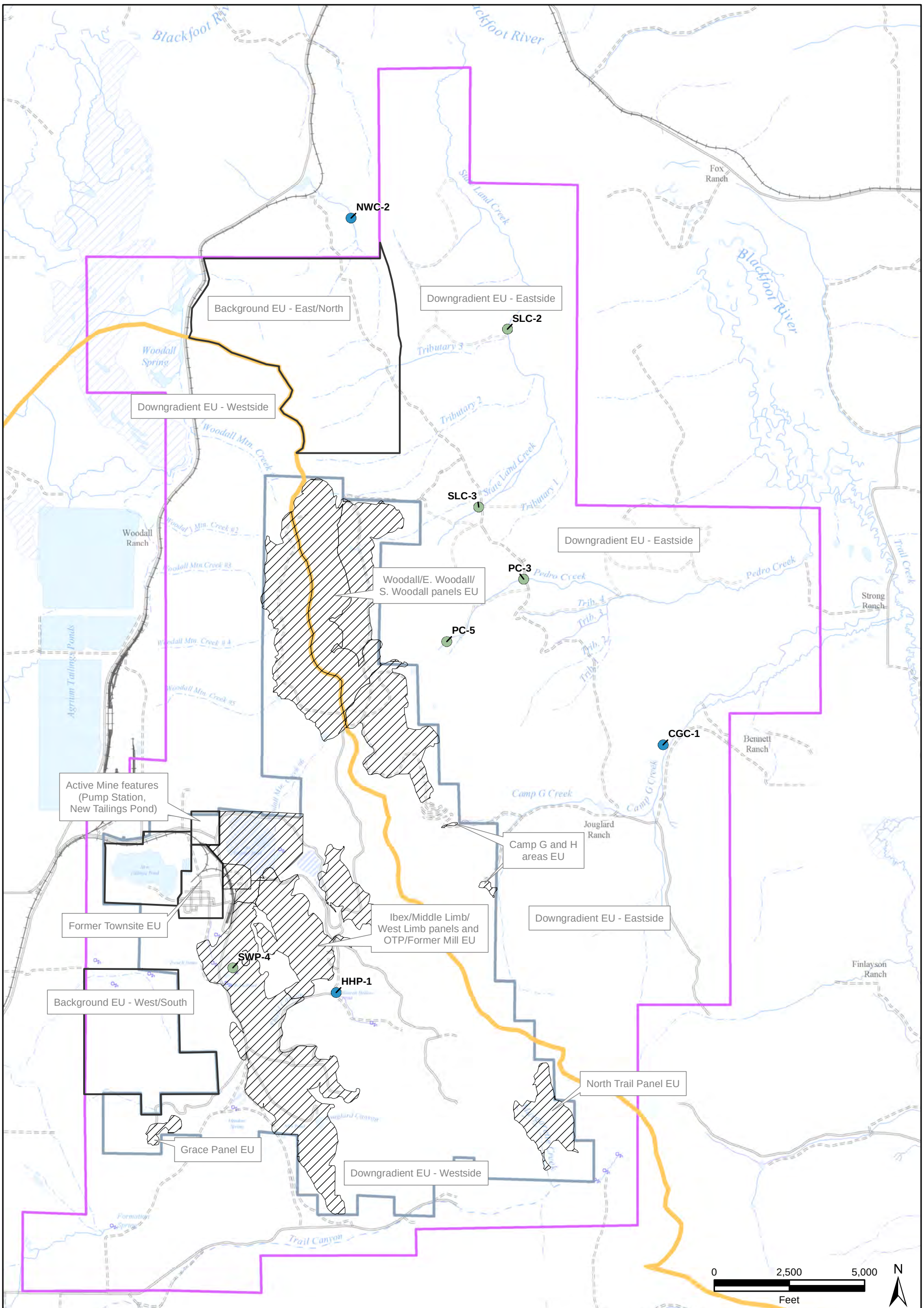
FIGURE 4.4-2

RIPARIAN TIER 2 HQs SELENIUM; MEADOW VOLE; GEOMETRIC MEAN NOAEL TRV

DATE: MAR 08, 2016
BY: CRL
FOR: RPS

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_4_02_Selenium_Meadow_Vole_rev.mxd



