experienced decreases in fire frequency and attendant increases in fire severity in its aspen, dry conifer, and mountain shrub cover types.

Fire frequencies in the aspen/conifer mix range between 25 years and 100 years (63 years mid-range) with mixed severity (Loope and Gruell 1973). Fuel loads range from above 6 tons per acre. Pre-settlement stand-replacing fire frequencies for low-elevation shrub are estimated to vary from 60 to 110 years (85 years mid-range) for basin big sagebrush and Wyoming sagebrush types (Whisenant 1990; Peters and Bunting 1994; Miller 2001).

Effects from phosphate mining are not expected because all existing mines and all foreseeable mines are required by stipulations in their permits to implement BMPs for air quality that includes watering roads and active work areas or applying another dust suppressant. Adherence to these and other permit conditions confirms that the mines would be in compliance for fugitive dust. Additionally, there are typically from 2 to 5 miles between mines in southeast Idaho (**Figure 5.1-1**), and the distance between mines contributes to the improvement of effects from any single mine rather than contributing to cumulative effects among several mines. Air emissions from the new proposed mine would also be offset by the closing of the South Rasmussen Mine.

The effects of adding the proposed project to the past, present, and foreseeable future disturbances to air resources would not result in adverse cumulative impacts.

5.2.2 Climate Change

5.2.2.1 CEA Boundary

The CEA for issues related to climate change is based on the global atmospheric system.

5.2.2.2 Introduction

There are two viewpoints within the scientific community regarding the potential for climate change: 1) global warming as a result of man's activities; and 2) climate change due to natural climatic cycles.

5.2.2.2.1 Global Warming

Ongoing scientific research has identified the potential impacts of anthropogenic (man-made) and natural GHG emissions and changes in biological carbon sequestration due to land management activities on global climate. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO_2 concentrations to increase. As with any field of scientific study, there are uncertainties associated with the science of climate change. This does not imply that scientists do not have confidence in many aspects of climate change science. Some aspects of the science are known with virtual certainty because they are based on well-known physical laws and documents trends (EPA 2008).

Historic trend data (1850 to present) show an increase of 1°C in global mean temperature. There have been extended periods (decades) where temperature has dropped or stayed constant. The overall historic warming over that same period has been identified the cause for rising sea levels, and has been implicated in changes in climate patterns on land. However, the changes have not been consistent over the planet. Equatorial temperatures have cooled by about 5°C, while closer to the

poles, temperatures have risen by similar amounts (Hansen and Lebedeff 1987). In northern latitudes, temperature increases have been documented since 1900. Changes in weather patterns (rainfall and wind) resulting from temperature changes may affect vegetation and habitat.

5.2.2.2.2 Natural Climatic Cycles

Other scientists believe that the earth's natural climate is associated with natural cycles, including the sun's activity and other natural atmospheric conditions, and is less dependent on man's contribution. NASA scientists have monitored solar activity for decades, and recent monitoring has indicated changes taking place on the sun's surface. This evidence indicates a climate change may be coming that would bring an extended period of deep cold to the planet (Casey 2008). This is not, however, a unique event for the planet, but understood to be the normal sequence of alternating climate changes that has been going on for thousands of years. Further, according to this research, solar cycles are predictable and can be used to forecast the next series of climate changes many decades in advance. The accuracy of these cycles' behavior over the last 1,000 years relative to temperatures on Earth had been verified to more than 90 percent.

The sun's surface flows have slowed dramatically as NASA has indicated. This process of surface movement, what NASA calls the "conveyor belt" essentially sweeps up old sunspots and deposits new ones. NASA studies have found that, when the surface movement on the sun slows down, sunspot counts drop significantly. All records of sunspot counts and other proxies of solar activity going back 6,000 years validate the findings that when sunspot counts are lower than 50, an intense cold climate globally follows.

5.2.2.3 Past and Present Activities

According to the Energy Information Administration (EIA 2008), estimated CO_2 emissions in the U.S. totaled 6 million metric tons in 2006. Total world emissions of CO_2 are estimated at 32 billion metric tons (EIA 2008). The primary man-caused source of CO_2 is fossil fuel burning, which accounts for 82 percent of the total emissions.

5.2.2.4 Foreseeable Future Activities

5.2.2.4.1 Global Warming

World CO_2 emissions are expected to increase by 1.8 percent annually between 2004 and 2030 (EIA 2008). Much of the increase in emissions is expected to occur in the developing world, where emerging economies, such as China and India, fuel economic development with fossil energy. Emissions from the countries outside the Organization for Economic Cooperation and Development are expected to grow above the world average at 2.6 percent annually between 2004 and 2030.

5.2.2.4.2 Natural Climatic Cycles

Records of past climate changes suggest global cooling for the first several decades of the 21st century to about 2030, followed by global warming from about 2030 to about 2060, and renewed global cooling from 2060 to 2090 (Easterbrook 2008). Climatic fluctuations over the past several hundred years suggest about 30-year climatic cycles of global warming and cooling, on a general rising trend from the Little Ice Age.

5.2.2.5 Cumulative Effects

Addition of CO_2 emissions resulting from mining equipment associated with the Proposed Action and alternatives, estimated at 14,000 tons/year, would combine with the existing CO_2 levels in the atmosphere. Assuming a 17-year life of mine, total contribution of carbon dioxide from the Proposed Action would represent approximately 0.00004 percent on an annual basis and 0.00074 percent of total world CO_2 levels over the life of mine.

Addition of CO_2 to regional or global atmospheric conditions is not expected to affect development of the Proposed Action or implementation of alternatives. Warming conditions would likely result in shorter winter periods, thereby decreasing the costs associated with mining operations. Cooling trends would increase the winter period, thereby increasing the need for snow management and generally raising equipment maintenance and operational costs.

5.2.2.5.1 Global Warming

Assuming global warming trends continue into the future, Chambers (2006) indicates that the following changes may be expected to occur in the West:

- Precipitation as rain may increase over most areas (IPCC 2007) with increases in summer precipitation predicted at 10 percent, fall by 30 percent, and winter by 40 percent. Snowfall would be reduced, and snowmelt would occur earlier in the spring.
- Flow in streams and rivers would change in response to less snowpack and increased precipitation in the form of rain. Spring runoff flow would occur earlier in the spring and may be lower in magnitude as a result of snowpack changes. Summer and fall low flow periods may be variable due to late season storm events.
- Some species of vegetation would expand including invasive (noxious weeds) species. Elevated levels of CO_2 in the atmosphere would provide favorable growing conditions for most plant species.
- Wildfire episodes may increase in response to increase in small fuels load in grasslands and forests. Increase in average temperatures may result in extending the fire seasons.

5.2.2.5.2 Natural Climatic Cycles

A period of extreme cold can result in massive crop losses, food shortages, famine, and disease. The projected cooling climate change is predicted to last up to 30 years with increased length of winter periods and more precipitation occurring as snow. With extended winter periods, at least in the northern latitudes, crop production in southern latitudes would see increased pressure to support the food supply (Casey 2008). Some animal species would migrate to southern latitudes to maintain populations; some individuals may die in response to extended winter periods.

5.2.3 Noise

5.2.3.1 CEA Boundary

The CEA for noise was delineated to include the past, present, and reasonably foreseeable Blackfoot Bridge Mine operations. The CEA includes the Blackfoot Bridge Mine and sensitive noise receptors

within 1.5 miles, including the area along State Highway 34 and Blackfoot River Road, where the closest residents live. Noise from mining is attenuated by vegetation and topography to levels that are not discernable for long distances to humans. Noise related to access traffic and haul roads is of importance to persons along nearby public roads and in nearby residences.

5.2.3.2 Introduction

Mines from the Southeastern Idaho Phosphate District do not overlap within the CEA. Noise impacts from Blackfoot Bridge Mine operations or other existing mines do not impact sensitive receptors in the CEA. The effects of adding the proposed project to the past, present, and foreseeable future disturbances to noise resources would not result in adverse cumulative impacts.

5.2.3.3 Past and Present Activities

Past and present disturbances contributing to noise include vehicular traffic on State Highway 34, Blackfoot River Road, the haul road, and from the Union Pacific Dry Valley Ranch Railroad. Noise from vehicular traffic and the railroad are short-term and intermittent. Mines that operated in the past would no longer contribute to noise impacts. Existing operating phosphate mines are located outside the CEA and would not impact the CEA.

5.2.3.4 Foreseeable Future Activities

Foreseeable future disturbances contributing to noise would include construction and operation of the mine and its related facilities, vehicular traffic, and the Union Pacific Dry Valley Ranch Railroad. Noise from vehicular traffic and the railroad would be short-term and intermittent. Noise from Blackfoot Bridge Mine would not impact sensitive noise receptors within the CEA. Existing operating phosphate mines are located outside the CEA and would not impact the CEA. If a future mine were to begin operating in the CEA or within 2 miles of the CEA, there is potential for cumulative impacts to noise.

5.2.3.5 Cumulative Activities

Past, present, and reasonably foreseeable disturbance impacts to the CEA have been and would be predominately associated with noise localized to the mining areas.

5.2.3.6 Cumulative Effects

Noise impacts from Blackfoot Bridge mining operations would not impact sensitive receptors within the CEA. The noise from Blackfoot Bridge and other mining operations would likely not overlap. Instead, noise would be localized to each phosphate mine.

The effects of adding the proposed project to the past, present, and foreseeable future disturbances on sensitive noise receptors would not result in adverse cumulative impacts.

