

Air Quality and Climate Change Recreation and Wilderness Socioeconomics and Environmental Justice

Air Quality and Climate Change

Summary of Impacts: pp. 158-205; Environmental Consequences: pp. 177-205

Under the proposed action, particulate matter 2.5 (PM_{2.5}) would increase by two times versus background levels, and particulate matter 10 (PM₁₀) would increase by more than three times versus background levels. National Ambient Air Quality Standards for particulates would not be exceeded, but those for PM₁₀ would be close to exceedance (97 percent of standard). Volatile organic compound emissions would be about 105 tons per year and would represent less than a 1 percent increase in Pima County. Nitrogen oxide emissions would be about 1,250 tons per year and would represent a 4 percent increase in Pima County; this would increase the risk of an exceedance of the ozone air quality standard in the Tucson area. Sulfur dioxide emissions would meet the air quality standard at the project site. Greenhouse gas emissions (carbon dioxide) would represent a 1 percent increase in Pima County. Emissions from the project would cause and contribute to degradation of visibility in the Saguaro Park East and Galiuro Wilderness Class I airsheds.

Rosemont Copper has committed to using numerous mitigation measures to minimize emissions and their impacts. These include: operational and engineering controls for controlling fugitive dust associated with the tailings, water sprays and wet scrubbers associated with the ore crushing; use of covers to control emissions from mix tanks and settlers used in the solvent extraction system; spray or physical enclosures for low emission potential processes; location of stockpile and loadout areas within the enclosed stockpile building; use of newer engine designs in mobile sources, dust control on access, haul, service, and maintenance roads; use of low-sulfur diesel fuel onsite for all stationary equipment; expedited construction of electrical lines to reduce the need for onsite power generation and associated emissions; design of the project administration building to showcase use of leadership in environmental and energy design and sustainable energy concepts; and application of acid leaching solution to the heap using emitters (similar to drip irrigation) to avoid aerosol losses to the wind.

Recreation and Wilderness

Summary of Impacts: pp. 511-551; Environmental Consequences: pp. 527-551

The proposed action would result in a loss of 6,211 acres to the Recreation Opportunity Spectrum based on the area within the perimeter fence, including these categories: 0 acres of semiprimitive nonmotorized, 5,973 acres of semiprimitive motorized, 170 acres of roaded modified, and 68 acres of roaded natural. No hunting permits would be modified or lost, but 4 percent of hunt unit 34A would be affected, resulting in 776 annual hunter days lost for certain species (white-tailed deer, javelina, and Mearns' quail). A total of 30.5 miles of public roads and trails would be lost, and 3.8 miles of the Arizona National Scenic Trail would be relocated.

Socioeconomics and Environmental Justice

Summary of Impacts: pp. 699-754; Environmental Consequences: pp. 736-754

The proposed action would result in a small increase in regional employment, taxes, and revenue. There would be increased funding needs for road maintenance on State Route 83 and other roads during the operational phase of the mine. The proposed action would result in a possible decrease in area property value and would cause a potential degradation of area quality of life in terms of community values. There potentially could be a change in regional tourism spending. No change in the cost of emergency services as a result of population increase would occur. There would be disproportionate effects on environmental justice communities as a result of impacts to cultural resources.

Biological Resources

Summary of Impacts: pp. 349-415; Environmental Consequences: pp. 385-415

The proposed action would result in the direct loss or conversion of 6,380 to 6,461 acres of habitat and may indirectly impact up to 145,190 acres, which may have the potential to impact animal behavior. For the majority of the species, the impact is not expected to have far-reaching consequences for population viability. However, because of the magnitude, intensity, length, and around-the-clock timing of the project, all special status plants and animals that occur in the area are expected to be impacted.

Some species would be directly and indirectly impacted, including nine species federally listed as threatened or endangered under the Endangered Species Act (Chiricahua leopard frog, Gila chub, Gila topminnow, Huachuca water umbel, jaguar, lesser long-nosed bat, ocelot, Pima pineapple cactus, and southwestern willow flycatcher) and four species federally listed as candidate under the Endangered Species Act (desert tortoise, northern Mexican gartersnake, Rosemont talussnail, and western yellow-billed cuckoo). For two special status plant species (beardless chinchweed and Coleman's coral-root), all action alternatives may result in a downward trend toward Federal listing as threatened or endangered or in a loss of population viability. For 7 special status plant and 13 special status animal species, all action alternatives may impact individuals of these species but are not likely to result in a downward trend toward Federal listing as threatened or endangered or in a loss of population viability of these species.