Legend

Hazard Quotient

- < 1
- 1 - 5
- 5 - 10
- 10 - 20
- > 20

- Major Watershed Boundary
- Mine Area
- Non-Mine Area
- Non-Mine Area

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

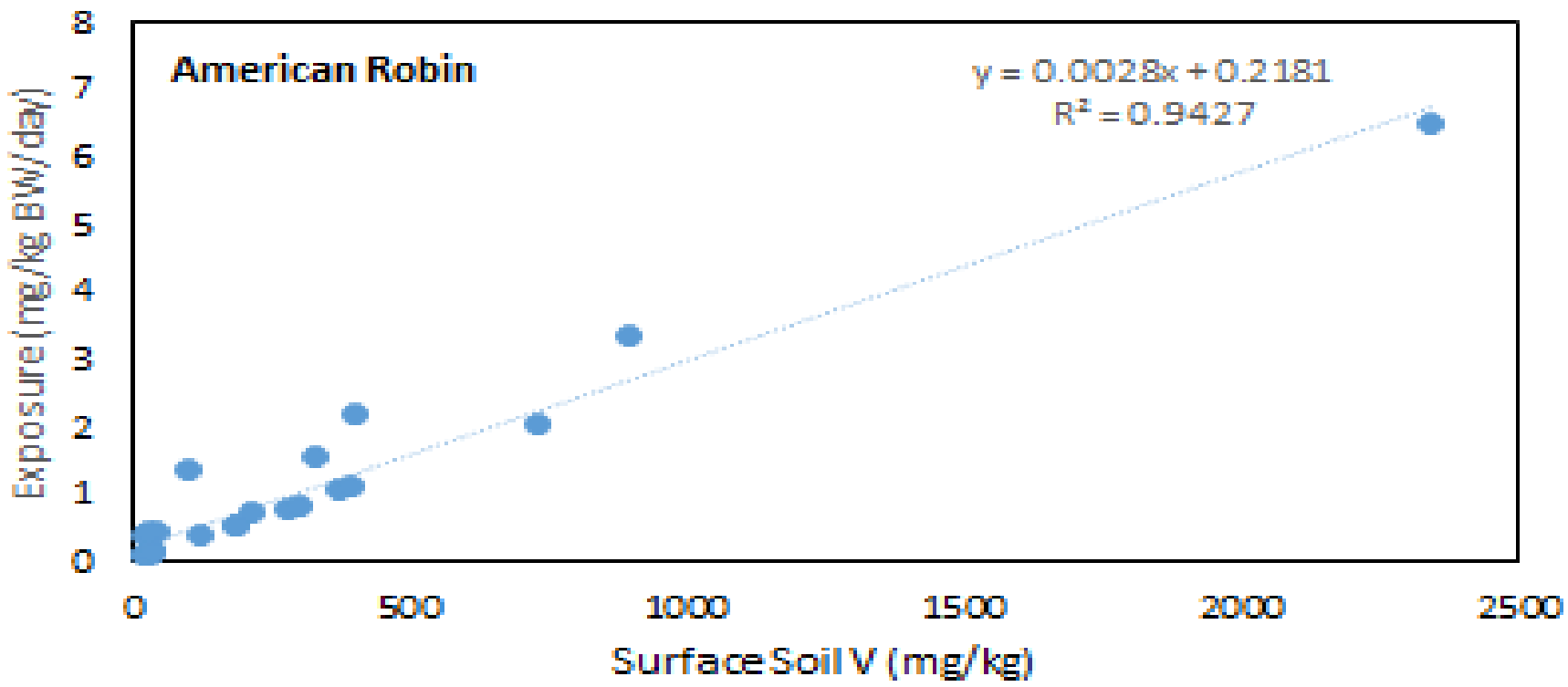
FIGURE 4.4-3