5.3 WATER RESOURCES

5.3.1 CEA Boundary

The CEA for water resources contains the Upper Blackfoot Watershed, which comprises the eastern third of USGS 4th order Hydrologic Unit Code (HUC-4) sub-basin (17040207). This CEA encompasses approximately 223,389 acres and incorporates areas that include all past, present, and reasonably foreseeable phosphate mining-related disturbances upstream of the Blackfoot Reservoir. Approximately 55 percent of the CEA is located within Caribou-Targhee National Forest (CTNF). The rest includes private, BLM, and State of Idaho land ownerships. CEA boundaries as well as locations of past and present mining activities are depicted on **Figure 5.3-1**. Water resources are addressed within this area due to the indirect effect that vegetation and soil disturbance has on surface- and groundwater quality as a result of erosion and sediment transport.

5.3.2 Introduction

Activities or phenomena affecting water resources within the CEA include mining; farming; ranching; livestock grazing; wildfires; fire suppression activities; road building; and development of domestic, commercial, and industrial land parcels. Two prominent water quality issues in the CEA include drainage from phosphate mine overburden and sediment from a variety of other sources. Major sediment sources include native surfaced roads and motorized trails near streams, eroding streambanks, gullies, and riparian areas lacking sufficient or proper ground cover. Mining activities increase the potential mobilization of COPCs (selenium is of primary concern) and sediment through ground-disturbing activities. Agricultural practices impact water quality through the introduction of fertilizers and animal and vegetation waste. Agriculture-derived sediment can also be introduced through normal runoff from tilled fields and from trampled or disturbed areas adjacent to water bodies. Various land use practices, such as mining, farming, grazing, and construction activities, can impact surface water by affecting volume and timing of surface runoff and through alteration of natural channel morphology.

Cumulative effects to surface water resources may include increases of COPC concentrations and sediment load in streams, ponds, and springs, and impacts to water quantity related to changes in volume and timing of surface runoff.

Cumulative effects to groundwater resources may include increases of chemical loading in local and regional aquifers and changes in depth to groundwater due to pumping or decreased infiltration rates.

5.3.3 Past and Present Activities

A variety of human actions have affected streams, riparian areas, and watersheds in the CEA. Reduction of beaver population due to trapping in 1800s reduced channel/pond water and sediment storage capacity, which in turn caused increased peak storm flows, flow energies, and sediment downstream (USDA 2009). Beginning in about 1870, intensive logging activities converted forest to range land, which resulted in reduced infiltration and increased storm runoff peaks and volumes. Intensive livestock grazing on open lands (increased by logging) over many years depleted soils of upper organic layers which absorb and hold rain and snowmelt. Organic layers increase the volume

of moisture that is available later in the year and decrease runoff volumes and peak flows (USDA 2009).

Exclusion of fire in the 1900s has changed vegetation communities, which directly and indirectly affect hydrologic conditions. Exclusion of fire promotes replacement of aspen by conifer or brush. Aspen produce a much thicker, more effective soil sponge than do conifer or brush, and transpire less water on an annual basis. Fire exclusion, therefore, can change the annual watershed water balance, which translates to less groundwater recharge and lower summertime streamflows (USDA 2009).

Starting in the 1950s, willows were eliminated near stream beds in many areas to increase forage for livestock. Reduction of willows contributed to bank stability problems, causing increased sediment loading in streams from bank erosion and overly widened channels. It also resulted in higher water temperatures due to loss of shading vegetation along stream banks. Increased bankwidths caused by willow reduction also increased the amount of solar energy transferred to the water, resulting in higher in-stream temperatures (USDA 2009).

Construction of roads and the use of off-road motorized vehicles such as all-terrain vehicles (ATVs) have increased the soils erosion in the watershed. Channel modifications have been done on a section of the Blackfoot River near the Blackfoot River Road. Small sections of channel have been modified elsewhere for road crossings and sometimes portions of channels have been moved or crowded for road placement. In general, channelization straightens and enlarges the channel cross-section. While this temporarily improves drainage efficiency in the area treated, over the medium- to long-term, it alters the sediment balance and almost always causes unintended side effects. Straightened channels have steeper gradients and more erosional power than meandering channels. Straightening triggers erosion and sedimentation in the channelized reach and erosion and downcutting in the reach above as the channel begins to re-adjust to a new equilibrium with the locally increased gradient and erosional power (USDA 2009).

Previous phosphate mining operations have left open pits and overburden piles scattered throughout the watershed. Older mining practices left shale materials with elevated levels of selenium and other elements either exposed at the surface or with shallow or no cover. Older overburden dumps generally do not have capillary barrier covers to restrict infiltration, and the surfaces may have shallow slopes or rough surfaces that do not minimize infiltration of precipitation. Seepage from many of the overburden disposal sites contain COPCs at elevated concentrations that may be transported into streams (USDA 2009). Selenium is the COPC of greatest regulatory focus in the CEA.

Twelve phosphate mines have operated within the CEA boundary between 1906 and 2009 (**Figure 5.3-1**). Investigations under CERCLA have been initiated for five of the mines to assess the contamination and potential risks associated with the sites. Historic mining sites that are being investigated under CERCLA include Enoch Valley Mine, Ballard Mine, Conda Mine, North Maybe Mine, and South Maybe Mine. Additionally, there are three active phosphate mining operations within the Upper Blackfoot River Watershed. Active phosphate mining operations include Dry

Figure 5.3-1 Upper Blackfoot Watershed CEA

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Valley Mine, North Rasmussen Ridge Mine, and South Rasmussen Mine. The other four mines (Champ Mine, Mountain Fuel Mine, Wooley Valley Mine, and Lanes Creek Mine) are historic mines, and the reserves have been mined out. The operating Smoky Canyon Mine is located outside of the CEA.

One of the CERCLA sites, the Conda Mine, shares a common boundary with the Blackfoot Bridge Project and is located south of the Project Area (**Figure 5.3-1**). Recent environmental studies for the CERCLA study at the Conda Mine indicate that groundwater in the local- to intermediate-scale groundwater system contains selenium at concentrations that exceed groundwater standards. Total selenium concentrations for wells completed in alluvium and shallow bedrock ranged from < 0.0002 mg/L to 0.215 mg/L during fall 2008, exceeding the groundwater standard of 0.05 mg/L in samples from four of the 11 wells. Selenium concentrations from wells completed in the regional Wells Formation were detected below the groundwater standard during this monitoring period (NewField 2009).

Historic Mining activities in the CEA have resulted in increased selenium concentrations in the Blackfoot River and some of its tributaries. IDEQ has annually sampled up to 21 surface water sites in the Upper Blackfoot Watershed since 2004 to assess water quality impacts from phosphate mining operations (USDA 2009). The monitoring program included analyses for metals including cadmium, chromium, copper, lead, nickel, selenium, silver, vanadium, zinc, as well as measurement of streamflow and physical parameters. Selenium levels greater than or equal to the chronic aquatic live (CCC) standard of 0.005 mg/L have been measured in the Blackfoot River, Goodheart Creek, Spring Creek, State Land Creek, and East Mill Creek. Selenium levels greater than the acute aquatic life (CMC) standard of 0.02 mg/L were measured in East Mill Creek and nearby Spring Creek (**Figure 5.3-1**) (USDA 2009).

As discussed in **Section 3.3**, the USGS has also monitored water quality for Blackfoot River at station 13063000 upstream of the project area (**Figure 5.3-1**). Water quality data from the USGS station indicate that selenium concentrations in the river vary considerably (from 0.005 mg/L to 0.0094 mg/L) and generally exceed the CCC aquatic life standard for a few days each spring before decreasing to below the standard during the remainder of the year. This seasonal cycling correlates to peak flows in the Blackfoot River and is likely related to increased runoff from phosphate mine overburden materials in the sub-basin during spring snowmelt (Whetstone 2009b).

Additionally, baseline monitoring in **Section 3.3** indicates that metal concentrations in the mainstem of State Land Creek are below applicable water quality standards with the exception of selenium, which was detected at concentrations that exceeded the CCC aquatic life standard. Concentrations of selenium in State Land Creek Tributary 2 were also elevated exceeding the CCC and CMC aquatic life standards. Samples from State Land Creek Tributaries 1 and 3 below the proposed Blackfoot Bridge Project have consistently met all applicable water quality standards.

These impacts have been recognized by IDEQ by listing portions of Blackfoot River and several of its tributaries, including State Land Creek, as impaired waterbodies under Section 303(d) of the Clean Water Act (IDEQ 2005a and 2008b). Section 303(d) requires states to identify streams and lakes that do not meet water quality standards and to establish a TMDL value for the listed pollutants. The most frequently identified causes of impairment in the CEA are sediment, habitat alteration, and chemical constituents (USDA 2009). Cultivated agriculture and livestock range land

uses continue to occur on private land across the CEA. Forest management activities on the CTNF include timber sales, livestock grazing, and public recreation. Many of the past and current human activities within CEA, including mining, livestock grazing, and road construction, continue to increase sediment loads to streams that often result in channel instability. These types of impacts have also been documented within the CEA. The Blackfoot River, as well as several tributaries within the Upper Blackfoot Watershed, have been identified as impaired by sediment loads under Section 303(d) of the Clean Water Act (IDEQ 2005a and 2008b).

5.3.4 Foreseeable Future Activities

Foreseeable future activities that have potential to affect water resources in the CEA include agricultural and livestock range land uses, public recreation, remediation of inactive mines, and construction activities resulting in ground disturbance. Mining activities at the currently operating Dry Valley, North Rasmussen Ridge, and South Rasmussen Mines, and proposed phosphate mining projects also have the potential to affect water resources.