There would be significant vegetation losses and changes in the area, resulting in a decrease in nesting, overwintering, foraging, and roosting habitat for dozens of species of migratory and resident birds. Every species currently occupying the area would potentially experience a reduction in individuals and population size.

Current activities such as livestock grazing, combined with the proposed project, would cumulatively contribute to a general loss of native grassland and woodland habitats; noise, air, and light pollution; and degradation of riparian habitats.

An unknown number of acres of animal movement corridors and linkage areas would potentially be impacted, including the potential to: (1) modify and/or fragment animal movements between mountain ranges; (2) reduce local connectivity between habitats; (3) increase animal roadkills from the transportation system and increased traffic; and (4) result in a loss of genetic flow. The alteration of surface and subsurface hydrology from the pit and other mining related operations may result in the loss of riparian habitat and the fragmentation of riparian habitat and corridors.

Riparian habitat that could be affected includes 490 acres of hydroriparian or mesoriparian habitat along Cienega Creek, 471 acres of xeroriparian habitat along Davidson Canyon, up to 204 acres of mesoriparian habitat along Davidson Canyon, 58 acres of hydroriparian or mesoriparian habitat along Empire Gulch, and 140 acres of hydroriparian or mesoriparian habitat along Gardner Canyon.

Cultural Resources

Noise

Transportation/Access

Cultural Resources

Summary of Impacts: pp. 660-699; Environmental Consequences: pp. 681-699

The proposed action would impact a total of 96 National Register of Historic Places eligible historic properties, consisting of 62 prehistoric sites (28 are known or likely to have human remains), 32 historic sites, and 2 multicomponent prehistoric/historic sites. A total of 63 springs/seeps would be affected within the alternative or by drawdown in the surrounding area; springs are considered sacred by all of the tribes consulted by the Coronado.

Mitigation of adverse effects on archaeological sites has traditionally involved data recovery excavations that sample or completely excavate a site to document the information contained therein and to identify human remains and arrange for their repatriation to culturally affiliated individuals or tribes. Excavation, however, destroys the site and is constrained by the analytical technology available at the time of the excavation. Any future information potential of the sites would be destroyed as well.

The sanctity and power of each spring are also unique and cannot be replaced once the spring is destroyed.

The Tohono O'odham Nation has requested and the Coronado has prepared a nomination of the Santa Rita Mountains as the *Ce:wi Duag* Traditional Cultural Property for listing in the National Register of Historic Places. All of the action alternatives and portions of the utility alternatives in higher elevations are within the proposed boundary of this traditional cultural property. The cultural landscape would be irrevocably altered by the massive movement of rock and soil and transformation of the topography.

Noise

Summary of Impacts: pp. 614-643; Environmental Consequences: pp. 637-643

The proposed action would result in impacts to recreational users from blasting noise (construction and mining operation phases) and equipment operational noise (mining operation phase), resulting in a likely decrease in recreational value in the area. The proposed action would not result in impacts to nearby residents from construction, blasting, or equipment operation during any phases of mine life. Noise caused by an increase in traffic would impact private property along State Route 83, although the number of residential noise receptors is unknown.

Transportation/Access

Summary of Impacts: pp. 591-614; Environmental Consequences: pp. 603-614

The proposed action would result in increased traffic, which would decrease the level of service of existing roadways and would have a potential effect on public transportation (namely school buses). When combined with the anticipated increase of traffic resulting from population growth, mine related traffic on State Route 83 between Interstate 10 and State Route 82 would decrease the level of service from its current B and C ratings to level C for peak and nonpeak seasons at peak a.m. and p.m. hours during all phases of the mine. Level of service C is not considered an unacceptable level of service, and the mitigation measure of a partial carpool system would help to ensure that a level of service D would not occur. The mitigation measure of constructing four school bus pullouts along State Route 83 would negate the impacts to public transportation by providing safer student loading and unloading. Transportation routes to the mine area open to the public would increase by the building of the primary and secondary access roads, but existing Forest Service roads within the project footprint would be closed to the public.

