3.18 PUBLIC HEALTH AND SAFETY

The World Health Organization (WHO) defines "health" as: "A state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity" (WHO 1946). Public health is the science of protecting and improving the health of families and communities through promotion of healthy lifestyles, research on disease and injury prevention, and detection and control of infectious diseases. Public health is concerned with protecting the health of entire populations; these populations can range from local neighborhoods to entire regions of the world. Public health also works to limit health disparities by promoting healthcare equity, quality, and accessibility. Public health addresses incidences and death rates for infectious and chronic diseases or other health conditions, including mental health. It can be affected by demographics (e.g., education, ethnicity, gender, socioeconomics, and minority status), the availability of health care services, physical environment, and prevalence of behavioral and social problems (e.g., substance abuse, obesity, and physical inactivity). For this analysis, public health is related to the overall physical health and well-being of the local populations.

Public safety refers to the welfare and protection of the public. Most states have departments of public safety. In many instances, public safety departments are composed of organizations, such as police, fire, and emergency medical services. In the context of this analysis, public safety is primarily related to the incidence of accidents that might lead to injuries and deaths. Injuries include unintentional injuries (e.g., motor vehicle accidents and falls) and intentional injuries (e.g., homicide and suicide). Such injuries can place a significant burden on available local public resources in a community. Safety can be affected by the prevalence of behavioral and social problems, availability of a police force and fire department, availability of safe transportation, and weather conditions.

This section describes the affected environment prior to initiation of the proposed Stibnite Gold Project (SGP) as it relates to the health and safety of the public that utilize lands that may be impacted by the SGP. The analysis follows National Research Council (2011) and North American Health Impact Assessment Practice Standards Working Group (2014) guidelines for assessing public health and safety impacts of potential projects.

3.18.1 Scope of Analysis

Due to the nature of a large mining project and within the context of public health and safety considerations, the analysis area consists of: Valley County and associated local population, particularly the residents of the village of Yellow Pine, the nearest residential community to the proposed mine site; Payette National Forest (PNF) Management Area 13 (Big Creek/Stibnite); Boise National Forest (BNF) Management Areas BNF 21 (Lower Johnson Creek), BNF 20 (Upper Johnson Creek), BNF 19 (Warm Lake), BNF 17 (North Fork Payette River); and associated recreational visitors, including adults and children, who frequently camp, hike, or engage in other recreational activities in these areas. The scope of this analysis is limited to the affected communities outside of the mine site and associated facilities. Accordingly, this analysis does not include a direct evaluation of the anticipated workforce safety and health

issues that could occur at the proposed mine site or off-site facilities. The SGP would be governed by the Occupational Safety and Health Association (OSHA) and Mine Safety and Health Administration (MSHA) regulations in the areas where mining and mining-related activities would occur. This analysis does consider "crossover issues," such as health issues for which workforce behaviors result in interactions/overlap with the affected communities. Some baseline data may not differentiate between workers and non-workers (e.g., traffic accidents) and hence, may indirectly evaluate worker health and safety. In particular, baseline data for traffic accidents applies to all travelers along roadways, including worker and non-worker populations. Similarly, some impacts to workers (e.g., catastrophic related event) may affect available community health resources and indirectly affect potential for health effects.

The National Research Council guidance lists five general categories that should be addressed as part of a public health evaluation to systematically select the issues that need to be addressed for a project. These five categories are: environment, economy, infrastructure, services, and demographics. Five types of health impacts are assessed for each area (National Research Council 2011):

- Chronic Disease: For the purposes of this evaluation, chronic diseases are health conditions that persist for long periods of time (i.e., 3 months or longer) and are non-communicable, such as heart disease, cancer, or asthma.
- Infectious Disease: Infectious diseases are associated with viral, bacterial, or microbial infections and are commonly transferred from person to person through direct contact, such as influenza.
- Injury: Unintentional or accidental event resulting in injury or trauma, such as a car accident or fall.
- Nutrition: Impacts to health (positive or negative) associated with diet.
- Well-being/psychosocial effects: Well-being and psychosocial effects consider the social and cultural well-being of the populations.

To facilitate evaluation of potential impacts of the SGP, it is necessary to understand baseline health conditions of the potentially affected communities. The baseline represents existing health conditions and provides a basis against which the potential impacts to human health from the SGP can be compared and evaluated. Baseline health statistics were obtained from the U.S. Census Bureau (Census 2010) and the Valley County health rankings (County Health Rankings and Roadmap 2019).

3.18.1.1 Environment and Public Health

As it relates to public health, impacts to the environment are typically evaluated based on potential impacts to various environmental media (i.e., air, soil, groundwater, and surface water). This analysis focuses on whether hazardous pollutants could be emitted by activities of the SGP and enter environmental media at levels that could be a health concern. Health concern is evaluated by considering the amount of human exposure to potentially impacted environmental media. Human exposure to environmental media can occur through several

pathways of exposure (e.g., inhalation of vapors or particulates in air, incidental ingestion or skin contact with impacted soils, and ingestion or skin contact with impacted groundwater or surface water).

In addition to hazards from pollutant-impacted environmental media, the existing terrain and characteristics of the environment can present certain natural hazards to public health and safety, such as:

- Steep terrain and rock cliffs
- Avalanches and landslides
- Flash floods and water hazards
- Wildfires.

3.18.1.2 Economy and Public Health

Economic conditions may have indirect impacts on health, as a result of the financial resources available to the local population or local government for health-related services.

3.18.1.3 Public Services/Infrastructure and Public Health

Availability of, and changes to public services and infrastructure can have direct or indirect health benefits or consequences. For example, health benefits can occur if new water or sanitation systems reduce disease incidence rates for the local community. There may be negative impacts if new roads or transit corridors increase traffic accidents or negatively impact access to health-related services or activities.