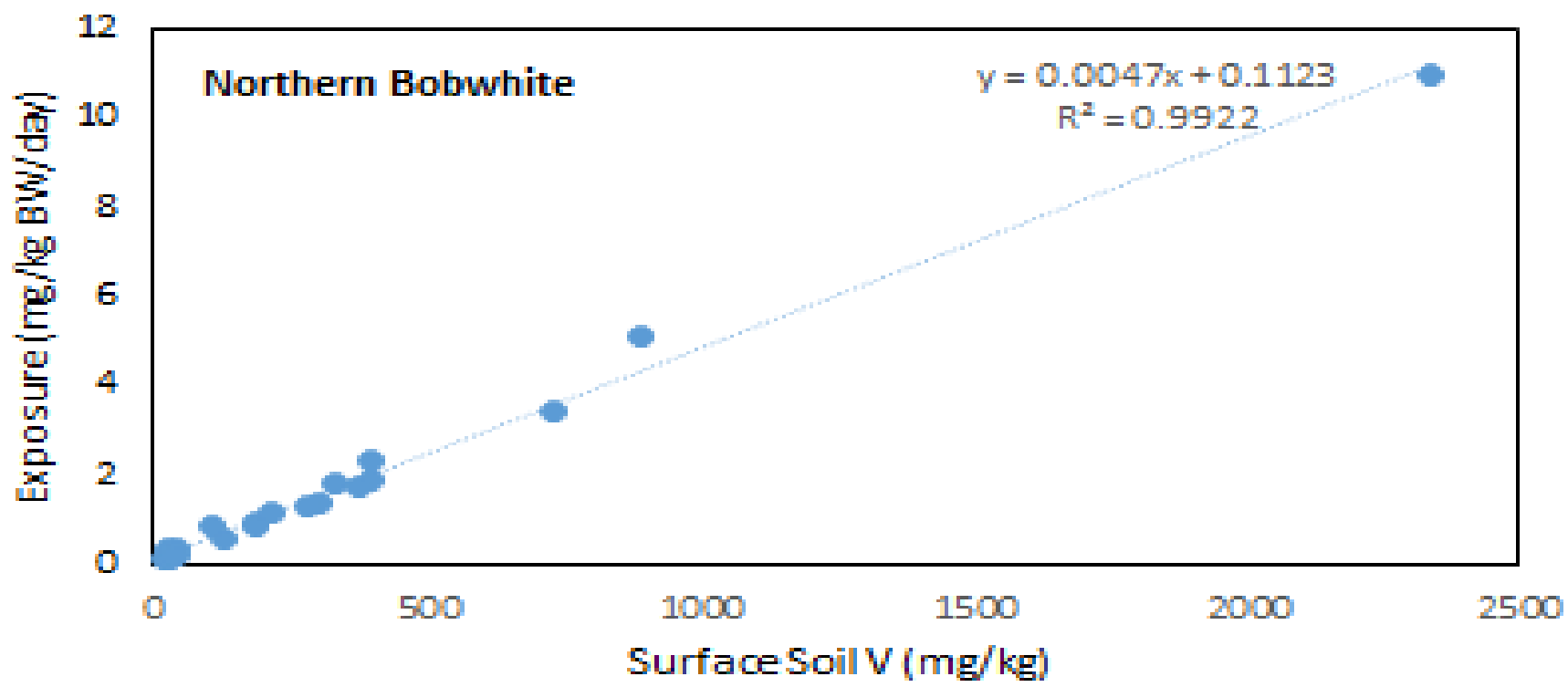
RIPARIAN TIER 2 HQs SELENIUM; MINK; GEOMETRIC MEAN NOAEL TRV

DATE: MAR 08, 2016
BY: CRL
FOR: RPS

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SSERA\Fig4_4_03_Selenium_Mink_Rev.mxd