Changes to private agricultural lands are likely, as portions of these lands are converted into low-density residential areas. Near-term development of private agricultural lands within the CEA is expected to be limited because Caribou County has identified infilling of existing city limits and impact areas, rather than expansion into rural areas as a growth goal (Caribou County 2006). No known changes to transportation or recreational uses of the CEA beyond those identified in the Proposed Action have been identified. The proposed project has the potential to affect the surface water and groundwater quantity and quality. These impacts have been evaluated and are described in detail in **Section 4.3** The primary impact of the Proposed Action would be from percolation of annual recharge water through the seleniferous stockpiles and overburden materials introducing COPCs into the Wells Formation aquifer, and consequently into the Blackfoot River.

As described in **Section 4.3**, the proposed project would also add sediment and reduce runoff to drainages for State Land Creek, Fish Pond, Beaver Pond, and the Blackfoot River during mining operations. However, backfilling of the pits would be concurrent with mining, and the area of the open pits that would capture runoff during any given year would be limited. The impacts to the local aquifers of the Rex Chert and Dinwoody Formation are expected to be of limited extent in the immediate vicinity of the proposed mine facilities. Pit dewatering during mining operations would result in a lowered water table and a depletion of about 2 percent of the stream flow in Blackfoot River under low-flow conditions. These impacts would be temporary and of limited duration. Another mining project currently proposed within the CEA in addition to the proposed Blackfoot Bridge project, the Dairy Syncline Mine and Reclamation Plan for Federal Leases I-28115 and I-2058, was submitted to the BLM in October 2008. The leases total 2,302.3 acres, all of which are on U.S. Forest Service System lands. Simplot, the proponent, is seeking to acquire six fringe leases or lease modifications that would total an additional 1,101.34 acres, mostly on U.S. Forest Service System lands (USDA 2009).

Development of the Fox Ranch and Trail Creek federal phosphate leases near the Blackfoot River could also impact water resources. However, because the mining and water management programs have not been developed, potential impacts to water resources cannot be quantified.

CERCLA studies and remedial actions would occur at phosphate mining sites within the CEA. Remedial activities could include regrading and capping and revegetation of existing overburden piles or backfills, backfilling of pits, and removal of overburden that was placed as cross-valley fills. Remedial activities would be designed to arrest existing sources of COPCs associated with these sites and minimize contaminated seepage from existing overburden disposal facilities and sediment loading to surface water from past mining disturbances.

Although not a requirement in order to meet Idaho Water Quality Standards in the Blackfoot River, P4 has evaluated projects to reduce selenium discharges from other sources in the Upper Blackfoot River Drainage. While the modeling results provided in this EIS predict that mine discharges would cause a negligible increase in concentrations of selenium in the Blackfoot River (**Section 2.4.1**), with peak selenium loads 0 to 3 pounds per year over approximately the next 50 years under the Proposed Action and 5.5 lbs/yr and 5.3 lbs/yr at year 108 for Alternatives 1A and 1B respectively (ARCADIS 2009). P4 has identified the following projects that would provide a reduction in impacts well beyond the estimated contribution of selenium from the Blackfoot Bridge Mine:

South Rasmussen Mine - As part of the overburden area design at the South Rasmussen Mine, a "toe trench" system was constructed at the toe of the overburden area to eliminate any buildup of water within the overburden pile that might cause a possible stability issue on the hillside. The toe trench also intercepts groundwater that may seep from below the pile. In 2008, P4 instituted a program to collect all of the water from the toe trench and pump that water back into the mining area water system where it is now being utilized or evaporated. This project resulted in reducing 5 to 15 pounds per year of selenium loading to the Blackfoot River basin.

Ballard Mine - P4 intends on constructing an interceptor pond for a seep identified south of the Ballard West Pit, commonly referred to as the "hayfield pipe". In the spring of 2008, sampling results detected a flow of up to 15,000 gallons per day with a selenium concentration of 350 ppb. The proposed project would include installation of a lined interceptor pond to collect water from this discharge and allow for evaporation of the water. The lined pond would be fenced to control wildlife exposure to the pond. Although flows from this area fluctuate each spring, based on 2008 data, the project would represent a reduction of approximately 1 pound per year of selenium being discharged in the Blackfoot River basin area. Implementation of this project is contingent upon receiving proper agency (IDEQ and EPA) approval, as it is part of an ongoing CERCLA investigation. As such, the project would be coordinated with the appropriate agencies to accelerate installation of the interceptor pond while the remedial investigation is being completed. Additionally, changes to the proposed project may be made in response to comments from the agencies overseeing the site, including use of tanks and treatment steps in lieu of lined ponds. The proposed project would be managed until final remedy for the Ballard Mine site is determined by the regulatory agencies.

In summary, the above noted projects identify reductions from other sources to address concerns associated with the potential impacts of selenium on fish tissue. These projects would reduce selenium loading to the Blackfoot River Basin in an amount that exceeds the Blackfoot Bridge project's modeled potential contribution of selenium to the Blackfoot River for Alternatives 1A and 1B.

Mining is an important economic resource for the State of Idaho, so it is anticipated that the historic trend for phosphate mining resource development within the watershed will continue into the future

at a similar or accelerated pace due to improvements in mining equipment and ore recovery optimization.

5.3.5 Cumulative Effects

From all identified past, present, and foreseeable future developments within the CEA, mining has the greatest potential to cumulatively impact water resources. However, activities such as farming, grazing, road construction, and recreational uses also have the potential to cumulatively affect water resources by increasing temperature, nutrients, and sediment loads in surface water features. These effects are expected to be minor and would be most pronounced during rainstorms and spring runoff.

Cumulative impacts to groundwater quality would primarily occur from mobilization of metals during mining at proposed and operating mines, and by leaching of COPCs from overburden at active, historical, and proposed phosphate mine sites. Contamination of shallow and intermediate scale aquifers at Blackfoot Bridge would be localized and of limited extent, and would not cumulatively affect the groundwater quality in the CEA outside of the project boundary. Groundwater quality of the regional Wells Formation may be cumulatively affected by past, present, and future mining activities. The proposed project is located downgradient from the Conda Mine and along the groundwater flowpath toward the Blackfoot River. Contamination from the Conda Mine, when combined with the predicted chemical loading of groundwater from the proposed project, would have the potential to result in cumulative impacts to the Wells Formation. The potential cumulative impacts to groundwater quality in the regional aquifer within the Blackfoot Bridge project boundary are expected to be moderate and long-term.

Impacts from groundwater withdrawals during mining would be temporary and would only occur during active dewatering for mining below the water table. Pumping for mine dewatering would be limited to less than about 3 months during any given year. Impacts related to groundwater withdrawals in the CEA outside of the project area would be negligible to minor, localized, and short-term.

In the long term, reduced infiltration may occur as a result of capping overburden piles and backfills. Cumulative impacts to groundwater quantity may also occur from pumping related to irrigation, municipal and domestic water supply, and other industrial activities. Project-related impacts to groundwater quantity in the CEA are expected to be negligible. Cumulative impacts to surface water quality would occur primarily due to contaminated runoff from overburden at the historical mines to nearby surface water features. At these former mines, direct recharge through mine features, such as overburden disposal areas and/or leaching from contaminated shallow/intermediate groundwater flow systems, may infiltrate into the regional Wells Formation flow system. Both local and regional groundwater systems could eventually transport and discharge these contaminants into the Blackfoot River. Contribution from the current and proposed mining activities would be limited to groundwater discharges to the Blackfoot River. BMPs and mitigation measures would limit any contaminated runoff discharges into surface water bodies.

As discussed in **Section 5.3.3**, Blackfoot River has been impacted by increased selenium concentration from phosphate mining activities in the watershed. The predicted project-related selenium load to the Blackfoot River would be relatively small compared to the current load in the river during peak flow; therefore, the proposed project would result in a minor impact to the river.

However, effects to water quality from the proposed project, when combined with past, present, and other foreseeable developments, are expected to be moderate to major and long-term until remediation actions at inactive mines reduce selenium load to streams. Increases in sediment loads to streams within CEA due to past, present, and foreseeable developments are expected to be minor, local, and short-term.

Impacts from reduced groundwater flow to the Blackfoot River during mining would be temporary and would occur as a result of dewatering during mining below the regional water table. Long-term increased runoff due to capping of reclaimed areas may result from all mines within the CEA. These impacts would be localized and negligible with respect to the CEA.

5.4 SOILS

5.4.1 CEA Boundary

The CEA for soil resources is the same as for water resources (**Section 5.3**) and encompasses the Upper Blackfoot Watershed Analysis Area (**Figure 5.3-1**). Soil and watershed resources are addressed under the same CEA due to the indirect effect that soil disturbance has on surface and groundwater quality as a result of erosion and sediment transport.

5.4.2 Introduction

Direct impacts to soil resources typically occur as a result of ground-disturbing activity. Activities affecting soils within the CEA could include mining, farming, ranching, livestock grazing, wildfires, fire suppression activities, timber harvest and management, road building, recreation, and development of domestic, commercial, and industrial land parcels. Potential impacts to soil resources include damage or removal of vegetation, topsoil and subsoil, changes in slope and aspect, decreased slope stability, and exposure of soil materials to weathering processes and subsequent erosion. Although soils are capable of regeneration over extended periods of time, cumulative impacts to soils can include the loss of productivity and increased exposure of people and facilities to unstable slopes.