3.18.1.4 Demographics and Public Health

The characteristics of the existing population are directly relevant to assessing potential public health impacts. For this environmental impact statement, local demographics and land use patterns (e.g., residential and recreational) were evaluated, as well as the available health information of Valley County residents. The local population's health status is relevant, as some populations are more sensitive to the effects of hazardous pollutants due to preexisting health conditions. In addition, populations without health insurance and those in poor health due to socioeconomic conditions may be particularly adversely affected, either because their baseline health is poor (sensitive sub-population) or their ability to receive medical care is compromised (Gresenz and Escarce 2011; Hadley 2003; Hadley and Cunningham 2005; Newton et al. 2008). There also is the potential for increased stress or annoyance levels for populations living or recreating nearest to the mining areas due to noise associated with mine operations or vehicle traffic.

3.18.1.5 Summary of Public Health Approach

For this analysis, possible public health impacts with regard to environment, economy, demographics, infrastructure/public services, and community health were considered.

Table 3.18-1 summarizes the resources potentially affected by proposed SGP activities and the possible impacts on public health. The analysis of possible public health and safety impacts is provided in Section 4.18, Public Health and Safety, Environmental Consequences.

3.18.2 Relevant Laws, Regulations, Policies, and Plans

While the National Environmental Policy Act does not directly address effects on public health and safety, it does require that an integrated analysis of health effects be addressed for an environmental impacts analysis. The scope of this analysis is limited to affected communities outside of the mine site and associated facilities and does not include a direct evaluation of the anticipated workforce safety and health issues. All worker health issues are covered under OSHA and MSHA, as described in the following subsections.

3.18.2.1 Occupational Safety and Health Administration

The Occupational Safety and Health Act of 1970 was passed to prevent workers from being killed or seriously harmed at work. This law created OSHA, which sets and enforces protective workplace safety and health standards. OSHA also provides information, training, and assistance to employers and workers. Under OSHA, employers have the responsibility to provide a safe workplace (OSHA 2019).

3.18.2.2 Mine Safety and Health Administration

The U.S. Department of Labor's MSHA works to prevent death, illness, and injury from mining activities and promote safe and healthful workplaces for U.S. miners. MSHA carries out the provisions of the Federal Mine Safety and Health Act of 1977 as amended by the Mine Improvement and New Emergency Response Act of 2006. The agency develops and enforces safety and health rules for all U.S. mines regardless of size, number of employees, commodity mined, or method of extraction. MSHA also provides technical, educational, and other types of assistance to mine operators. MSHA works cooperatively with industry, labor, and other federal and state agencies to improve safety and health conditions for all miners in the United States (MSHA 2019).

3.18.2.3 National Forest Land and Resource Management Plans

Physical, social, and biological resources on National Forest System lands are managed to achieve a desired condition that supports a broad range of biodiversity and social and economic opportunity. National Forest Land and Resource Management Plans embody the provisions of the National Forest Management Act and guide natural resource management activities on National Forest System land.

In the SGP area, the Payette National Forest Land and Resource Management Plan (Payette Forest Plan; Forest Service 2003), and the Boise National Forest Land and Resource Management Plan (Boise Forest Plan; Forest Service 2010) provide management prescriptions designed to realize goals for achieving desired condition for public health and safety and include various objectives, guidelines, and standards for this purpose.”

3.18.2.4 Valley County Comprehensive Plan

As stated in the Valley County Comprehensive Plan (Valley County 2018):

> *"The purpose of the Comprehensive Plan is not to control land, but to prevent uses of land harmful to the community in general."*

The underlying objectives of the plan promote the health, safety, and general welfare of the people of Valley County, and aim to protect citizens from unsafe or unhealthy conditions caused by growth and development in the county.

Table 3.18-1 Summary of Public Health Approach: Potentially Affected Resources and the Possible Impact on Public Health

Category Relevant to Public Health	Potentially Affected Resources	SGP Specifics	Possible Health Impact: Chronic Disease	Possible Health Impact: Infectious Disease	Possible Health Impact: Injury	Possible Health Impact: Nutrition	Possible Health Impact: Well-Being or Psychosocial
Environment	Air	Localized impacts to air quality from fugitive dust and particulate emissions during mining operations; diesel emissions from vehicle traffic and machinery	Negative Effect: Inhalation of particulate emissions	None	None	None	Negative Effect: Inhalation of particulate emissions
Environment	Soil	Aerial deposition impacts to soil from proposed mining emissions	Negative Effect: Direct contact with hazardous pollutants	None	None	None	Negative Effect: Direct contact with hazardous pollutants
Environment	Soil	Uptake of contaminants (i.e., metals) from soil into subsistence foods (plants, berries)	Negative Effect: Ingestion of contaminants from edible plants and berries	None	None	Negative Effect: Ingestion of contaminants from edible plants and berries	Negative Effect: Ingestion of contaminants from edible plants and berries
Environment	Soil	Remediation of residually contaminated soils; removal of legacy tailings piles	Positive Effect: Minimizes direct contact with hazardous pollutants	None	None	None	Positive Effect: Improved environmental quality
Environment	Groundwater	Leaching of contaminants to groundwater from proposed mining operations	None:Groundwater impacts (primarily arsenic and antimony) are greatest immediately downgradient of areas of legacy	None	None	None	Negative Effect: Degraded environmental quality (limited to mine site) Groundwater beneath the site is not used as