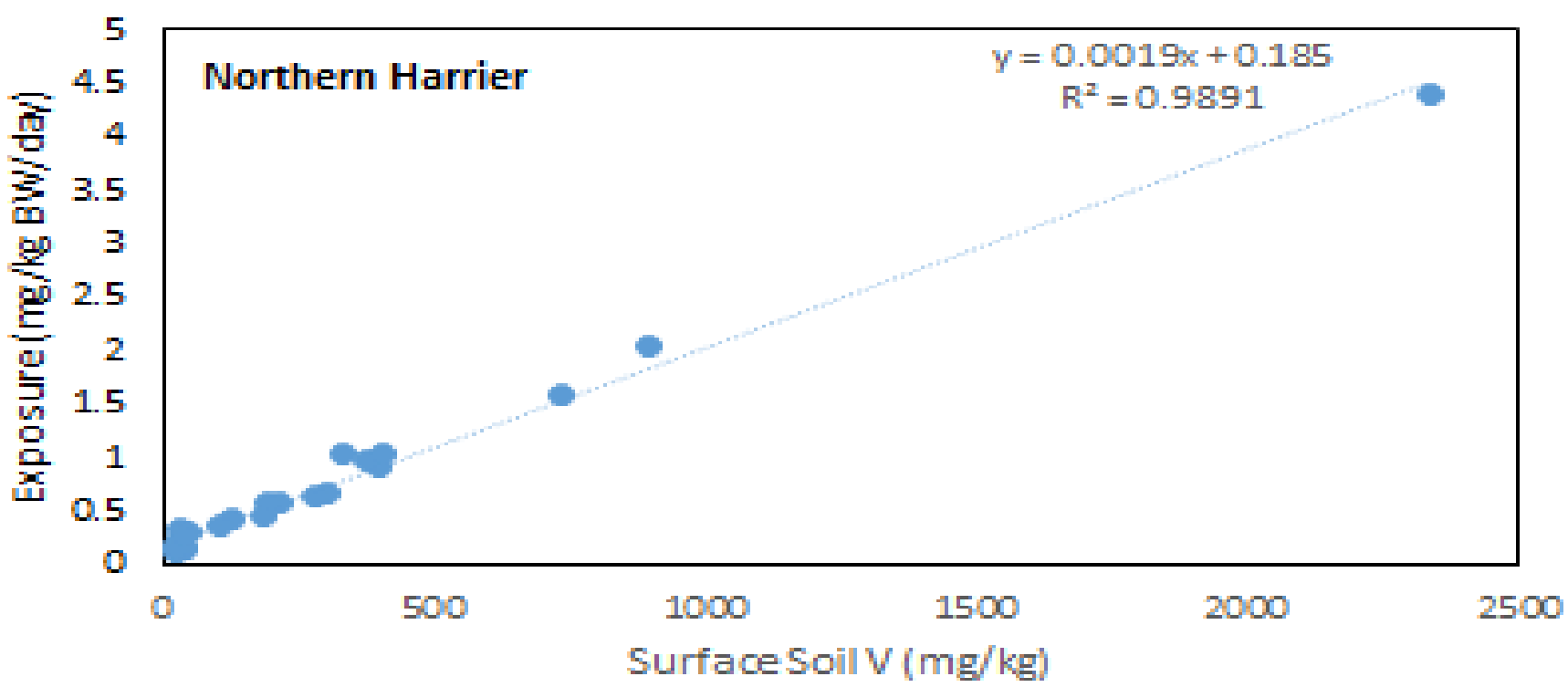
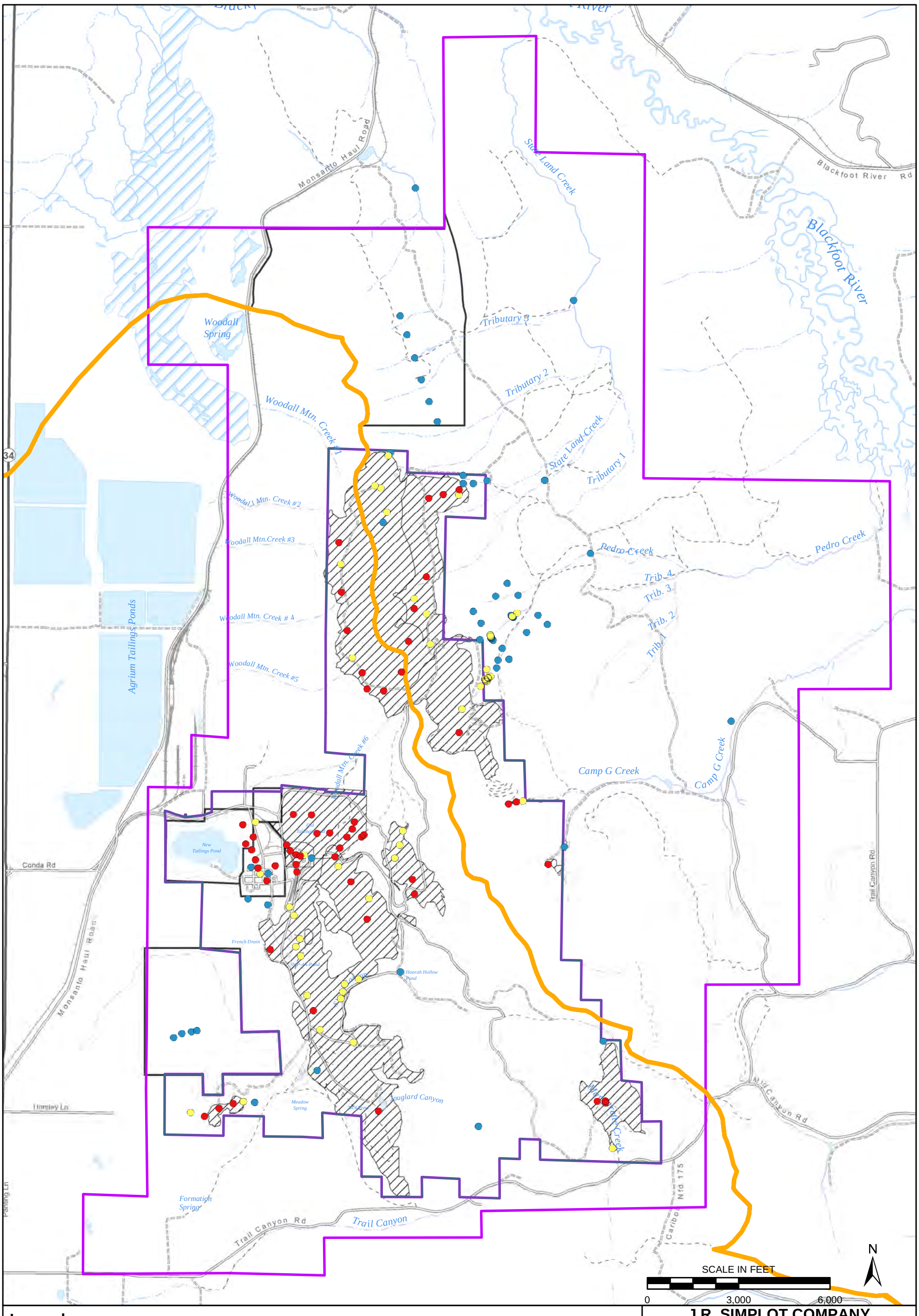