The most extensive impacts to soils in the CEA would likely result from mining, agricultural, and timber harvesting activities. Because the success of mine reclamation largely depends on reuse of stockpiled or live-handled topsoil, and because all mines are required to implement a SWPPP, impacts to soils beyond initial disturbance and relocation (i.e., soil loss through erosion) are minimized. The success of the agricultural industry is also inherently dependant on soil quality, and range management practices are widely implemented during these activities. Forest management activities on the CTNF include timber sales, livestock grazing, and public recreation. Extensive portions of the soil resource CEA are located on lands administered by the CTNF. Activities in these areas are subject to management goals and standards provided in the CTNF Forest Plan (USFS 2003b). Forest management activities (including timber sales, livestock grazing, and public recreation) are not expected to contribute to cumulative effects on soil resources within the CEA.

5.4.3 Past and Present Activities

Past and present disturbances within and near the CEA are similar to those discussed in **Section 5.3.3**. Many former and current human activities within the CEA can increase sediment loads to streams. Livestock grazing has the potential to affect soil resources by decreasing the vegetative cover, destroying the microbiotic crust, increasing compaction, and increasing the erodibility of soils. Localized damage in areas adjacent to waterways can destroy stream banks and allow sediment to directly enter the water system.

Typical recreation activities in the CEA include hunting, fishing, and other outdoor activities. Generally, these activities have a lesser impact on soils resources than other uses due to their intermittent and seasonal nature. Effects on soils resources due to past and present recreation are limited to compaction from off-road vehicle travel, runoff from dirt roads, and hiking or pack trails.

Mining activities have major impacts on soil resources within in the CEA. Soils are directly impacted by removal and storage during open pit excavations and subsequent replacement during reclamation. Successful reuse of soils is a primary goal of mine reclamation and is a critical component of maintaining soil productivity.

Current soil erosion hazards across the project area are generally low (soil erodibility [K] factor less than 0.25), as are hot-water soluble selenium concentrations (less than 0.01 mg/kg) (Greystone 2006a). Despite generally low local soil erodibility, the Draft 2008 Integrated 303(d)/305(b) Report (IDEQ 2008b) listed approximately 18 miles of water within the CEA (stretches of Coyote Creek, Bear Creek, State Land Creek, upper Mill Canyon, lower Chippy Creek, and Clarks Cut above Sheep Creek) as impaired due to sedimentation/siltation. Excessive sediment levels in the CEA have not been attributed to a specific source and have likely resulted from a combination of activities within the CEA.

5.4.4 Foreseeable Future Activities

Mining could occur on lease areas that have not been developed, which would result in disturbance to soil resources. Soil would be salvaged, stockpiled, and replaced to achieve reclamation of mine areas. Sediment control systems would be used to control soil loss from disturbance areas.

Future quantities, extents, and types of grazing activities within the CEA are not expected to vary from current activities. Present rates of soil loss in agricultural areas are expected to be maintained in the foreseeable future. Changes to private agricultural lands and disruption of soils are likely, as portions of these lands are converted into low-density residential areas. Near-term development of private agricultural lands within the CEA is expected to be limited because Caribou County has identified infilling of existing city limits and impact areas rather than expansion into rural areas as a growth goal (Caribou County 2006). Timber sales are anticipated to continue similar to current levels, with similar constraints on soil disruption as in recent years (USFS 2003b). No known changes to transportation or recreational uses beyond those identified in the Proposed Action have been proposed that would affect soil resources within the CEA.

Although current soil conditions within the project area are resistant to erosion, disruption of vegetative cover and soil aggregates would result in increased soil erosion and transport of sediment

by water and wind. Due to low native concentrations of selenium and other COPCs within project area soils (Greystone 2006a), the amount of soil-derived COPCs is not expected to increase significantly. Increases to sediment load in the Blackfoot River and tributaries from future phosphate mining within the CEA, including the Proposed Action and alternatives, would be minimized by implementation of SWPPPs and the Water Management Plan, which is designed to contain all transported sediment within the project area. These plans would be designed to contain sediment derived from future mining disturbances and minimize sediment loading in area waters. Because soil movement would be controlled by installation of sediment control basins, runoff control ditches, and implementation of BMPs, changes to soil erosion and sediment transport as a result of the Proposed Action and alternatives have not been quantified.

5.4.5 Cumulative Activities

Cumulative disturbances of soil resources within the CEA as a result of past, present, and reasonably foreseeable developments, including the Proposed Action and Alternatives 1A and 1B, would primarily be the result of agricultural practices and phosphate mining activities. Additional disturbances of soils as a result of timber sales and residential development would also occur but would be of smaller scale.

5.4.6 Cumulative Effects

Cumulative impacts to soil resources within the CEA as a result of past, present, and reasonably foreseeable developments, including the Proposed Action and Alternatives 1A and 1B, are expected to be minor. Because soils disturbed during the Proposed Action and other mining ventures would be collected, protected, and reused during reclamation, long-term cumulative effects to soil resources would be less than cumulative disturbances. Other activities that contribute sediment to watersheds would continue.

Effects resulting from the Proposed Action and the alternatives would be limited to the project area and would generally be short-term. One exception is unreclaimed areas, such as highwalls, which have had soil removed and would continue to be unproductive until soils redevelop through pedogenic processes. Because impacts to water as a result of sediment loading in the CEA have been identified and are anticipated to decrease in the future, and because mining, agriculture, and forest management activities are all vested in maintaining soil productivity, no long-term effects on soil resources are expected in the CEA. Long-term, local effects on soils as a result of residential development within the CEA would be minor.

5.5 VEGETATION, RIPARIAN AREAS, AND WETLANDS

5.5.1 CEA Boundary

The CEA for vegetation, riparian areas, and wetlands is the same as that described for surface water and soils (**Figure 5.3-1**). It is composed of the Upper Blackfoot River Watershed. Much of the land within the CEA is under private ownership, where data on past, present, and particularly future disturbances are not readily available. Other land managers include the State of Idaho, BLM, and USFS, which includes the majority of the land in the CEA.

Vegetation, wetlands, and riparian areas are supported and influenced by surface water and near-surface groundwater. Disturbance to vegetation would also be roughly equivalent to the disturbance of soil in the same area. Vegetation effects from the Proposed Action and alternatives would not be noticeable beyond the natural watershed boundaries that define the CEA.

5.5.2 Introduction

Disturbance of vegetation in the CEA occurs through activities related to mining, agriculture, grazing, vegetation management, wildfires, controlled burns, and off-road vehicle use. The reasonably foreseeable developments in the CEA include the continuation of past and present disturbances. **Table 5.5-1** provides the major vegetation types and the amount of acreage each vegetation type occupies within the CEA. The six major vegetation types (deciduous forest, evergreen forest, mixed forest, scrub/shrub, grassland/herbaceous, and wetland) cover approximately 97 percent of the CEA (USGS 2007b). According to available data, approximately 14,303 acres of past and present land uses and direct disturbances to vegetation have occurred within the CEA (**Table 5.5-2**), which represents approximately 6 percent of the total CEA.

Table 5.5-1 Existing Land Cover in Vegetation CEA

Cover Type	Acres
Open Water	18
Developed, Open Space	1,107
Developed, Low Intensity	27
Developed, Medium Intensity	<1
Barren Land	31
Deciduous Forest	13,630
Evergreen Forest	84,375
Mixed Forest	227
Scrub/Shrub	82,445
Grassland/Herbaceous	29,467
Pasture/Hay	386
Cultivated Crops	4,565
Woody Wetlands	2,124
Emergent Herbaceous Wetland	4,985
Total	**223,386**

Source: USGS 2007c.

According to National Wetland Inventory (NWI) data, approximately 13,251 acres of emergent and forest/shrub wetlands were present within the CEA as of the early 1980s, when the data were collected (USFWS 2009). Direct impacts to wetlands and riparian areas within the CEA have occurred mainly through agricultural activities. Many activities that have affected vegetation in the past are expected to continue in the reasonably foreseeable future (e.g., agriculture, grazing, recreation, and mining).

5.5.3 Past and Present Activities

5.5.3.1 Vegetation

Table 5.5-2 indicates the acreage of disturbance from various past and present sources in the CEA. The principal past and present anthropogenic disturbances to vegetation within the CEA include phosphate mining, accounting for 42 percent of disturbance; agriculture (cultivated crops and pasture), accounting for 41 percent of disturbance; vegetation management activities, accounting for 16 percent of disturbance; and development (e.g., roads, buildings), accounting for 9 percent of disturbance. Wildfires have been a relatively minor cause of disturbance within the CEA. The Trail Fire burned 730 acres about 4.6 miles to the southeast of the project area in 2003. Dozens more fires have burned hundreds of acres just west of the CEA over the past century (BLM 2008c). Most disturbances have predominately affected evergreen forest and scrub/shrub communities, which are the primary vegetation types in the CEA.

Table 5.5-2 Acres of Disturbance from Past and Present Activities in Vegetation CEA

Disturbance Type	Acres
Agriculture (Cultivated Crops and Pasture)	4,951
Development (e.g., Roads, Buildings, Railroads)	1,334
Wildfires	730
Phosphate Mining	5,057
Timber Harvest/Prescribed Burns	*2,231
Total	**14,303**

* Since 2005

Source: USGS 2007c; Moyle and Kayser 2006; BLM 2008c; USFS 2003b.