Category Relevant to Public Health	Potentially Affected Resources	SGP Specifics	Possible Health Impact: Chronic Disease	Possible Health Impact: Infectious Disease	Possible Health Impact: Injury	Possible Health Impact: Nutrition	Possible Health Impact: Well-Being or Psychosocial
			mining activities, but then decrease further downgradient. Off-site groundwater is unimpacted. Groundwater beneath the site is not used as drinking water.				drinking water and off-site groundwater is unimpacted.
Environment	Groundwater	Remediation of residually contaminated soils resulting in reduced leaching potential of hazardous pollutants to groundwater	None: Groundwater beneath the site is not used as drinking water and off-site groundwater is unimpacted.	None	None	None	Positive Effect: Improved environmental quality
Environment	Surface Water	Reclamation of surface conditions, re-vegetation to reduce run-off of hazardous pollutants to streams and rivers	Positive Effect: Minimizes direct contact with hazardous pollutants	None	None	Positive Effect: Reduction of hazardous pollutants in fish harvested from local water bodies	Positive Effect: Improved environmental quality Negative Effect: Temporary disruption of current recreational areas during operation and reclamation
Environment	Surface Water	Leaching of contaminants from groundwater to surface water	Negative Effect: Direct contact with hazardous pollutants	None	None	Negative Effect: Ingestion of hazardous pollutants in fish harvested from local water bodies	Negative Effect: Direct contact with hazardous pollutants

Category Relevant to Public Health	Potentially Affected Resources	SGP Specifics	Possible Health Impact: Chronic Disease	Possible Health Impact: Infectious Disease	Possible Health Impact: Injury	Possible Health Impact: Nutrition	Possible Health Impact: Well-Being or Psychosocial
Environment	Terrain and Features	Disturbance of existing terrain and features	None	None	Negative Effect: Injury due to natural hazards - avalanche, land slide, flash flooding and water hazards, wildfires	None	Negative Effect: Physical injury
Economy	Personal (income, employment)	Increase in local employment	Positive Effect: Increased access to health care	Positive Effect: Increased access to health care	None	Positive Effect: Increased access to healthy foods	Positive Effect: Positive impacts due to job opportunities
Economy	Revenue or expense to local government (support for or drain on services, infrastructure)	Increased revenue	Positive Effect: Positive impacts due to increased revenue stream	Positive Effect: Positive impacts due to increased revenue stream	None	Positive Effect: Positive impacts due to increased revenue stream	Positive Effect: Positive impacts due to increased revenue stream
Public Services and Infrastructure	Need for new infrastructure	Base camp and employee lodging	None	Negative Effect: Potential transmission of infectious diseases from employees to local community.	Positive Effect: Increased access to health care and emergency services support	None	Positive Effect: Positive impacts due to increased emergency services in remote area
Public Services and Infrastructure	Roads	Construction of improved roads for mining	None	None	Positive Effect: Positive impacts due to improved access to remote area	None	Positive Effect: Positive impacts due to improved access to remote area

Category Relevant to Public Health	Potentially Affected Resources	SGP Specifics	Possible Health Impact: Chronic Disease	Possible Health Impact: Infectious Disease	Possible Health Impact: Injury	Possible Health Impact: Nutrition	Possible Health Impact: Well-Being or Psychosocial
Public Services and Infrastructure	Roads	Increased mine related trucking traffic on roads	Negative Effect: Increased potential for spill of hazardous substances	None	Negative Effect: Increased potential for traffic accidents	None	Negative Effect: Increased potential for traffic accidents
Public Services and Infrastructure	Demand on existing infrastructure and services	Increased power demand to support mining operations	Negative Effect: Increased exposure to electromagnetic fields (EMF) along transmission lines	None	None	None	Negative Effect: Increased exposure to EMF along transmission lines
Demographics	Land use patterns (residential or recreational)	Disturbance of current recreational land use; remediation of residually contaminated soils; removal of legacy tailings piles.	Positive Effect: Minimizes direct contact with hazardous pollutants	None	None	None	Negative Effect: Short term impacts to current recreational activities Positive Effect: Improved environmental quality.
Demographics	Land use patterns (residential or recreational)	Noise disturbances during mine blasting and vehicle noise along truck routes	None	None	None	None	Negative Effect: Psychological effects due to noise

Table Source: AECOM 2020

3.18.3 Existing Conditions

Many natural and human-made public health and safety hazards are present in the analysis area, ranging from avalanches and wildfires to past and present storage and transportation of hazardous materials related to mining operations. Most of the analysis area is open to the public as most of the land is public land managed by the U.S. Forest Service (Forest Service).

Common users of the analysis area include Midas Gold Idaho, Inc (Midas Gold) and Forest Service employees, residents of the village of Yellow Pine, and recreationists. Recreation is a major use throughout much of the analysis area, and activities commonly include hunting, fishing, sightseeing, hiking, camping, all-terrain vehicle use, snowmobiling, and horseback riding. The remote nature of the analysis area presents numerous challenges for emergency operations, which include emergency management services and evacuation procedures.

The following section includes an assessment of the existing: environmental conditions; socioeconomic conditions; public services and infrastructure related to public health and safety; and demographics with respect to land use and baseline community health conditions.

3.18.3.1 Environment and Health

As discussed above, public health impacts associated with the environment could include exposure to pollutant-impacted media (e.g., air, soil, groundwater), as well as potential physical hazards associated with the rugged, mountainous terrain in the analysis area that could result in severe injuries or fatalities. This section discusses the existing conditions of the environmental media and the physical terrain as they relate to public health and safety.

3.18.3.1.1 AIR

As described in the Air Quality Baseline Study (Trinity Consultants 2017), potential emissions from the SGP include criteria air pollutants. As discussed in Section 3.3, Air Quality, baseline air quality measurements indicate current concentrations of the criteria air pollutants are well below the National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: particulate matter (including particulate matter with an aerodynamic diameter of 10 microns or less and particulate matter with an aerodynamic diameter of 2.5 microns or less), sulfur dioxide, nitrogen dioxide, ozone, lead, and carbon monoxide. The NAAQS are allowable concentration limits adopted by the State of Idaho into the Rules for the Control of Air Pollution in Idaho. Hazardous air pollutants (HAPs) are pollutants that are known or suspected to cause cancer, other serious health effects, or adverse environmental effects. In addition to exposure from breathing HAPs, some HAPs can be transported from the source and deposited onto soils or into surface waters, where they are taken up by plants and/or ingested by animals. Like humans, other animals may experience health problems if exposed to large enough quantities of HAPs over time. Major sources of HAP emissions are required to obtain permits from Title V of the Clean Air Act. There are currently no permitted sources of HAP emissions in the vicinity of the analysis area. Thus, the baseline concentrations of HAPs from human-made sources is likely within regulatory limits (Trinity Consultants 2017).