FIGURE 4.4-4 Calculated Exposure Versus Surface Soil Vanadium Concentration for Sampling Locations

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

DATE: MAY 30, 2015
BY: AJ
FOR: RPS
FORMATION ENVIRONMENTAL

"S:\Jobs\0442-001-900-Simplot-Conda\RIFS_RiskAssessRpts\ERA\DrftReport\Figures\source files\Fig4_4-04.ppt"



Legend

- Major Watershed Boundary
- Mine Area
- Non-Mine Area
- Railroad
- Primary Highway
- Major Road
- Minor Road
- Unimproved Road
- Trail (4WD)
- Trail (Other than 4WD)
- Lake/Pond
- Reservoir
- Swamp/Marsh
- Intermittent Stream
- Perennial Stream

Surface Soil Vanadium (mg/kg)

- < 64 mg/kg; < LOAEL TRV
- 64 - 229 mg/kg; > LOAEL TRV < Geometric Mean NOAEL TRV
- > 229 mg/kg; > Geometric Mean NOAEL TRV

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 4.4-5

SURFACE SOIL VANADIUM COMPARED TO RISK-BASED BENCHMARKS BOBWHITE; LOAEL TRV AND GEOMETRIC MEAN TRV

DATE: MAR 08, 2016
BY: CRL
FOR: JMA

FORMATION ENVIRONMENTAL

S:\GIS\arcpro\2\010139\plt\RIA_2015\SSERA\Fig4_4_05_Vanadium_SL.mxd

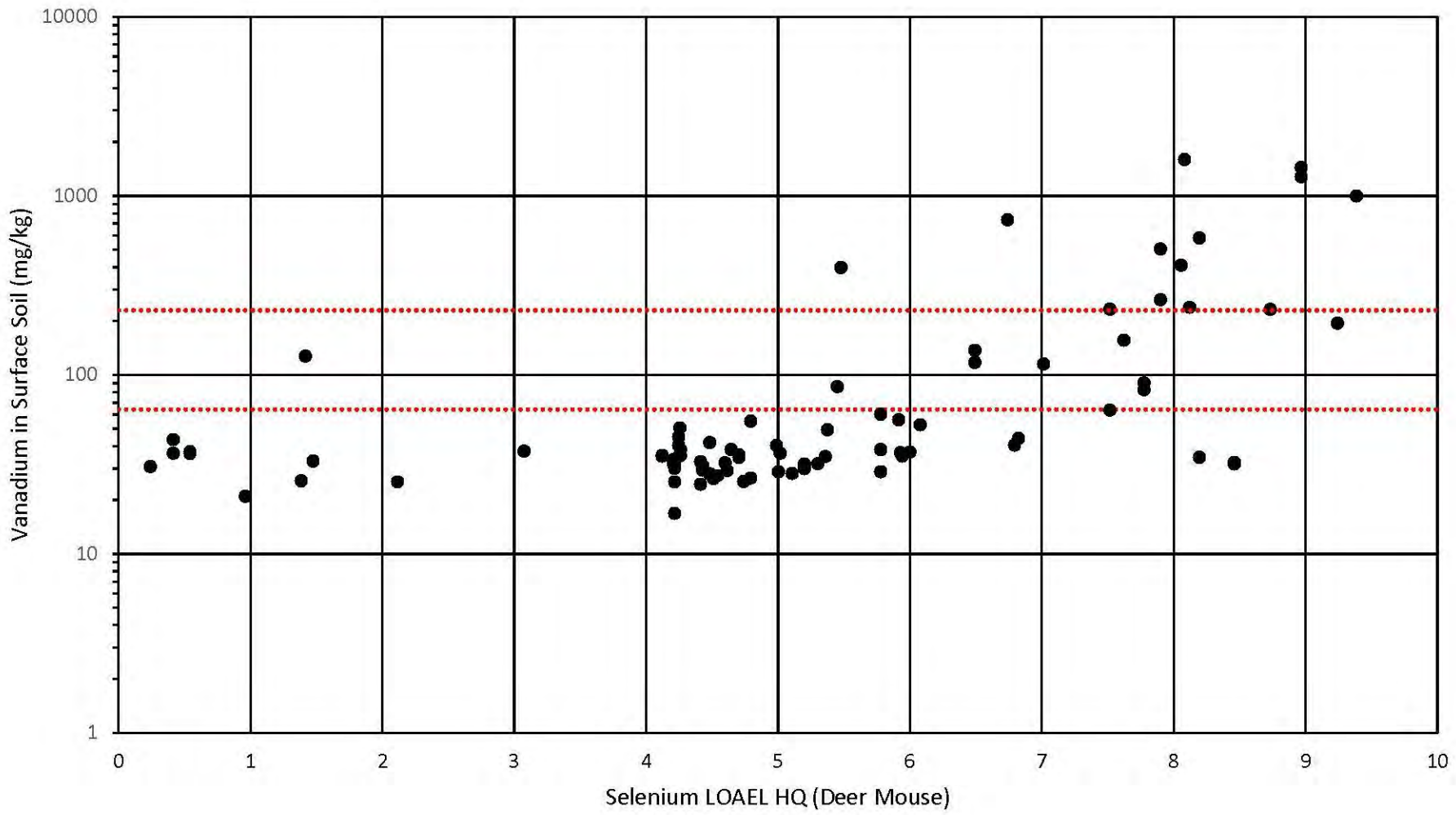


FIGURE 4.4-6 Soil Vanadium Compared to Collocated Selenium Hazard Quotients

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

DATE: MAY 28, 2015
BY: AJ
FOR: RPS

FORMATION ENVIRONMENTAL

"S:\Jobs\0442-001-900-Simplot-Conda\RIFS_RiskAssess\Rpts\ERA\DrftReport\Figures\source files\Fig4_4_06.ppt"