Grazing activities occur throughout much of the CEA, which includes 33,618 acres of BLM grazing allotments (BLM 2008d). Livestock grazing has and would continue to alter vegetation community composition. In addition, grazing activities can result in specific, localized damage in riparian areas from vegetation removal by cattle, as well as increasing the introduction and spread of noxious and non-native vegetation species.

Vegetation growing on reclaimed mine sites in the CEA has been found to contain elevated levels of selenium. The IDEQ sampled terrestrial vegetation at the Conda and Ballard Mines as part of an area-wide risk assessment study. This study found selenium concentrations ranging from 8.9 to 39 mg/kg at the Ballard Mine and from 1.5 to 20 mg/kg at the Conda Mine (IDEQ 2003). In comparison, background selenium concentrations in terrestrial plants have been reported to range from 0.01 to 0.6 mg/kg (Ohlendorf 2003).

5.5.3.2 Wetlands

Past and present ground disturbances in the CEA that could have impacted wetlands are shown in **Table 5.5-3**. The principal past and present impacts to wetlands within the CEA occurred as a result of agricultural land uses. Overall, agriculture has accounted for 75 percent of disturbance to wetlands within the CEA since the early 1980s, when wetlands data were collected. Phosphate mining has accounted for 21 percent of direct wetland disturbance, and roads, buildings, and other facilities have accounted for 4 percent of disturbance to wetlands. The documented past and present

direct impacts to wetlands (329 acres) from all of these activities amount to approximately 2 percent of the total wetlands area in the CEA, as determined by NWI data (USFWS 2009). However, programs administered by various regulatory agencies have greatly reduced or eliminated a potential net loss of wetlands through some type of mitigation whether it is fee in-lieu, wetland restoration, or wetland creation.

Indirect impacts to wetlands, such as those resulting from sedimentation and selenium contamination, have likely occurred as well but are more difficult to quantify. Agricultural disturbances may include draining, flooding, leveling, and grazing in wetlands. These impacts are relatively transient and reversible. In contrast, roads, buildings, and mines may have long-term or permanent impacts on wetlands due to long-term changes in topography and hydrology.

Table 5.5-3 Existing/Past Disturbance to Mapped NWI Wetlands in Vegetation CEA

Disturbance Type	Acres
Agriculture (Cultivated Crops and Pasture)	247
Development (e.g., Roads, Buildings, Railroads)	12
Phosphate Mining	70
Total	**329**

Source: USFWS 2009, USGS 2007c, Moyle and Kayser 2006

5.5.3.3 Noxious Weeds

No quantitative data are available on the acres currently affected by noxious weeds within the CEA or the number of acres that have been treated to combat noxious weeds. Land disturbances totaling approximately 14,303 acres of past and present surface disturbances (e.g., wildfires, roads, mining and exploration activities, and private land development) have potentially introduced and increased the susceptibility for the establishment of noxious weeds in about 6 percent of the CEA. Wildfires in sagebrush often result in the establishment of cheatgrass, which establishes quickly after fire and excludes native perennials (Zouhar 2003).

5.5.3.4 Fire Management

The majority of the vegetation CEA was historically classified as Fire Regime IV, which is characterized by 35 to 100+ year fire frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced). Low elevation shrub and perennial grass are cover types commonly associated with Fire Regime IV.

According to the BLM (2008a), many of the cover types near the project area have been subjected to wildland fire that is not within the historical range of variability. Large and/or uncharacteristic fires in these cover types can threaten people and property, as well as the resiliency, integrity, and long-term sustainability of ecosystem components and processes. Fires are occurring more frequently and are burning more severely in some cover types. For example, the invasion of the sagebrush steppe by invasive annual species, such as cheatgrass and medusahead wildrye, has substantially increased fine fuel continuity in this cover type, making it more susceptible to large, frequent, and uncharacteristic fires. In other vegetation cover types, fires are occurring less frequently than they have historically, which causes undesirable changes in vegetation species composition and structure and an accumulation of hazardous fuels. For example, because of long-term fire suppression, juniper

species are expanding their range at the expense of sagebrush steppe, and dry conifer cover types are slowly replacing aspen and some mountain shrub cover types (BLM 2008a). Within these vegetation types, prescribed burns have been used as a management tool for fuel management, which reduces the potential for wildfires.

Since approximately 1996, wildland fires have occurred in the region at an overall accelerated rate, mostly due to vegetation changes and changed conditions like cheatgrass invasion into sagebrush steppe cover types. To a lesser extent, the area has experienced decreases in fire frequency and attendant increases in fire severity in its aspen, dry conifer, and mountain shrub cover types. These vegetation cover types require more frequent disturbance to decrease fuel loads, facilitate aspen and forb regeneration, and decrease fire intensity. Altered fire regimes (i.e., changes in fire frequency, severity, and size) not only threaten resources, such as wildlife habitat, cultural resources, air/visual quality, and grazing, but also affect public and firefighter safety within and around areas of human development (BLM 2008a).

5.5.4 Foreseeable Future Activities

5.5.4.1 Vegetation

No foreseeable future timber sales or prescribed burns are currently proposed or planned within the vegetation CEA by the State of Idaho, BLM Pocatello Field Office, or CTNF. Wildfire effects in the CEA cannot be reliably evaluated; therefore, results of wildfires are not considered for this analysis. Forest product extraction (including fuel, posts, poles, plant gathering, and Christmas trees) would continue to impact forest resources in the CEA.

Changes to private agricultural lands within the CEA are likely, as some of these lands are converted from traditional agricultural (farming and ranching) to residential and recreational use. Impacts to vegetation resources would include changes in vegetative composition and possibly loss of vegetation in some areas; however, specific plans for such conversions are unknown and cannot be reliably evaluated.

The Caribou-Lower Valley Transmission Line is a proposed 20-mile long segment of high voltage power line that would cross the CEA and affect vegetation within a 100-foot wide right-of-way. Overall, this project would result in disturbance to vegetation on about 150 acres in the CEA.

The reasonably foreseeable developments within the CEA that would affect vegetation include potential phosphate mining in several not-yet-mined federal phosphate leased areas, such as the Fox Ranch, Trail Creek, Schmid Valley, and Dairy Syncline leases. Exploration on the Dairy Syncline leases totaling 22 acres is planned beginning in 2009, but no specific plans are known for mining in the other available leases within the CEA in the immediate future. Federal phosphate lease boundaries may be used to estimate the maximum amount of potential disturbance from future mining, an area equal to approximately 10,988 acres. As with past and present disturbance, the majority of future disturbance would likely take place within the evergreen forest and scrub/shrub cover types, which comprises the majority of the leased areas.

Selenium-related impacts to vegetation in the CEA would be expected to continue on sites that were mined in the past. New phosphate mines are likely to incorporate BMPs and cover designs that limit

potential for selenium uptake by vegetation, unlike past mines that were constructed without regard for potential selenium release (IDEQ 2006b).

5.5.4.2 Wetlands

Some additional wetland impacts, although not specifically described, are likely to occur from road maintenance, livestock grazing, and other activities, such as those conducted on private lands within the CEA. These impacts cannot be quantified due to lack of data. According to the NWI (USFWS 2009), not-yet-mined federal phosphate leases within the CEA overlap about 363 acres of mapped wetlands. Therefore, there is the possibility that future mining in these leases would directly impact wetlands, though mitigation measures would likely be implemented to compensate for these impacts. Future indirect impacts to wetlands from sedimentation and selenium contamination are also possible, though BMPs would likely minimize these impacts as well.

5.5.4.3 Noxious Weeds

The BLM Upper Snake and Pocatello Field Offices have recently completed the planning process for implementing an integrated weed control program (BLM 2009). This would give the BLM more tools to control noxious weed infestations on BLM-administered public land in the vicinity of the project area and within the vegetation and wetlands CEA. Under the weed control program, the BLM would treat approximately 2,000 acres per year for weeds across the lands administered by the Upper Snake Field Office and Pocatello Field Office. Of these acres, approximately 500 acres per year would be treated using manual or mechanical methods, approximately 1,600 acres per year would be treated using herbicides, and approximately 400 acres per year would be treated using biocontrol methods (BLM 2009). Specific locations for these treatments have yet to be identified.

5.5.4.4 Fire Management

Alteration of vegetation through fire suppression and spread of invasive species would continue to alter fire regimes in the CEA in the foreseeable future. The BLM Idaho Falls and Twin Falls Districts have released a fire and fuels plan (BLM 2008a). This plan incorporates the National Fire Plan direction into existing Land Use Plans by emphasizing the increased use of fire including prescribed burns and wildfires. This would approximate the historical role of fire and prepare sites for restoration treatments.

5.5.5 Cumulative Activities

5.5.5.1 Vegetation

The potential new disturbance to vegetation from the Proposed Action or alternatives (739 acres), added to known past, present, and reasonably foreseeable future disturbances, results in approximately 7 percent of the CEA being disturbed (15,214 acres out of 233,386). The majority of this is disturbance due to phosphate mining (5,818 acres including the Proposed Action and alternatives). Natural revegetation and reclamation reestablish vegetation relatively quickly to most of these disturbed areas, although the vegetation composition and community type is changed and modified from its pre-disturbance state. Long-term disturbance resulting from the Proposed Action or alternatives would total 99 acres, or 0.04 percent of the CEA.

