

# Bonita Peak Mining District Terrestrial Baseline Ecological Risk Assessment

November 2020



## Background

The Bonita Peak Mining District (BMPD) is an approximately 150-square-mile mining district in San Juan County, Colorado. The Silverton Caldera basin is extensively naturally mineralized which lead to years of mining. The BMPD consists of 48 historic mines or mining-related source areas within the Mineral Creek, Cement Creek, and Upper Animas River drainages. Mining-related activities have resulted in the generation of various types of solid wastes, such as tailings and waste rock piles. In addition, mine influenced water coming out of mine adits may enter nearby creeks. BMPD also contains sources of naturally occurring metals in addition to metals from mine-related activities. Metals and low pH are the contaminants of potential ecological concern at the site.

## Introduction

The Environmental Protection Agency (EPA) conducted a Terrestrial Baseline Ecological Risk Assessment (Terrestrial BERA) with data collected from **2014-2018**. EPA looked at concentration levels of contaminants and evaluated potential exposure pathways for various wildlife receptors. A Terrestrial BERA is used to characterize risk and identify exposure levels under the current conditions in the BMPD landscape to the terrestrial and semi-aquatic ecological receptors including:

- Plant communities.
- Invertebrates living in the soil.
- Wildlife that eat or drink surface water, soil, and dietary items potentially contaminated by mine wastes and naturally mineralized materials within the BMPD assessment area.

## Assessment

The Terrestrial BERA provided an objective overview of the ecological risks for receptors and specific exposure units (EUs). Each EU is the relevant home range area the receptor lives in. Depending on receptor type, the Terrestrial BERA evaluated 29 floodplain EUs in specific reaches of Mineral Creek, Cement Creek and the Animas River, like the EUs used in the 2019 Aquatic BERA. Given the topography and ways that contamination travels in the BMPD, it is expected that floodplains receive and accumulate mine wastes from upgradient sources. Reference EUs were evaluated for the vegetated upland areas and floodplain EUs. These reference EUs were picked to represent creek and river reaches that are similar to the reaches in the BMPD, but without obvious historic mining-related activities.

When mine waste contamination occurs in habitats used by plants, invertebrates and wildlife, there are complete exposure pathways via direct contact and consumption of contaminated soils, surface water and other dietary items. The Terrestrial BERA evaluates risk based on the following complete exposure pathways:

- Direct contact to soil (plants and soil invertebrates)
- Ingestion of soil or surface water (wildlife receptors)
- Ingestion of contaminated prey items (wildlife receptors)

## Results and Conclusions

### Large home-range Receptors (e.g. moose, lynx, golden eagle and coyote)

The assessment showed that the risk posed to these animals when exposed to BPMD contamination sources was below the level of concern.

### Smaller home-range herbivorous receptors (e.g. pika, gopher, shrew, beaver and marmot)

Risks for these animals are relatively low and occur only for a limited number of contaminants, primarily lead, in the most contaminated habitats.

### Insectivorous and Omnivorous Birds (e.g. swallow, bluebird and robin)

These animals are most at risk from dietary exposures to contaminants. Risk characterization work showed high risk from lead exposure in all upland habitats near mine wastes (halo areas) and most floodplain EUs. A highly conservative (low/sensitive) avian screening level is used to generate lead hazard quotients for birds. This combined with elevated lead concentrations in soil and diet are factors leading to high lead hazard quotients for birds.

### Plants and Soil Invertebrates

The assessment showed that the risk posed to plant communities ranges from moderate to high risk from metals such as manganese, lead, molybdenum and zinc. Risk to soil invertebrates is considered moderate from zinc and manganese. For both plants and soil invertebrates, risk is heightened in heavily contaminated barren areas (e.g. waste rock piles), or in habitats that support struggling metal-tolerant plant communities.

## Summary

The Terrestrial BERA assesses community-level risks for plant and invertebrate communities, as well as species-specific risks for 16 representative model wildlife species, including semi-aquatic and terrestrial wildlife.

The evidence gathered suggests that large home-range receptors (e.g. moose, coyote) experience an acceptable level of risk when exposed to BPMD contamination sources. Smaller home-range receptors (e.g. insectivorous and omnivorous birds and small mammals) may be at risk from dietary exposure to elevated concentrations of metals. Specifically, metals such as lead that are common in BPMD mine wastes in and downgradient from waste piles. Plants and soil invertebrates may also be at risk from exposure to elevated concentrations of metals. There is evidence that metal concentrations in non-mine impacted habitats may also contribute to elevated ecological risk due to naturally occurring highly mineralized soils found throughout the BPMD, which will be considered in future remedial investigation and feasibility study activities.

## For more information

- Read the Terrestrial BERA: <https://semspub.epa.gov/src/document/08/100009162> (PDF, 726 pp, 34.7 MB)
- Visit the BMPD website: [www.epa.gov/superfund/bonita-peak](http://www.epa.gov/superfund/bonita-peak)
- Contact information:  
**Brian Sanchez**, Toxicologist, 1-800-227-8917 (ext. 312-6659), or [sanchez.brian@epa.gov](mailto:sanchez.brian@epa.gov)