3.18.3.1.2 SOIL

Reference area samples collected from undisturbed mineralized and non-mineralized zones near the mine site area indicated that concentrations of antimony and arsenic are consistently higher in samples collected from mineralized zones than in samples collected in non-mineralized zones (URS Corporation 2000). Midas Gold evaluated 4,828 exploration soil samples collected from undisturbed areas adjacent to the mine site (Tetra Tech 2019) and reported elevated levels of these metals due to natural mineralization (see Section 3.5, Soils and Reclamation Cover Materials). As described in Section 3.7, Hazardous Materials, past mining activities at the mine site have deposited ore, waste rock, and mine tailings containing metals and other potential pollutants over approximately half of the mine site. Previous studies at the mine site have assessed potential soil contamination resulting from legacy mining activity (URS Corporation 2000). Soils were sampled in areas suspected to contain mining or ore processing contamination. The report showed elevated levels of arsenic, antimony, and mercury in areas disturbed by legacy mining relative to reference concentrations from both non-mineralized and mineralized zones (URS Corporation 2000). Some known contaminated soil was relocated on-site in 2002. Legacy mine tailings also are known to contain elevated levels of arsenic and antimony, and additional soil contaminants may be exposed during mining operations (Section 3.5, Soils and Reclamation Cover Materials). In 2003, the Agency for Toxic Substances and Disease Registry (ATSDR) completed a Public Health Assessment for the Stibnite/Yellow Pine Mining Area (ATSDR 2003). The assessment concluded that reasonable maximum exposure concentrations of arsenic and antimony in surface soil are unlikely to result in adverse public health effects for reclamation workers and recreational users of the site.

Fires have occurred on the landscape in the analysis area, causing extensive erosion and burying of former features in debris. While there has been no confirmation by sampling, it is suspected that there were spills of hazardous materials (such as petroleum hydrocarbons) below legacy tailings, sediment, and waste rock at the mine site related to legacy mining activities. Current baseline conditions in the analysis area include limited use, transportation, and storage of hazardous materials and petroleum substances (e.g., diesel, gasoline, jet fuel, grease, and hydraulic oils) associated with Midas Gold's existing exploration activities. The analysis area could currently be impacted by accidental releases of hazardous materials during transportation to and from the mine site, during storage and use activities, or through improper disposal of waste materials.

3.18.3.1.3 GROUNDWATER

As described in the Stibnite Gold Project Plan of Restoration and Operations (Midas Gold 2016), prior mining operations generated metal-laden tailings, which were deposited in the Meadow Creek valley without consideration to long-term impacts on water quality. These tailings likely represent a source of metals leaching into groundwater and surface water. As discussed in Section 3.9, Surface Water and Groundwater Quality, most contaminants in groundwater samples collected from the alluvial and bedrock wells in the analysis area were detected at concentrations that meet regulatory criteria for most constituents (except arsenic and antimony), as defined by the U.S. Environmental Protection Agency's (EPA's) maximum

contaminant levels (MCLs). MCLs are standards that are set by the EPA for drinking water quality. A MCL is the legal threshold limit on the amount of a substance that is allowed in public water systems under the Safe Drinking Water Act. Arsenic and antimony are considered the key chemicals of public health concern in groundwater in the analysis area. The groundwater samples indicated that arsenic and antimony are consistently present at concentrations that exceed MCLs. Highest concentrations were noted in wells directly downgradient of the legacy disturbed areas, with concentrations decreasing further downgradient.

There currently are no active domestic groundwater wells used for drinking water within 15 miles of the mine site. Yellow Pine's public water system uses surface water from Boulder Creek, which is located approximately 15 miles downstream of the SGP area and is a tributary to the East Fork South Fork Salmon River, but drains an area unaffected by prior mining activities. Because groundwater in the SGP area was not used as a drinking water source in the analysis area, and was assumed to not be used as a source in the future, the ATSDR Public Health Assessment eliminated groundwater quality from consideration as a public health concern (ATSDR 2003). However, concentrations of constituents in groundwater in excess of MCLs are assumed to present an adverse effect for drinking water users. Midas Gold currently has a drinking water supply well associated with its exploration camp. The well and associated drinking water treatment system use filtration to remove contaminants of concern to appropriate regulatory levels. Any future use of groundwater in the SGP would likely need to incorporate appropriate filtration systems to remove contaminants of concern due to the naturally elevated levels of arsenic and antimony present.

3.18.3.1.4 SURFACE WATER

Based on the findings of the Surface Water Quality Baseline Study (HDR, Inc. [HDR] 2017a) conducted for the SGP, antimony, arsenic, and mercury are considered the key chemicals of public health interest in surface water in the analysis area and these constituents are naturally elevated in the region (Brown and Caldwell 2017). Arsenic is the most widespread of the key chemicals of concern; in-stream concentrations generally increase along the flow path from Meadow Creek in the south to the East Fork South Fork Salmon River downstream to the confluence of Sugar Creek in the north (Brown and Caldwell 2017). Antimony concentrations in surface water show a slightly different distribution compared to arsenic, with elevated concentrations typically beginning in the East Fork South Fork Salmon River below Meadow Creek. Antimony also shows more seasonal variability than arsenic. Total and dissolved antimony and arsenic concentrations tend to be lowest during the high flow conditions associated with spring snowmelt. These findings suggest that groundwater inflows are the main source contributing to surface water antimony and arsenic concentrations at the mine site. Mercury concentrations in surface water show a different distribution compared to either arsenic or antimony, with the highest mercury concentrations occurring in samples collected from Sugar Creek both upgradient and downgradient of the confluence of West End Creek and Sugar Creek. Total and dissolved mercury tend to reach a peak during high flow conditions, indicating soil and stream channel erosion as potential mercury sources. This is consistent with the U.S. Geological Survey's (USGS) findings, which demonstrated that 98 percent of the estimated total mercury load transported downstream of the analysis area is attributable to Sugar Creek, as a

result of natural sources and anthropogenic disturbances (mine waste rock piles and mine tailings) near the Cinnabar Mine on Cinnabar Creek (Brown and Caldwell 2017). The Cinnabar Mine is located outside of the SGP area.