Plant growth and animal burrows could extend to depths where seleniferous materials would be placed as pit backfill and external overburden piles; however, roots and burrows would need to extend to at least 4 feet to contact core seleniferous materials. With the exception of alfalfa, which represents about 2 percent of the Proposed Action seed mix, the species included in the seed mix are shallow rooting and would not extend to these depths. As native plants (shrubs and trees) invaded reclaimed areas, it is expected that more root systems could potentially extend into seleniferous materials, and to the extent that selenium is available to these roots, uptake of selenium could occur.

According to Gough et al. (1979), "Excess soil selenium may prevent plants not in [selenium-tolerant] groups from growing on seleniferous soils by causing toxicity symptoms to develop." These toxicity symptoms include stunting of growth and chlorosis (reduction in chlorophyll production), though it is unknown at what selenium threshold these symptoms are likely to occur (Gough et al. 1979). At a minimum, selenium content of growth medium and selenium concentrations in vegetation on new reclaimed areas in the CEA may increase under the Proposed Action or alternatives, and cumulative effects may occur to vegetation in the CEA from this potential impact.

This impact would be minimized under Alternatives 1A and 1B because the seed mix to be used in reclamation would be adjusted to account for any potential impacts from plant rooting in areas where the GCLL would be used. Plant rooting depths would be controlled by selection of the types of species proposed to be used for reclamation seed mix. Species in the seed mix would be selected based on their shallow rooting depths in order to minimize potential penetration of the liner by roots. Finally, the unique nature of the GCLL is the ability to "self-repair" holes of up to 3 inches in diameter in the event of root penetration (O'Kane 2009a).

5.5.5.2 Wetlands

In addition to past and present impacts, implementation of the Proposed Action or the alternatives would result in a maximum direct disturbance of approximately 6.11 acres of wetlands, which would be mitigated by creating or enhancing wetlands elsewhere. This proposed wetland disturbance would be approximately 0.05 percent of the total wetlands in the CEA. In total, past, present, and reasonably foreseeable future disturbance would have a cumulative impact to approximately 335 acres of wetlands in the CEA (not including phosphate leases for which there are no current plans for mining). This represents approximately 3 percent of the estimated wetlands in the CEA. The Proposed Action or alternatives would also result in indirect impacts to wetlands including reduction in groundwater discharge to Wetland A and potential release of selenium to the Fish Pond drainage. These indirect effects would cumulatively contribute to wetland degradation in the CEA.

5.5.5.3 Noxious Weeds

Adding the proposed disturbance to vegetation within the CEA from implementing the Proposed Action or alternatives (739 acres) would increase the cumulative effect of disturbed acres susceptible to noxious weed invasion by about 5 percent; however, improved weed prevention measures, control/treatment requirements, and the implementation of the BLM Upper Snake-Pocatello Integrated Weed Control Program (BLM 2009) would limit the contribution of noxious weeds by the Proposed Action to the overall cumulative effect within the CEA.

5.5.5.4 Fire Management

The Proposed Action or alternatives would result in the conversion of 267 acres of forested land (historical Fire Regime III) to grassland (historical Fire Regime IV), representing a change in fire regime in 0.1 percent of the CEA. The disturbed land could also cumulatively add to the amount of land deviating from natural fire regimes if natural characteristics were altered by noxious weed invasions, fire suppression, or grazing management practices.

5.5.6 Cumulative Effects

5.5.6.1 Vegetation

Adding the Proposed Action or alternatives disturbances to past, present, and foreseeable future vegetation disturbances, cumulative effects to vegetation in the CEA from direct disturbance would be short-term due to the temporary nature of many of the disturbances. Generally, mining would replace existing vegetation with grassland, which would then be subject to the process of succession.

Cumulative effects of selenium accumulation in the vegetation growing on the reclaimed site would be long-term until selenium mobility and availability within the reclaimed landscape stabilized. Mining activities constitute a relatively small area within the CEA, and future mines would likely incorporate BMPs and closure practices that minimize this potential effect.

5.5.6.2 Wetlands

Although approximately 3 percent of wetlands in the CEA either have been or could be directly disturbed, compensatory mitigation by the USACE is required for most projects that impact wetlands under their jurisdiction. The single largest past impact to wetlands in the CEA is from agriculture, which normally is not subject to USACE regulation. However, programs administered by USDA NRCS to address agricultural impacts to wetlands in agreement with state and USACE regulations could greatly reduce or eliminate a potential net loss of wetlands in general.

5.5.6.3 Noxious Weeds

Disturbed lands would be more susceptible to weed infestations; however, control measures would be implemented either by private landowners or county, state, and federal weed control efforts.

5.5.6.4 Fire Management

Because of the small area involved, the long-term cumulative effects of the altered fire regimes under the Proposed Action or alternatives would be negligible.

5.6 TERRESTRIAL WILDLIFE

5.6.1 CEA Boundary

The CEA for wildlife species (**Figure 5.6-1**) generally includes suitable habitat for a given species within a 15-mile radius surrounding the project area. The wildlife CEA encompasses approximately

523,000 acres and approximately 53 percent (277,593 acres) is private land. Public lands in the CEA include those administered by the USFS (115,425 acres), State of Idaho (70,140 acres), and the BLM (51,773 acres). There is no Wild and Scenic Rivers, wilderness, or other ecologically critical areas within the CEA.

Most impacts to wildlife would occur within or immediately adjacent to the project area and would affect individuals with home ranges overlapping or immediately adjacent to the project area. An area with a 15-mile radius is large enough to encompass the home ranges of the most mobile wildlife individuals in the project area, such as large predatory mammals. It is unknown to what extent wildlife individuals would be displaced and what the impacts of displacement on resident populations would be; however, given the scale of the Proposed Action or alternatives, it is unlikely that any short- or long-term adverse impacts to wildlife species would occur beyond the identified CEA.

5.6.2 Introduction

According to the USGS (USGS 2007b), scrub/shrub (e.g., sagebrush), evergreen forest, and grassland/herbaceous are the dominant vegetation types within the CEA (**Table 5.6-1**). Riparian areas and other vegetation communities also occur throughout the CEA in lesser amounts. This diversity in habitat types allows many wildlife species to utilize the area.

Table 5.6-1 Existing Land Cover in Wildlife CEA

Cover Type	Acres
Open Water	12,229
Developed, Open Space	6,691
Developed, Low Intensity	1,515
Developed, Medium Intensity	653
Developed, High Intensity	81
Barren Land	483
Deciduous Forest	23,365
Evergreen Forest	100,861
Mixed Forest	1,135
Scrub/Shrub	204,223
Grassland/Herbaceous	79,246
Pasture/Hay	2,087
Cultivated Crops	68,195
Woody Wetlands	2,588
Emergent Herbaceous Wetland	19,691
Total	**523,043**

Source: USGS 2007c.

Past, present, and reasonably foreseeable actions in the wildlife CEA have likely resulted in both beneficial and negative impacts at various levels on wildlife. The foremost impact to wildlife within the CEA has been habitat changes associated with past and present agriculture, wildfires, construction of roads and buildings, mining activities, and vegetation management activities. These changes measure approximately 98,162 acres or 19 percent of the CEA. In addition, range allotments, which affect vegetation through grazing, occur on 152,648 acres (29 percent) of the

CEA. Other impacts that are not quantified include effect of noise on wildlife, displacement from mining, roads, and recreational activities. Beneficial impacts related to timber harvesting and wildfires include increased foraging opportunities for species that use forest openings. Negative impacts include loss of habitat; displacement; and fragmentation as a result of fires, mining, timber harvesting, roads, private land development, agriculture, and recreation. Specific to small and less mobile wildlife species (e.g., small mammals, amphibians, reptiles), past impacts from direct mortality (trampling) by livestock, large wild ungulates, and vehicles has likely also occurred within the CEA but is not quantifiable. In addition, grazing can contribute to impacts by increasing competition for forage and changes in the structure or composition of native plant communities.

5.6.3 Past and Present Activities

Within the CEA, major past and present anthropogenic disturbances (**Table 5.6-2**) have resulted from grazing (152,648 acres, not shown in table), agriculture (70,282 acres), mining (7,697 acres), roads and buildings (8,940 acres), vegetation management (2,231 acres since 2005), and recreation. Wildfires have also been an important cause of disturbance, having burned 9,012 acres in the CEA between 1937 and 2007.

Table 5.6-2 Past and Present Disturbances in the Wildlife CEA

Disturbance Type	Acres
Agriculture (Cultivated Crops and Pasture)	70,282
Wildfires	9,012
Development (e.g., Roads, Buildings, Railroads)	8,940
Phosphate Mining	7,697
Timber Harvest/Prescribed Burns	2,231*
Total	**98,162**

* Since 2005

Source: USGS 2007c; Moyle and Kayser 2006; BLM 2008c; USFS 2003b.

Past and present timber harvests in the CEA have resulted in habitat changes that affect wildlife. The majority of habitat conversion is in the form of forest removal followed by reforestation with a short period of early seral (non-climax grass or shrub) conditions. This habitat conversion would cause forest-dependent wildlife using the affected areas to disperse in search of new areas. In contrast, most wildfires have affected the scrub/shrub (largely sagebrush) vegetation type. Wildfires in sagebrush may result in the establishment of cheatgrass, which establishes quickly after fire and excludes native perennials, reducing habitat for sagebrush-dependent species (Zouhar 2003).

In general, wildlife are affected by livestock grazing due to competition for forage, direct mortality by trampling (e.g., amphibians and ground-nesting birds), and habitat removal and conversion. Both domestic livestock and wild ungulate grazing may change the structure or composition of native plant communities. Proper rotation and stocking rates can minimize these negative effects.