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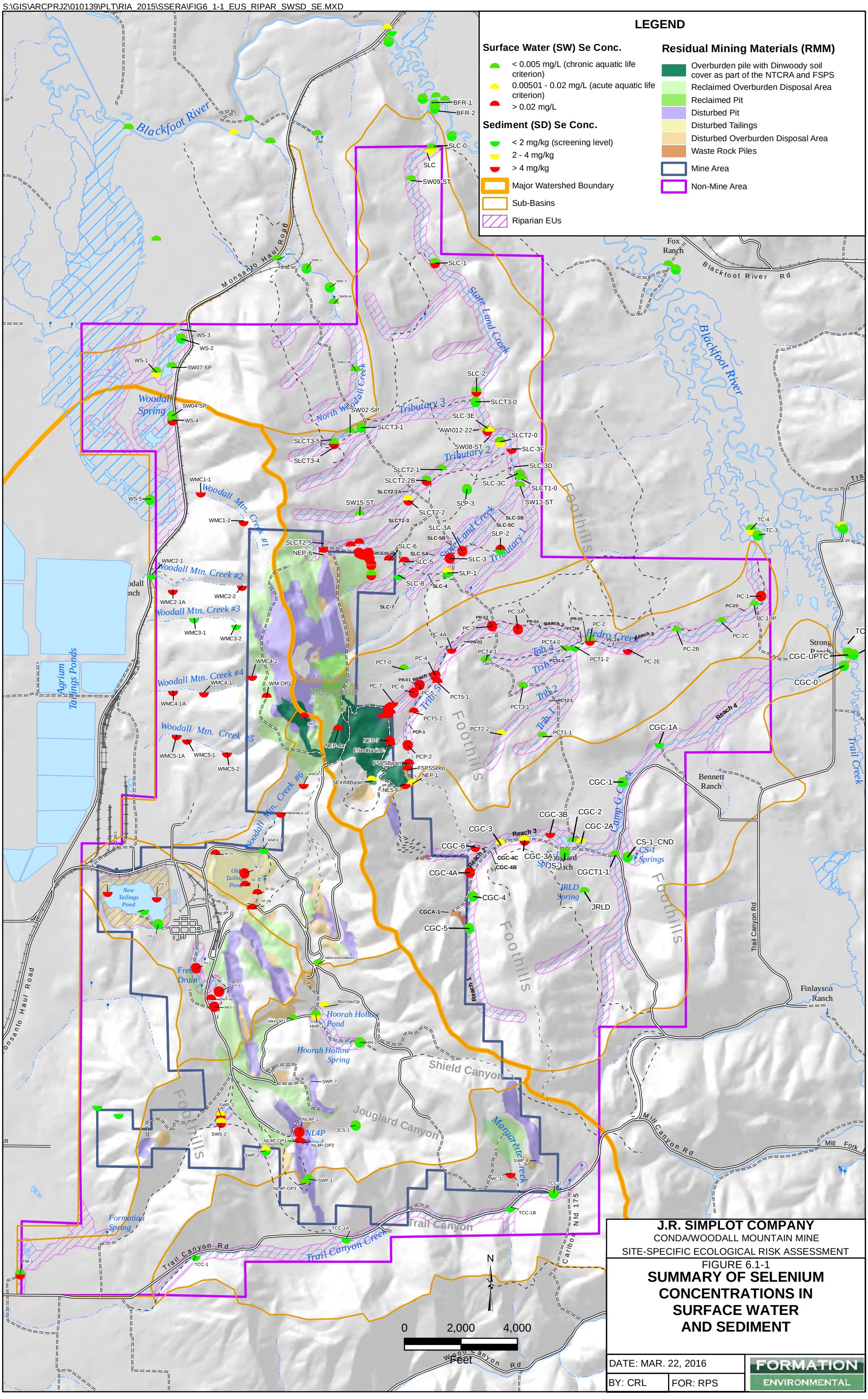
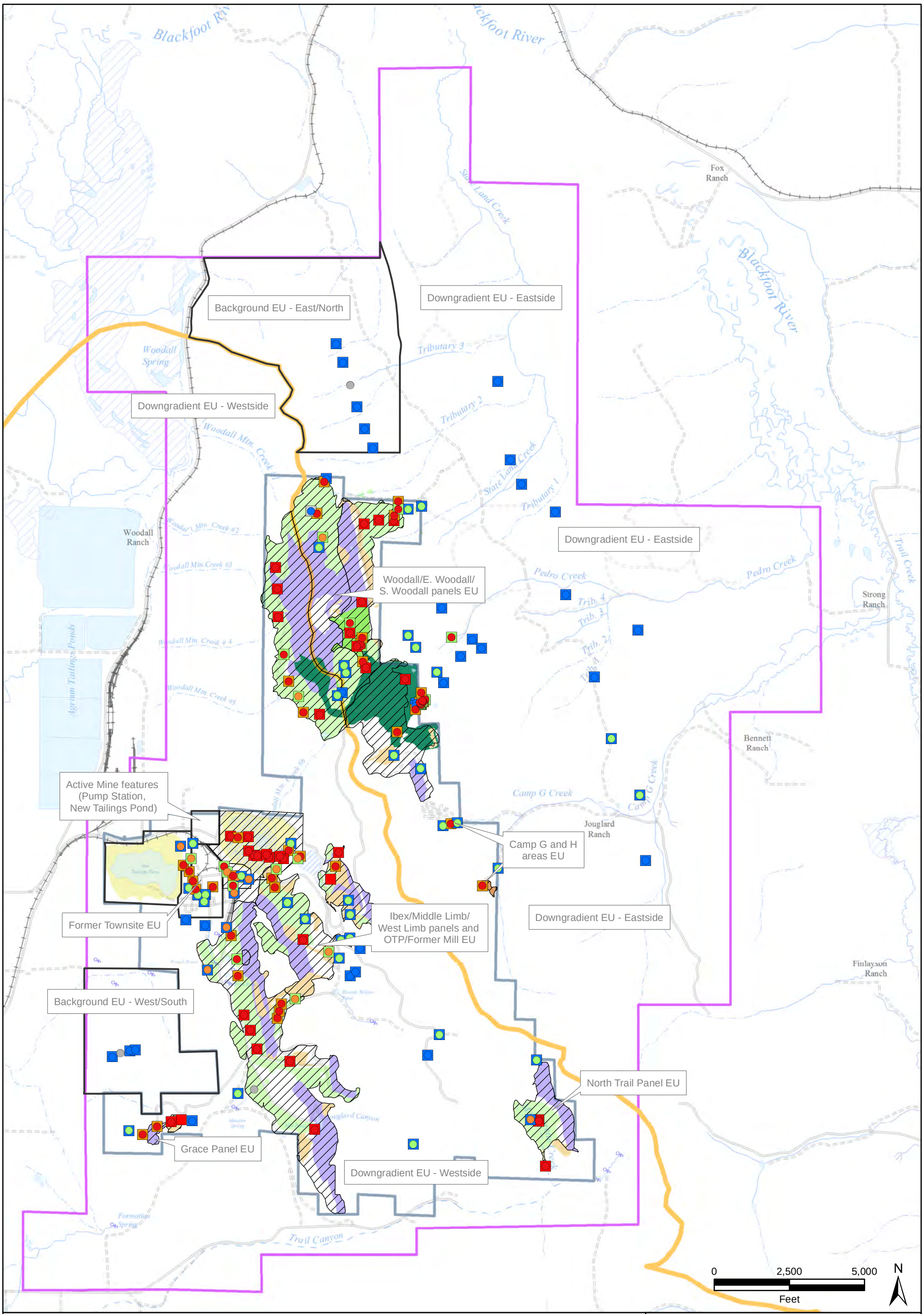