The ATSDR Public Health Assessment (ATSDR 2003) evaluated potential public health risk associated with exposure to contaminants in surface water from the mine site. The Public Health Assessment was based on surface water data collected in 1997 and 1999 from various streams and creeks in the mine site area, as well as from seeps and surface water in the Yellow Pine pit lake. Maximum concentrations of arsenic and antimony in surface water data used in the ATSDR Public Health Assessment ranged from 12 to 535 micrograms per liter and 8.3 to 281 micrograms per liter, respectively, which is within the range of concentrations measured in seeps and surface water samples evaluated in the Surface Water Quality Baseline Study (HDR 2017a).

The ATSDR Public Health Assessment concluded that contaminants in surface water would be unlikely to result in adverse health effects for recreational users in the existing mine site (ATSDR 2003). In addition, the ATSDR Public Health Assessment concluded that for recreational fishers and even for local fishers from American Indian tribes, who have higher fish consumption rates, consumption of fish harvested from surface waters in the mine site is unlikely to result in any adverse health effects (ATSDR 2003).

3.18.3.1.5 EXISTING TERRAIN AND FEATURES

As described in the Public Health and Safety Baseline Study (HDR 2017b), the rugged, mountainous terrain in the analysis area includes many potential hazards to public health and safety that could result in severe injuries or fatalities to users. Common hazards related to terrain include extremely steep slopes, rock cliffs, uneven terrain, and fallen trees. Avalanches, rock falls and debris flows also present a potential hazard for travelers, recreationists, and Forest Service and Midas Gold employees. They can cause severe injury or death and can block access to homes, cabins, and recreation sites. As described in the Recreation Baseline Study (HDR 2017c), the analysis area is a popular destination for winter recreation activities, including snowmobiling, snowshoeing, and cross-country skiing. Recreationists participating in these activities are at risk for causing or encountering avalanches in the analysis area.

Also described in the Public Health and Safety Baseline Study (HDR 2017b), the entire analysis area presents potential flash flood and debris-flow hazards that also can cause severe injury or death, and can block access to homes, cabins, and recreation sites. In addition, areas that were not traditionally flood-prone are at risk due to changes to the landscape caused by wildfires.

Similar to flash-flooding and debris flows, portions of the analysis area are susceptible to landslides and avalanches due to factors such as geology, landscape, climate, and soil, as was experienced in 2014, 2017 and 2019 along the South Fork of the Salmon River Road (National Forest System Road 474/50674) and the Stibnite portion of the McCall-Stibnite Road (County Road [CR] 50-412).

Wildfires are another potential hazard in the analysis area that can cause severe injury or death for travelers, recreationists, and Forest Service and Midas Gold employees, as well as damage to homes and property. They can spread unpredictably and rapidly and are highly dependent on changing weather patterns. Past wildfires have presented health and safety risks to the public. Much of the analysis area was burned by major wildfires in 2000, 2006, and 2007, as detailed in the Vegetation Baseline Study (HDR 2017d), as well as more recently in 2019. The danger of wildfires in the analysis area remains. The dense stands of snags and dead material left behind on the forest floor by those fires could be sources of fuel for future fires.

3.18.3.2 Economics and Health

Section 3.21, Social and Economic Conditions, discusses the existing social and economic conditions of the analysis area in detail. In 2018, Valley County had a relatively strong economy with an unemployment rate of 2.2 percent, slightly less than the 2.9 percent Idaho statewide unemployment rate. In 2018, 10.0 percent of Valley County residents were below the poverty level, which was less than the Idaho statewide percentage of 13.8. Median household and per capita incomes in Valley County were slightly higher than the statewide averages. The percentage of people not in the labor force in Valley County (50.5 percent) also was higher than the statewide average (37.6 percent) (**Table 3.21-4**, Valley County, Adams County, and Idaho Income [2018 Dollars]).

The Idaho Department of Labor collects data on employment by industry in each county. Valley County was substantially affected by the 2008 recession, but in recent years its economy has subsequently recovered. Historically, Valley County's economy was dependent on timber extraction; however, the county's last mill closed in 2001 and the loss of 70 jobs has continued to impact the area (Idaho Department of Environmental Quality 2019). In 2018, the tourism (leisure and hospitality) and trade, utilities, and transportation industries employed a majority of Valley County workers. Currently, the highest paying jobs in Valley County are in the mining, information services, government, and education/health service sectors (**Table 3.21-5**, Employment and Wages by Industry in Valley and Adams County [2018 Dollars]).

3.18.3.3 Public Services/Infrastructure and Health

The existing analysis area is remote and limited services exist; most of the remaining mining infrastructure is abandoned. Significant improvements to off-site and on-site infrastructure would be necessary to support the proposed cleanup of legacy impacts and site reclamation, exploration, mining and ore processing, and closure. The following subsections summarize the existing infrastructure conditions and services most relevant to the public health and safety analysis.

3.18.3.3.1 HISTORIC MINE FEATURES

As described in the Public Health and Safety Baseline Study (HDR 2017b), significant portions of the analysis area have a long history of mining activities that left behind a range of potential hazards. Some facilities and buildings associated with previous mining operations have been dismantled or destroyed by fire, but the mine site still contains dilapidated structures, old mining

equipment, underground mine openings (all collapsed and/or closed) and altered landscapes, such as mine pits, abandoned and reclaimed townsites, abandoned and reclaimed mine and exploration roads, hydroelectric generating foundations, municipal dumps at various locations, the reclaimed Hecla heap leach pad, the spent ore disposal area, and waste rock disposal areas. Because most of these hazards are on private land, unauthorized entry is considered trespassing, but these areas are easily accessible to the public.