Figure 5.6-1 Wildlife and Special Status Species Cumulative Effects Area

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Human presence tends to disturb many species of wildlife. Past and present recreational uses in the area include hunting, fishing, ATV and snowmobile use, camping, and picnicking. Human disturbance during periods of the year when wildlife are otherwise stressed, due to a lack of forage and/or harsh weather (as occurs during the winter season), can further stress wildlife and may increase mortality.

Past and present disturbances from roads and mining activities have resulted in fragmentation of certain wildlife populations and their habitats. Fragmentation effects within the CEA have not been quantified by the land management agencies.

Other nearby phosphate mines have increased concentrations of selenium and other metals in water, aquatic plants, aquatic invertebrates, and fish near the project area (Hamilton and Buhl 2003). Increasing concentrations of selenium in surface water and groundwater seeps and springs may lead to reduced reproductive success in certain terrestrial wildlife of the region. The toxicity effects could, in turn, cause changes in food web structure and ecosystem functioning and decreased monetary revenues from big game and waterfowl hunting.

5.6.3.1 Big Game

Big game have potentially been affected by all of the past and present disturbances described above including habitat changes caused by agriculture, mining, development, vegetation management, and wildfires. According to the IDFG, there are about 29,151 acres of big game critical winter range within the wildlife CEA. Winter range represents areas that contribute to the long-term viability of elk and deer populations. Human disturbance during periods of the year when big game are otherwise stressed by a lack of forage or harsh weather has potentially led to increased stress and mortality on winter range in the CEA. On the range allotments within the CEA, big game has had to compete with livestock for forage. They have also been subject to direct disturbance from anthropogenic noise and activity and direct mortality from hunting and vehicle collisions.

Big game foraging on reclaimed mine overburden piles in the wildlife CEA have been exposed to elevated levels of selenium. One past study found selenium levels as high as 13.06 mg/kg in elk liver and 0.92 mg/kg in elk muscle tissue. The level found in elk liver was high enough for the Idaho Bureau of Community and Environmental Health to advise people to avoid eating elk liver in large quantities (BCEH 2006). The controlling issue for Idaho Bureau of Community and Environmental Health advisory was copper content and not selenium. Although some samples yielded elevated selenium, it was secondary to copper. Relative to selenium, the advisory was only informational. Typically, these sorts of hunting advisories are issued annually. The selenium information advisory has not been issued for the past two hunting seasons. In grazing animals, chronic selenium poisoning is characterized by skin lesions involving alopecia (hair loss), hoof necrosis, and emaciation. An effort in 2000 to look for hoof deformities in a sample of 50 elk in southeastern Idaho turned up a single elk with abnormal hooves, but it is not known whether this elk's deformities were caused by selenium toxicity (Wright et al. 2002).

5.6.3.2 Bats

Potentially habitat for six species of bats could be affected as the result of the Proposed Action or alternatives in the wildlife CEA (these species are listed in **Section 3.6.1.2**). Bats have potentially been affected by all of the past and present disturbances described above, including habitat changes

caused by agriculture, mining, development, vegetation management, and wildfires. Many bats forage on adult stages of aquatic insects, which have been found to contain elevated levels of selenium at some locations within the wildlife CEA (Hamilton and Buhl 2003). Selenium exposure has not been specifically evaluated for bats in the CEA.

5.6.3.3 Other Mammals

Other mammals in the wildlife CEA include small herbivores, such as rabbits; omnivores, such as rodents; and medium- to large-sized carnivores. All species have been subject to the disturbances described above. Smaller species, such as rodents, have likely been more susceptible to direct mortality due to crushing (e.g., by construction equipment during road building or by livestock grazing), whereas large carnivores have been more likely to be disturbed by noise and human presence.

5.6.3.4 Raptors

Suitable habitat for nesting and foraging raptors occurs throughout the wildlife CEA. In general, raptors are sensitive to human disturbance during the nesting season. Noise and activity from vehicles, recreation, construction, mining, and vegetation management has likely resulted in disturbance to breeding raptors in the past, but this is not quantifiable. Timber removal has likely resulted in the loss of habitat for some species but increased foraging habitat for others that hunt prey in early successional habitats.

5.6.3.5 Bald Eagles

According to the Idaho Cooperative Fish and Wildlife Research Unit Gap Analysis Project, there are about 36,935 acres of potential bald eagle habitat in the wildlife CEA (Landscape Dynamics Lab 2001). Monitoring indicates that bald eagles have exceeded USFWS recovery goals in Idaho and are continuing to increase, though the nest failure rate has also increased in recent years (IDFG 2006a). The cause of the increased nest failure rate is unknown, though human disturbance, environmental contamination from heavy metals, and intraspecific competition for food or nesting habitat are listed as possibilities (IDFG 2006a). Past and present mining and other activities may have resulted in temporary displacement of bald eagles within the CEA at various times as a result of noise and disturbances. Timber removal may have resulted in the loss of large nesting trees. Degradation of rivers and streams through sedimentation (e.g., through road-building) and contamination (e.g., from mining and agricultural practices) may have affected eagle populations by affecting prey populations.

5.6.3.6 Migratory Birds

Habitat for migratory birds occurs throughout the wildlife CEA and includes every listed cover type, except perhaps the most heavily developed areas. Migratory birds have potentially been affected by all of the past and present disturbances described above including habitat changes caused by agriculture, mining, development, vegetation management, and wildfires. A 2001 population-level assessment of the impact of selenium on reproduction of red-winged blackbirds and American robins in southeastern Idaho demonstrated no substantial negative impact from selenium, and in fact, data suggested a positive influence of selenium on reproduction (Ratti et al. 2002).

5.6.3.7 Upland Game Birds

There are several species of upland game birds potentially found in the wildlife CEA including blue grouse, ruffed grouse, greater sage grouse, and sharp-tailed grouse. The blue grouse is a Type 5 BLM special status species, the sharp-tailed grouse is a Type 3 BLM special status species, and the greater sage grouse is a Type 2 BLM special status species. Known sage-grouse and sharp-tailed grouse leks near the project area are presented in **Table 3.6-2**. About 56,282 acres within the wildlife CEA are considered key sage grouse habitat, defined as "Areas of generally intact sagebrush steppe habitat that provide sage grouse habitat during some portion of the year (summer-use, late brood-rearing, fall, transition sites from winter to spring, spring to summer, and summer/fall to winter)" (BLM 2008e).

All species have been subject to the past and present disturbances described above including mining, recreation, road and building construction, vegetation management, and wildfires. Forest-dwelling species (e.g., ruffed grouse, blue grouse) have been affected by timber removal. Sage grouse and sharp-tailed grouse have been impacted by loss of sagebrush habitat and grazing management practices. All species have potentially been affected by selenium exposure on reclaimed mine sites, but this impact has not been quantified for upland game birds in the CEA.

5.6.3.8 Water Birds

According to the USGS (USGS 2007b), there are about 12,229 acres of open water habitats in the CEA. These open water habitats may be used by a wide variety of water birds for foraging, brood-rearing, and resting.

Past and present disturbances to water birds in the CEA include impacts from noise related to construction, mining, and recreation; hunting; and degradation of water quality from sedimentation and contamination. Aquatic insects, plants, and fish, on which water birds feed, have been shown to carry elevated selenium levels at multiple sites within the CEA (Hamilton and Buhl 2003). Ratti et al. (2006) analyzed eggs collected from various mine and reference sites in the Southeast Idaho Phosphate District and for six water bird species (eared grebe, western grebe, cinnamon teal, Canada goose, mallard, and American coot) found higher selenium concentrations in eggs from mine sites. For some species (eared grebe, cinnamon teal, and American coot), egg concentrations exceeded 10 mg/kg dry weight. Ratti et al. (2006) did not find any indications of abnormal development such as embryo deformities.

5.6.3.9 Amphibians and Reptiles

Many species of amphibians and reptiles are potentially found within the wildlife CEA. As a whole, they use every habitat type, from wetland to dry sagebrush to forest. Amphibians and reptiles are small and fairly immobile, so they likely have been more affected by habitat fragmentation and direct mortality than have other species in the wildlife CEA. Habitat fragmentation and mortality have occurred as a result of road-building and other construction projects, grazing, mining, vegetation management, conversion of land to agriculture, and wildfire.

Amphibians and reptiles residing in wet areas (such as garter snakes) are vulnerable to degradation of water quality and aquatic prey; these species have likely been affected by activities in the CEA

causing sedimentation or contamination of streams and wetlands. Effects to amphibians and reptiles from elevated selenium concentrations have not been evaluated within the CEA, but studies have found elevated selenium levels in water, sediment, aquatic plants, and aquatic insects downstream of reclaimed phosphate mines (Hamilton and Buhl 2003). Also, selenium poisoning has been confirmed in many salamanders at the Gay Mine and the Smoky Canyon Mine, both of which are just outside the CEA boundary. Concentrations in some individuals were 10 to 100 times the normal level in animal tissue (BLM 2003). It seems likely, therefore, that amphibians and semi-aquatic reptiles have been affected by elevated selenium levels within the CEA.

5.6.4 Foreseeable Future Activities

In addition to the reasonably foreseeable actions described in **Section 5.5** within the applicable CEA, **Table 5.6-3** lists proposed activities that could impact wildlife habitat throughout the wildlife CEA. Fifty-three percent (277,593 acres) of the wildlife CEA occurs on private lands. Past and present actions on private land within the CEA have mainly included agriculture and grazing activities. Housing development has also occurred on the large ranches within the CEA. Specific land impacts on private lands in the CEA are difficult to quantify due to lack of specific data. Disturbance of wildlife habitat caused by these private land impacts is also not quantified with existing data, but would be an area smaller than the private land ownership area.