J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 6.1-1
SUMMARY OF SELENIUM CONCENTRATIONS IN SURFACE WATER AND SEDIMENT

DATE: MAR. 22, 2016
BY: CRL
FOR: RPS

FORMATION ENVIRONMENTAL



Legend

Hazard Quotient - Deer Mouse	Hazard Quotient - Am Robin
< 1	< 1
1 - 5	1 - 5
5 - 10	5 - 10
10 - 20	10 - 20
> 20	> 20

Note: HQs for both receptors based on the mean NOAEL TRV.

- Major Watershed Boundary
- Mine Area
- Non-Mine Area

Residual Mining Materials (RMM)

- Overburden pile with Dinwoody soil cover as part of the NTCRA and FSPS
- Reclaimed Overburden Disposal Area
- Reclaimed Pit
- Disturbed Pit
- Disturbed Tailings
- Disturbed Overburden Disposal Area
- Waste Rock Piles

J.R. SIMPLOT COMPANY
CONDA/WOODALL MOUNTAIN MINE
SITE-SPECIFIC ECOLOGICAL RISK ASSESSMENT

FIGURE 6.2-1

SUMMARY OF TIER 2 SELENIUM HQS FOR THE AMERICAN ROBIN AND DEER MOUSE

DATE: MAR 22, 2016
BY: CRL
FOR: RPS

FORMATION ENVIRONMENTAL

S:\GIS\arcprj2\010139\plt\RIA_2015\SERA\Fig6_2-1_Se_Robin_Deermouse.mxd