Efforts have been made by Midas Gold to mitigate potential public safety issues related to these features. For example, “danger” and “no-trespassing” signs are posted near pits and waste rock disposal facilities where terrain is steep and benches could be unstable. Efforts also have been made to render old adits inaccessible by collapsing the entrances and posting warning signs. However, numerous hazards still exist throughout the mine site, including discarded sharp, rusted metal objects, foundation remnants, nails, glass, and other debris (HDR 2017b).

3.18.3.3.2 ROADS

Vehicle travel on National Forest System roads and CRs in the analysis area presents health and safety risks ranging from hazardous road conditions to transportation of hazardous materials through the analysis area. Many National Forest System roads, including those in the analysis area, are open to the public and used by federal, county, state, Midas Gold, and private vehicles. The analysis area is dominated by unpaved roads, one state highway, and county roads (**Figure 3.16-1**). The road segment of highest safety and traffic concern from the access and transportation risk analysis was found to be the Warm Lake Road (CR 10-579), with an average of 8 vehicle accidents per year from 2000 to 2016 (see Section 3.16, Access and Transportation).

Section 3.16, Access and Transportation, presents a detailed characterization of existing transportation routes, road conditions, design standards, and recorded vehicle accidents that have occurred in the analysis area. The analysis area experiences harsh weather conditions that pose potential travel hazards, especially during winter, when roads become snow-covered or icy. During winter, Valley County maintains only one route from Cascade to the analysis area, which follows Warm Lake Road (CR 10-579) to the intersection with South Fork Salmon River Road (National Forest System Road 474), then to the East Fork Stibnite Road portion of the McCall-Stibnite Road (CR 50-412) to the village of Yellow Pine. Midas Gold maintains Stibnite Road (CR 50-412) for access from the village of Yellow Pine to the mine site. All other routes to the mine site are not maintained (plowed or sanded) when snow-covered roads become impassable to vehicles.

3.18.3.3.3 POWER AND UTILITIES

From the Lake Fork substation, there is an existing 42-mile-long 69-kilovolt (kV) electric transmission line that passes through Cascade and connects with a substation near Warm Lake. Electricity for Yellow Pine is currently provided by an existing 21.5-mile-long 12.5-kV electric distribution line that connects to the Warm Lake substation. Idaho Power Company’s existing transmission line runs from its Lake Fork Substation south of McCall along its existing right-of-way to the Johnson Creek Airstrip. No power is currently supplied via a transmission line

to the mine site. Potential public health and safety hazards associated with transmission lines are from exposure to EMF and shock hazards. Magnetic and electric fields are separate phenomena that occur both naturally and as a result of human activity. Human-induced fields occur over a broad electrical and electromagnetic spectrum and are generated by communications equipment, appliances, and the generation, transmission, and local distribution of electricity.

Both electric and magnetic fields are produced when transmission lines are energized. Both electric and magnetic fields decrease rapidly with distance from the source. In addition, electrical fields associated with transmission lines are dampened by most objects, such as trees or houses, which shield receptors; however, magnetic fields are not easily shielded by objects or materials. As a result, the primary concern regarding potential health effects associated with EMF from transmission lines is related to magnetic fields (National Institute of Environment Health Services [NIEHS] 2002).

Most people in the United States are exposed to magnetic fields that average less than 2 milligauss (NIEHS 2002). Magnetic fields directly beneath power distribution lines typically range from 10 to 20 milligauss. Transmission lines and electrical appliances are the most common sources of non-ionizing EMFs and are considered extremely low frequency (ELF) forms of radiation. ELF-EMFs omit non-ionizing radiation from 1 to 3,000 hertz. ELF fields at 60 hertz are produced by transmission lines, electrical wiring, and electrical equipment in North America (NIEHS 2002).

During the 1990s, most EMF research focused on ELF exposures stemming from conventional power sources, such as transmission lines, electrical substations, or home appliances. While some of these studies showed a possible link between EMF field strength and an increased risk for childhood leukemia, their findings indicated that such an association was weak (International Agency for Research on Cancer 2002; NIEHS 1999; WHO 2007). Research over the decades by both national and international panels has been inconclusive regarding potential public health risks from exposure to EMF, and existing data do not provide sufficient evidence to conclude that EMF causes cancer. No EPA or State of Idaho limits for EMF exposure have been issued.

Although there are no federal standards limiting EMF from transmission lines and other sources to people at work or home, some states set standards for the width of rights-of-way under high-voltage transmission lines due to the potential for electric shock (EPA 2018; Idaho Power Company 2013).

Transmission lines transmit high-voltage electricity from the generation source or substation to another substation in the electric distribution system (OSHA 2020). Transmission lines move electricity more efficiently than lower voltage distribution lines, which deliver power directly to customers. Transmission lines vary in voltage from 69 kV up to 765 kV (OSHA 2020). A person standing directly under a high-voltage transmission line may feel a mild shock when touching something that conducts electricity. These sensations are caused by the strong electric fields from the high-voltage electricity in the lines. They occur only at close range because the electric fields rapidly become weaker as the distance from the line increases. Electric fields may be

shielded and further weakened by buildings, trees, and other objects that conduct electricity (NIEHS 2002).

The magnetic fields generated by transmission lines also can induce currents and voltages in conductive objects such as metal fences, automobiles, and metal roofs or buildings that are close to and run parallel to the transmission line. The induced currents in these objects can result in a small electrical shock or a perceptible current when contacted by humans or animals. These small shocks are a nuisance, but do not cause physiological harm (NIEHS 2002).