Groundwater Quality Groundwater Quantity

Groundwater Quality

Summary of Impacts: pp. 278-296; Environmental Consequences: pp. 286-296

Under the proposed action, seepage is expected to occur from the dry-stack tailings facility from remnant process water. Infiltration of precipitation could cause seepage from the waste rock facility. Both these sources could impact groundwater quality; however, modeling indicates that the water quality of potential seepage from these facilities would meet all Arizona Aquifer Water Quality Standards.

Following closure of the heap leach facility, seepage is expected to continue at low flow rates for 115 years. Modeling indicates that remnant heap leach seepage would exceed numeric aquifer water quality standards for cadmium, nickel, and selenium. This seepage would be collected and treated. Conceptually, modeling shows that with treatment, heap leach seepage can meet all numeric aquifer water quality standards. Long-term discharge from the heap leach facility requires permitting under the Arizona Aquifer Protection Permit program; the specific techniques for collection and treatment of the long-term discharge would be determined by the Arizona Department of Environmental Quality. The heap leach facility is located and designed to collect all possible drainage and solution, is on top of a stable rock location, and will be encapsulated by waste rock to protect from stormwater infiltration.

As modeled, mine pit lake water quality would not exceed any Arizona Aquifer Water Quality Standards.

Groundwater Quantity

Summary of Impacts: pp. 205-278; Environmental Consequences: pp. 237-278

Under the proposed action, 5,400 acre-feet per year of groundwater would be pumped from the Upper Santa Cruz Subbasin of the Tucson Active Management Area and piped to the mine site in the Davidson Canyon/Cienega Basin. This would represent a 6 to 7 percent increase in groundwater pumping from the Upper Santa Cruz Subbasin and a 2 percent increase in groundwater pumping from the entire Tucson Active Management Area. Groundwater levels would decrease up to an additional 70 feet from the pumping, declining at a rate of up to 3.5 feet per year above and beyond existing groundwater declines. The geographic extent of the drawdown would be 3 to 4 miles from the Rosemont production wells during the first 20 years of pumping; the geographic extent of impacts would continue to expand an additional 1 to 2 miles for up to 140 years after completion of pumping. An estimated 400 to 450 registered wells are located within this area of drawdown; specific impacts to these wells, if any, are not known.

In the vicinity of the mine site, the presence of the mine pit would create a permanent hydraulic sink as a result of active pumping and long-term evaporation from the lake, which would result in permanent drawdown in water levels in the regional aquifer. Groundwater modeling shows that this drawdown would be greater than 100 feet in the immediate vicinity of the mine pit and from 10 to 100 feet in the vicinity of the residences in Singing Valley and at Hilton Ranch Road; drawdown would not be greater than 5 feet at the Corona del Tucson residences, along Cienega Creek, or at the Davidson Canyon/Cienega Creek confluence. Drawdown up to 10 feet would potentially occur along Empire Gulch and Gardner Canyon. An estimated 500 to 550 registered wells are located within this area of drawdown; specific impacts to these wells, if any, are not known.

Based on median flow values, a reduction in average annual flow from 1 to 3 percent would occur along Cienega Creek from drawdown in the regional aquifer, resulting in 0.16 mile of lost

perennial stream length. During periods of low flow (typically May and June), impacts could be much greater. A reduction in flow of 10 percent would occur along Davidson Canyon from reduction in ephemeral flows stored in the shallow alluvial aquifer; the impact on perennial stream length in Davidson Canyon is not known.

Mountain front recharge to the Davidson Canyon/Cienega Basin would be reduced by approximately 1 percent, and the water lost in perpetuity to evaporation from the mine pit lake would represent up to 5.3 percent of the basin water balance. Groundwater outflow from Davidson Canyon would potentially be reduced by up to 6.4 percent.

A total of 63 springs would potentially be lost either directly to surface disturbance or to impacts from declining aquifer water levels. The presence of most of these springs is based on literature and map review, and they have not been field verified.

Existing groundwater withdrawals contribute to land subsidence in the Santa Cruz Valley; an incremental additional risk of subsidence would result from mine water supply pumping.

To the extent possible, stormwater will be diverted through or around project facilities to transport runoff water to downstream watersheds. Rosemont Copper will mitigate the potential effects of mine related pumping on residential water supply wells in the Sahuarita Heights neighborhood by entering into an agreement with the Rosemont United Sahuarita Well Owners. This well protection plan addresses pump inspection, pump maintenance, pump replacement, well inspection, well maintenance, and well replacement to ensure that residential water wells in the Sahuarita area remain productive throughout the life of minerals production operations.