Direct contact with exposed or downed transmission lines could result in significant electrical shock. However, the incidence of downed transmission lines would be unlikely, occurring only in the rare event of an accident, severe weather, or natural disaster.

3.18.3.3.4 SANITARY AND SOLID WASTE

Midas Gold currently has and uses sanitary waste handling facilities at the exploration housing facility and other facilities that were approved by Valley County, Idaho Department of Environmental Quality, and Idaho Department of Health and Human Services (i.e., packaged sewage treatment facilities and leach fields and a recycling program that minimizes waste and trash delivery to area landfills) (Midas Gold 2016).

3.18.3.3.5 EMERGENCY MEDICAL SERVICES AND FIRE PROTECTION

In the event of a disaster or emergency, the local government's primary responsibility is to respond to the incident to preserve life and property. As described in the Public Health and Safety Baseline Report (HDR 2017b), due to the remote nature of the proposed SGP, most of the analysis area is located more than 30 miles from the nearest local emergency services. The mine site is 68 miles from Cascade and 50 miles from McCall, the two closest communities with hospitals. The nearest hospital with specialized care facilities is in Boise 146 miles away. The emergency transportation service stations for Life Flights are in Boise, Idaho and Ontario, Oregon and service up to a 175-mile radius area. Recently, a new helipad was added in Yellow Pine for emergency transport via Life Flight (Yellow Pines Times 2019). No urgent care or medical facilities are located close to the mine site or Yellow Pine; however, there is a Cascade Fire/EMS Paramedic Ambulance Substation in Yellow Pine, which allows the community to administer First Aid and Advanced Life Support (Yellow Pines Times 2018). In addition to the Village of Yellow Pine Fire District, there are three major fire-fighting agencies and districts in Valley County that serve the communities of Cascade, Donnelly, and McCall, as well as the rural areas surrounding these towns. These fire districts provide 24-hour fire protection for businesses and residents and are mostly staffed by volunteers. In the event of a catastrophic emergency, all the fire-fighting districts, the American Red Cross Valley County Chapter, and Valley County personnel would join forces to compose the Valley County Fire Working Group Collaborative. For larger scale emergencies, local officials may implement emergency statutes and ordinances and declare a local state of emergency to mobilize and commit their resources. If local governments do not have sufficient resources to handle an emergency, they can request the support of the Idaho Emergency Operations Center, which developed the Idaho Emergency

Operations Plan, a statewide comprehensive plan outlining disaster emergency response (Idaho Emergency Operations Center 2017).

3.18.3.4 Demographics and Health

Section 3.21, Social and Economic Conditions, discusses the existing demographics of the analysis area in detail. The SGP is located in Valley County, which encompasses approximately 3,664 square miles and is comprised of over 88 percent public lands. Cascade is the county seat, and McCall is the largest population center. Valley County is the fifth largest county in Idaho by area but is only the 28th most populated (year-round residence) county of the 44 counties. As of 2018, Valley County had an estimated year-round population of 10,401 people (U.S. Census Bureau 2018); however, the county does experience a seasonal increase of residents during the summer months. Non-Hispanic whites make up most of the population of Valley County (98.9 percent), with only 1.8 percent and 0.2 percent being Hispanic and American Indian, respectively, below the state averages of 12.7 percent and 1.3 percent, respectively. Yellow Pine is the closest residential community to the analysis area. According to the 2010 Census, Yellow Pine has a small population of only 32 people and comprises a small area of approximately 1 square mile.

3.18.3.4.1 LAND USE

Section 3.15, Land Use and Land Management, discusses the existing land use of the analysis area in detail. The Stibnite area has been the site of widespread mining and mining-related activities for over a century, the effects of which dominate the mine site. Most of the proposed SGP is in a relatively unpopulated, remote area. The closest (non-Midas Gold) occupied residence is in Yellow Pine, approximately 14 road miles west of the mine site. Most of the area adjacent to the mine site is open to the public because most of the land is public land managed by the Forest Service. Common users of the mine site include Midas Gold and Forest Service employees, residents of Yellow Pine, and recreationists. Recreation is a major use throughout much of the analysis area; activities commonly include hunting, fishing, sightseeing, hiking, camping, all-terrain vehicle use, snowmobiling, and horseback riding.

3.18.3.4.2 NOISE

Section 3.6, Noise, discusses existing noise conditions of the analysis area in detail. Noise is defined as “unwanted sound.” To avoid hearing impairment, impulse noise exposures should not exceed a peak sound pressure of 140 decibels (dB) in adults and 120 dB in children (WHO 1999). According to the Centers for Disease Control and Prevention, noise above 85 dB over a prolonged period may begin to cause hearing damage, and loud noise above 120 dB can cause immediate harm to ears. There are some non-auditory impacts on human health due to noise at sound levels beyond those associated with ear impairment (WHO 1999); this is an ongoing area of research. Non-auditory effects due to noise in a community can contribute to stressors that may influence health such as:

- Reductions in quality of life (potentially work, home, and school life), as noise can disrupt speech and sleep, potentially leading to increases in stress and reduction in productivity (U.S. Department of Transportation 2005).
- Effects on cardiovascular health via increases in blood pressure (Babisch 2011).
- Changes in hormone levels related to a stress response (Evans et al. 2001).

In addition, noise can represent a nuisance with associated annoyance levels for those affected. There is not a clear delineation as to when an "annoyance" results in a stress significant enough to produce measurable health effects; thus, some community noise analyses are based on annoyance perception levels rather than health effects (U.S. Department of Transportation 2005). Providing further complication, the impacts of increased sound depend not only on the numerical increase in sound levels, but also on the intensity and duration of the sound, as well as the sound setting (WHO 1999). Unexpected, short duration, high intensity sounds can have a worse effect than relatively steady sounds. Humans do appear to have an adaptive response to typical sound levels in their environment; once adaptation has occurred; sleep patterns are generally not affected (Stansfeld and Matheson 2003).