Rosemont Copper will implement regional groundwater mitigation measures within the Tucson Active Management Area, including recharge of available Central Arizona Project water. The location of the recharge may not be in the vicinity of the mine water supply wells. Rosemont Copper will also annually fund the U.S. Geological Survey to operate and maintain the existing surface waterflow measurement gage at Barrel Canyon.

Hazardous Materials Public Health and Safety

Hazardous Materials

Summary of Impacts: pp. 552-579; Environmental Consequences pp. 558-579

This section refers to the risk of release to and effect of hazardous materials on the environment (as opposed to risks to public health and safety). Under the proposed action, the use of ammonium nitrate and fuel oil mixtures, laboratory reagents, cleaning fluids, and solvent extraction and electrowinning reagents (excluding sulfuric acid and kerosene) represent a negligible risk to the environment. The proper storage of ammonium nitrate in dry form in silos presents little risk to the environment. The proper storage, disposal, and transportation of hazardous waste present little risk to the environment.

An accidental catastrophic release of sulfuric acid or petroleum products during transportation would cause direct impacts to plants, wildlife, and soil in the immediate vicinity of the spill; would cause possible migration into surface waters with indirect downstream effects on vegetation, aquatic species, and wildlife; and would pose some risk of groundwater contamination.

An accidental catastrophic or major onsite release of sulfuric acid or petroleum product would cause direct impacts to soil and wildlife, and if a long-term release were to occur, it would carry a high potential for groundwater contamination. Groundwater contamination would be unlikely to migrate beyond the mine site as a result of hydrologic gradients but would cause direct impacts to birds and wildlife from pit contamination.

Failure of the leach pad containment would cause direct impact to groundwater by sulfuric acid. Groundwater contamination would be unlikely to migrate beyond the mine site as a result of hydrologic gradients but could cause direct impacts to birds and wildlife from pit contamination.

Accidental releases of hazardous materials cannot be entirely prevented, but proper training, storage, and handling are intended to minimize the potential for releases, and in the event of a release, to minimize the effects on and threat to the environment.

Public Health and Safety

Summary of Impacts: pp. 643-660; Environmental Consequences: pp. 651-660

When combined with increases in traffic on State Route 83 resulting from population growth, the proposed action would result in traffic increases up to 10 to 88 percent during year 1 of the construction phase (under a 75 percent commuter carpool scenario), 128 to 290 percent during year 5 of the operation phase (no carpool scenario), and 204 to 356 percent by the end of mine life (no carpool scenario). A corresponding decrease in traffic safety would occur that may result in 61 to 107 accidents per year (from current rate of roughly 30 accidents per year), with a fatality occurring between one and two times per year (from a current rate of roughly one fatality every 3 years). By applying the mitigation measure of a partial carpool during the operation phase (75 percent of worker commutes in 5-person vans), the traffic increase from mine related traffic and population growth would be 67 to 135 percent at year 5 of operations and 137 to 201 percent during year 20 of operations. Direct impacts to public health and safety associated with traffic would remain after mitigation.

Risks to public health and safety would exist from the storage, use, and transportation of hazardous materials. While unlikely to occur, an onsite ammonium nitrate explosion would cause damage up to 2 miles away and release a plume of toxic gases. An onsite petroleum product fire or sulfuric acid release would release a plume of smoke and/or toxic gases. An accident during transportation involving sulfuric acid, fuels, or ammonium nitrate would affect a radius of up to 0.5 mile, and an accident during transportation of explosives would affect a radius of up to 1 mile.

Risk to public health and safety from recreational hazards, subsidence and other geological hazards, noise, or air quality would be unlikely to occur.

Fuels and Fire Management Landownership and Boundary Management Livestock Grazing

Fuels and Fire Management

Summary of Impacts: pp. 580-590; Environmental Consequences: pp. 587-590

The proposed action would cause a slight increased risk of ignition of wildfires along transportation routes, an increased risk of wildfire spread from the transportation of flammable materials, and minor additional fuel loading from noxious weed growth. Noxious weed management would help mitigate overall potential for a fire to occur, and training and fire control plans would help reduce the severity and extent of fires.

Landownership and Boundary Management

Summary of Impacts: pp. 416-429; Environmental Consequences: pp. 424-429

The proposed action would directly affect corner monuments that could lead to the loss of ability to effectively determine boundaries between public and private land. However, the proposed action includes design of a resurvey and control network to preserve the ability to reestablish landownership boundaries. Mineral survey fractions (5.5 acres) would be impacted by mining operations and would be sold to Rosemont Copper under the Small Tracts Act, relieving the Coronado of management responsibilities. Under the proposed action and other action alternatives, direct impacts would occur to the following lands: 1,212 to 1,369 acres of private land, 6,122 to 7,208 acres of land managed by the Coronado, 3 to 14 acres of Bureau of Land Management administered land, and 93 to 138 acres of Arizona State Land Department land administered as a State Trust.

Livestock Grazing

Summary of Impacts: pp. 429-442; Environmental Consequences: pp. 435-442

The proposed action would result in a change from fully capable of supporting grazing activities to partially capable on 4,684 acres of the Rosemont grazing allotment, 280 acres of the Thurber allotment, 88 acres of the Greaterville allotment, 18 acres of the DeBaud allotment, 155 acres of the Helvetia allotment, and 0 acres of the Stone Springs allotment. The proposed action would result in a change from fully capable to not capable on 950 acres of the Rosemont grazing allotment (the area represented by the mine pit). A total reduction of 1,146 animal unit months would occur. Fifteen stock ponds and 63 springs would be lost. Mitigation would replace lost manmade water sources.

Geology, Minerals, and Paleontology Soils

Geology, Minerals, and Paleontology

Summary of Impacts: pp.109-136; Environmental Consequences: pp. 133-136

The mine operation would excavate and relocate approximately 1.8 billion tons of geological material, of which approximately 1.3 billion tons would be waste rock and 0.5 billion tons would be ore. Slippage or ground movement would be typically limited to the confines of the pit. The proposed action would disturb 3,782 acres that have a moderate potential fossil yield. A field survey for locating potential paleontological resources was conducted between March 10, 2011, and March 16, 2011, for all action alternatives; no vertebrate fossils were identified. No cave resources have been identified in the project area. However, the potential may exist, and if present, cave resources could be impacted.

Upon indication or discovery of a cave or similar karst features, Rosemont Copper would suspend work at that site and contact the designated Forest Service representative to investigate the discovery before work is reinitiated. In order to mitigate potential impacts to significant paleontological resources, monitoring ahead of ground disturbance by a Forest Service approved paleontologist would occur. Upon discovery of such resources, Rosemont Copper would suspend work at that site and the site would be investigated.

Soils

Summary of Impacts: pp. 135-146; Environmental Consequences: pp. 146-158

The proposed action would result in the loss of 4,415 acres of soil productivity by direct impact of the mine footprint, and sediment delivery to the surface drainages would be about 16,000 tons annually, compared with 32,600 tons annually under current conditions. Modeled stability of tailings and waste rock facilities exceeds regulatory requirements. Reclamation is expected to approach historical vegetation climax conditions after 100 years.

The design of the proposed action and other action alternatives includes a mine footprint that is substantially smaller than conventional mines with similar production capacity. The use of dry-stack tailings facilities would also enhance reclamation, compared with the use of traditional tailings settling ponds. Filtered tailings would be transported, spread, and compacted to form an unsaturated, dense, stable tailings stack, which would include a surrounding rock and soil buttress seeded for revegetation. Revegetation efforts would be conducted to meet success criteria established by the Forest Service and would include the stockpiling and use of salvage topsoil as a growth medium.

Surface Water Quality Surface Water Quantity

Surface Water Quality

Summary of Impacts: pp. 322-349; Environmental Consequences: pp. 335-349

The proposed action would result in the loss of 47.8 acres of jurisdictional waters of the United States, regulated by the U.S. Army Corps of Engineers, and 213.8 acres of riparian areas. Sediment delivery downstream would be reduced from current conditions by about 51 percent at the water quality monitoring point in Barrel Canyon, by 18 percent at the mouth of Barrel Canyon, and by about 5 percent at the mouth of Davidson Canyon. No exceedances of surface water quality standards are anticipated from tailings or waste rock facilities; at present, naturally occurring surface water exceeds some surface water standards.