As discussed in Section 3.6, Noise, baseline sound levels at the 12 baseline noise measurement locations in the analysis area ranged from 34 decibels on the A-weighted scale (dBA) to 64 dBA. For comparison, 40 dBA is relatively quiet and can be equated to the noise level of a residence at night, while 60 dBA is comparable to a normal conversation and is considered a comfortable noise level.

3.18.3.4.3 COMMUNITY HEALTH

As summarized in **Table 3.18-2**, Valley County ranks sixth best in the state for health outcomes, based on an equal weighting of length and quality of life. Valley County ranks fourth best in the state for overall health factors, based on weighted scores for health behaviors, clinical care, social and economic factors, and the physical environment.

Table 3.18-2 Valley County Health Ranking in the State of Idaho

Valley County Measure of Health	2019 County Report Rank (out of 44)
Health Outcomes (overall)	**6**
Length of Life	14
Quality of Life	1
Health Factors (overall)	**4**
Health Behaviors (tobacco, diet and exercise, alcohol use, high risk sexual behavior)	3
Clinical Care (Uninsured adults, primary care providers rate, preventable hospital stays, diabetic screenings)	2
Social and Economic Factors (education, employment, income, family and social support, community safety)	12
Physical Environment (air quality, built environment)	30

Table Source: County Health Rankings and Roadmap 2019

Table 3.18-3 summarizes the health outcomes and health factors for Valley County compared to the State of Idaho as a whole and the U.S. median. As shown in **Table 3.18-3**, Valley County has better health outcomes than the state overall, as well as the U.S. median, in most categories measured.

Table 3.18-3 Detailed Health Outcomes and Measures for Valley County Compared to National and State Results

Factor	Measure	Description	US Median	Idaho State Overall	Valley County, Idaho
Health Outcome	Premature death	Years of potential life lost before age 75 per 100,000 population	8,100	6,251	6,217
Health Outcome	Poor or fair health	Percent (%) of adults reporting fair or poor health	17%	15%	13%
Health Outcome	Poor physical health days	Average number (#) of physically unhealthy days reported in past 30 days	3.9	3.7	3.4
Health Outcome	Poor mental health days	Average # of mentally unhealthy days reported in past 30 days	3.9	3.7	3.6
Health Outcome	Low birthweight	% of live births with low birthweight (< 2500 grams)	8%	7%	6%
Health Behavior	Adult smoking	% of adults who are current smokers	17%	14%	13%
Health Behavior	Adult obesity	% of adults that report a body mass index (BMI) ≥ 30	32%	28%	25%
Health Behavior	Food environment index	Index of factors that contribute to a healthy food environment, (0-10)	7.7	7.2	7.5
Health Behavior	Physical inactivity	% of adults aged 20 and over reporting no leisure-time physical activity	26%	19%	17%
Health Behavior	Access to exercise opportunities	% of population with adequate access to locations for physical activity	66%	78%	86%
Health Behavior	Excessive drinking	% of adults reporting binge or heavy drinking	17%	17%	17%
Health Behavior	Alcohol-impaired driving deaths	% of driving deaths with alcohol involvement	28%	31%	26%
Health Behavior	Sexually transmitted infections	# of newly diagnosed chlamydia cases per 100,000 population	321.7	356.3	198
Health Behavior	Teen births	# of births per 1,000 female population ages 15-19	31	24	13
Clinical Care	Uninsured	% of population under age 65 without health insurance	10%	12%	13%

Factor	Measure	Description	US Median	Idaho State Overall	Valley County, Idaho
Clinical Care	Primary care physicians	Ratio of population to primary care physicians	2,050:1	1,547:1	617:1
Clinical Care	Dentists	Ratio of population to dentists	2,450:1	1,547:1	1527:1
Clinical Care	Mental health providers	Ratio of population to mental health providers	970:1	506:1	534:1
Clinical Care	Preventable hospital stays	Rate of hospital stays for ambulatory-care sensitive conditions per 100,000 Medicare enrollees	4648	2696	1597
Clinical Care	Mammography screening	% of female Medicare enrollees ages 67-69 that receive mammography screening	40%	39%	40%
Social and Economic Factor	High school graduation	% of ninth-grade cohort that graduates in four years	90%	80%	83%
Social and Economic Factor	Some college	% of adults ages 25-44 with some post-secondary education	58%	65%	75%
Social and Economic Factor	Unemployment	% of population aged 16 and older unemployed but seeking work	4.4%	43.2%	4.4%
Social and Economic Factor	Children in poverty	% of children under age 18 in poverty	21%	15%	14%
Social and Economic Factor	Income inequality	Ratio of household income at the 80th percentile to income at the 20th percentile	4.4	4.3	3.6
Social and Economic Factor	Children in single-parent households	% of children that live in a household headed by a single parent	32%	25%	27%
Social and Economic Factor	Social associations	# of membership associations per 10,000 population	12.6	7.4	18.1
Social and Economic Factor	Violent crime	# of reported violent crime offenses per 100,000 population	205	221	327
Social and Economic Factor	Injury deaths including planned (homicide, suicide) and unplanned (motor vehicle accidents, falls, poisoning)	# of deaths due to injury per 100,000 population	82	73	75
Physical Environment	Air pollution – particulate matter	Average daily density of fine particulate matter in micrograms per cubic meter (particulate matter with an aerodynamic diameter of 2.5 microns or less)	9.2	7.4	6.6
Physical	Severe housing	% of households with	14%	16%	20%

Factor	Measure	Description	US Median	Idaho State Overall	Valley County, Idaho
Environment	problems	overcrowding, high housing costs, or lack of kitchen or plumbing facilities			
Physical Environment	Driving alone to work	% of workforce that drives alone to work	81%	79%	79%
Physical Environment	Long commute – driving alone	Among workers who commute in their car alone, % commuting > 30 minutes	30%	23%	10%

Table Source: County Health Rankings and Roadmap 2019