Mitigation measures under all action alternatives to reduce impacts to surface water quality include: the diversion of surface water from undisturbed areas of the watershed around mining activities; segregation and encapsulation of waste rock believed to have the potential for acid rock drainage by waste rock that has acid-buffering characteristics; continual testing of waste rock for acid rock drainage potential; use of lined ponds and retention of all stormwater flows in contact with ore bodies and other active mining facilities for reuse as process water; collection of stormwater from tailings and waste rock disposal areas in sediment ponds for further water quality testing prior to discharge to natural drainages; reuse or recycling of most process water; revegetation of tailings buttress walls to prevent erosion of sediment during mine operation; reclamation of mine facilities following mine closure; and use of best management practices, stabilization measures, and sediment control measures.

Mitigation measures for impact to waters of the United States include those specifications identified in the Clean Water Act Section 404 individual permit. Mitigation potentially includes the purchase and setting aside of offsite mitigation areas, payment in lieu of mitigation to an established restoration program, and/or permittee responsible onsite mitigation.

Surface Water Quantity

Summary of Impacts: pp. 296-322; Environmental Consequences: pp. 311-322

The proposed action would result in the loss of 15 stock tanks, although mitigation would replace lost water sources. Stormwater flow from the area would be reduced by 46 percent, and flow in Davidson Canyon, which is most likely dependent on stormwater stored in the shallow alluvial material, would be reduced by 10 percent.

For all action alternatives, a water source enhancement and mitigation plan would be developed so that there would be no net loss in numbers of surface water sources for livestock and wildlife. Stormwater diversions shall be designed and operated to route stormwater efficiently through or around project facilities and to transport runoff water to downstream watersheds.

Additional proposed measures are designed for monitoring surface water resources and include sharing surface water data. For the purpose of obtaining surface waterflow data, Rosemont Copper will annually fund the U.S. Geological Survey to operate and maintain the existing surface waterflow measurement gage at Barrel Canyon. Rosemont Copper will also perform periodic monitoring and maintenance of spillways, diversions, and other permanent surface water facilities in accordance with specific permit conditions. To share these data, a Rosemont Copper Mine water Web site will be constructed, updated annually, and maintained by Rosemont Copper, with concurrence by the Coronado. All water related data and reports will be accessible to the general public at this location, including all surface water quantity data and monitoring reports.

Dark Skies Visual Resources

Dark Skies

Summary of Impacts: pp. 442-452; Environmental Consequences: pp. 448-452

The proposed action would cause long-term adverse impacts on astronomy research at Whipple Observatory and Jarnac Observatory, and would cause long-term adverse impacts on amateur astronomers, star gazing, and general public viewing regionally and within the Santa Rita Ecosystem Management Area.

Visual Resources

Summary of Impacts: pp. 452-511; Environmental Consequences: pp. 479-511

The proposed action would adversely impact visual resources. The proposed action would include strong contrasts and adverse impacts from the highly visible pit face and diversion channel, along with permanent and major impacts, including the irreversible loss of scenic views, from highly visible piles and power lines visible in Box Canyon, along the ridgeline, and at Lopez/Gunsight Pass for the life of the project.

Under the proposed action, the plant facility would be visible for up to 7 years. There would be impacts to 13,742 acres within the Santa Rita Ecosystem Management Area with very high and high scenic integrity characteristics. There would be 40 miles of project area visibility along forest roads and trails with concern levels 1 and 2, as defined under the Scenery Management System, and 3.4 miles of scenic quality impacts along State Route 83. There would be 187,893 acres within the analysis area with project visibility.

Mitigation measures to reduce the impact to visual resources would occur during mine operations, closure, and postclosure. Concurrent reclamation will occur during operations that would have minor beneficial impacts to scenic quality. Sediment and dust controls would reduce but not eliminate visual impacts from fugitive dust. During operations, the colors of buildings would be painted or stained in earth tones to reduce color contrasts with the surrounding landscape. During closure, facilities and foundations would be removed, access roads would be reclaimed, and final reclamation would be conducted on the waste rock and tailings piles. During closure, the applicability of measures to darken the exposed rock faces of the mine pit to reduce color contrasts would also be determined. Postclosure reclamation would include monitoring revegetation success on the waste rock and tailings slopes.

Additional mitigation measures may be considered. The Forest Service is investigating the feasibility of geomorphic design (sometimes called landforming) to create more stable, natural functioning, and natural looking topography related to the waste rock and tailings piles. With respect to the facility footprint, grading to restore a natural appearing topography would reduce impacts and encourage more natural revegetation in this area. Breaking up the horizontal benches in the visible portions of the upper pit may also be pursued. There are several ways to accomplish this, including double benching, postmine bench blasting, and randomized benching.