Table 5.6-3 Proposed Activities in the Wildlife CEA

Project Name	Project Type	Schedule	Acres
Rattlesnake Salvage Sale	Beetle-killed Timber Salvage	2009	115
Soda Point Hazardous Fuels Reduction	Vegetation Treatment	2009	200
Caribou - Lower Valley Transmission Line	Transmission Line Construction	2009	242
Dairy Syncline Exploration Project	Phosphate Exploration Drilling	2009	22
		Total	**579**

Source: USFS 2009

In addition to the projects listed in **Table 5.6-3**, there are approximately 14,478 acres of not-yet-mined federal phosphate leases in the wildlife CEA. While no specific plans are known for mining in these leases in the immediate future, the lease boundaries may be used as an estimate of the maximum amount of potential disturbance from future mining.

For most groups of species, disturbances described above under "Past and Present Disturbances" are expected to continue in the reasonably foreseeable future. Habitat fragmentation and alteration resulting from construction projects, grazing, mining, vegetation management, conversion of land to agriculture, wildfires, controlled burns, and noxious weed invasions would continue. Individuals of small, less mobile species would continue to be vulnerable to direct mortality from crushing by vehicles, construction equipment, and livestock. Wintering big game may be subject to increased harassment by recreationists, particularly if available hiding and escape cover is reduced by other activities. Recreation use in the area can be expected to reflect local changes in population and interest in outdoor activities.

All species are potentially vulnerable to the toxic effects of selenium accumulation. Selenium contamination is expected to continue below operating and reclaimed phosphate mines in the foreseeable future. New phosphate mines are likely to incorporate BMPs that limit the potential for

selenium contamination of the environment, unlike past mines that were constructed without regard for selenium contamination (IDEQ 2006b).

5.6.5 Cumulative Activities

The reasonably foreseeable disturbances listed in **Table 5.6-3** (579 acres), when added to the past and present disturbance, would increase the disturbance of lands in the CEA to about 18.9 percent. The potential new disturbance of the Proposed Action or alternatives (739 acres) is added to that total, the overall percent of disturbance increases to 19.0 percent of lands in the CEA.

In general, wildlife dispersal from habitat disturbance decreases survival rates of affected individuals to some degree and increases competition. The effects to specific species from disturbance related to the Proposed Action and alternatives are described in detail in **Section 4.6**. Mine construction and operation could temporarily limit the attractiveness of the CEA to wildlife, such as big game, carnivores, and raptors, which generally prefer areas free from anthropogenic noise and activity. Bald eagles usually modify their activities and movements to avoid human disturbance, but implementation of the Eagle Management Plan (P4 2009b) would minimize disturbance to the eagles nesting in the project area. Some species, such as elk, could take advantage of new foraging areas after reclamation was completed.

Implementing the Proposed Action or alternatives would result in the displacement of wildlife and some forms of recreation (e.g., hiking, hunting, ATV use) from the project area and the surrounding habitat into adjacent undisturbed areas. Displacement of some forms of recreation has the potential to result in a minor cumulative impact to wildlife for the duration of the Proposed Action or alternatives as a result of adding the impacts from the Proposed Action or alternatives to the past and present impacts from recreation on wildlife in the CEA.

Implementing the Proposed Action or alternatives would result in additional fragmentation to wildlife habitat and could isolate populations of small, immobile wildlife such as amphibians and reptiles. Thus, a minor cumulative effect to wildlife from fragmentation impacts would potentially occur for the duration of the Proposed Action.

In terms of mining activities exposing wildlife species in the area to potentially toxic levels of selenium, the Proposed Action or alternatives would not incorporate harmful amounts of selenium or trace metals in the growth medium/soil of reclaimed areas due to the incorporation of BMPs into the mine and reclamation plan. As discussed in **Section 4.6**, however, plant roots and burrowing animals may still be able to reach seleniferous materials and introduce elevated levels of selenium into the food chain. Additionally, the Proposed Action and Alternatives 1A or 1B are likely to result in selenium concentrations in Fish Pond exceeding the cold water aquatic life CCC standard of 0.005 mg/L, which could pose a risk to wildlife residing in or drinking the water. Therefore, although BMPs would limit the potential for selenium exposure relative to some past mining operations, minor, long-term cumulative impacts to wildlife may still occur as a result of the Proposed Action and alternatives.

5.6.6 Cumulative Effects

Adding the Proposed Action or alternatives disturbances to past, present, and foreseeable future disturbances would result in long-term, minor cumulative effects to wildlife. Effects would betemporary, and disturbances affect small areas compared with species' ranges and the overall amount of habitat available in the CEA.

5.7 FISHERIES AND AQUATIC RESOURCES

5.7.1 CEA Boundary

The CEA for fisheries and aquatic resources includes the Upper Blackfoot River Watershed above the Blackfoot Reservoir. It is the same CEA that is described for surface water, soils, and vegetation (**Figure 5.3-1**).

The most mobile aquatic species in the CEA are large fish, such as cutthroat trout. The reservoir population of cutthroat trout uses the upper Blackfoot River system for spawning. Activities throughout the upper Blackfoot River drainage would therefore potentially impact aquatic species downstream of the project area. Aquatic resources should not be affected by the Proposed Action or alternatives beyond this area, even over the long term.

5.7.2 Introduction

The effects of mining at Blackfoot Bridge on fisheries and aquatic resources include a potential for increased introduction of selenium into waterways and increased sedimentation into waterways.

5.7.3 Past and Present Activities

Past activities within the CEA that have impacted fisheries and aquatic resources include livestock grazing, agriculture, vegetation management, road construction, and phosphate mining. Acres of disturbance in the CEA associated with most of these activities are shown in **Table 5.5-2**. In addition, predation by growing numbers of American white pelicans has also impacted fish populations within the CEA in recent years (Sallabanks 2008).

The IDEQ assessed approximately 85 miles of the Blackfoot River and its tributaries between 1997 and 2000. The agency determined that, along portions of the river, the Blackfoot River's beneficial uses (coldwater aquatic life, salmonid spawning, recreation, domestic water supply, agricultural water supply, industrial water supply, wildlife habitat, and aesthetics) are impaired by sediment, nutrients, organics, and unknown pollutants (IDEQ 2006b).

Sedimentation can reduce the foraging and reproductive success of aquatic organisms, disrupt fish migration, and impair the respiratory systems and gills of invertebrates and fish. Species composition and numbers of invertebrates can be altered by increased sedimentation and resultant habitat changes (Waters 1995). In the CEA, possible causes of sedimentation have included agriculture, grazing, and road construction.

Approximately 93 percent of the BLM Pocatello Field Office planning area is open to grazing by either cattle or sheep (BLM 2006a). Grazing allotments occur on approximately 33,618 acres in the CEA (BLM 2008d). Livestock grazing in riparian areas can increase sediment load to watersheds through increased instream trampling, increased disturbance and erosion from overgrazed streambanks, reduced sediment trapping by riparian and instream vegetation, decreased bank stability, and increased peak flows from compaction (Waters 1995).

Road construction has also impacted streams and wetlands in the CEA. Roads can disrupt the natural hydrology of watersheds by concentrating runoff, which is then directed to streams at higher flow rates, leading to widening or deepening of channels. Such changes in flow rate and stream morphology can negatively impact some species and benefit others, leading to shifts in community composition. Second, roads can lead to sedimentation of water bodies by contributing to erosion. Third, unless culverts are properly placed and maintained, roads can create barriers to stream flow and alter stream hydrology, isolating populations of aquatic organisms (Gucinski et al. 2001).

Agricultural practices, such as over-application of fertilizer and manure, can also affect streams and wetlands through phosphorous pollution. Runoff containing high concentrations of phosphorous can enter streams, leading to the increased growth of algae and aquatic weeds and subsequent oxygen shortages. Die-offs of fish and aquatic invertebrates may occur as a result (Sharpley et al. 2003).

Other nearby phosphate mines have caused increases in selenium and other metal concentrations in groundwater and surface water in the area watersheds including the Blackfoot River. In general, reproductive effects may be observed in fish if selenium concentrations in fish eggs exceed the recommended toxicity threshold of 10 mg selenium/kg egg tissue (Lemly 1997). The Lemly (1997) threshold was developed using data for bass, sunfish, and minnows, though it can be applied to all species. Rudolph et al. (2008) studied cutthroat trout and determined the no-effect threshold selenium concentration in eggs to be >20.6 mg/kg dry weight. Hamilton and Buhl (2003) extrapolated fish egg selenium concentrations from fish whole-body selenium concentrations and found values exceeding 10 mg/kg at several sites in and around the CEA. In State Land Creek, fish egg concentrations were determined to be as high as 50.2 mg/kg, extrapolated from a mean whole-body concentration of 15.2 mg/kg dry weight. However, no studies have reported reproductive impacts to fish from selenium exposure in the Blackfoot River. Cutthroat trout living in a seleniferous river system may evolve tolerance to higher tissue selenium concentrations and not exhibit symptoms of toxicity (Kennedy et al. 2000).

5.7.4 Foreseeable Future Activities

The practices that have affected aquatic resources in the CEA in the past would be expected to continue into the foreseeable future. Reasonably foreseeable actions, including maximum acres of potential future phosphate mines in the CEA, are described in **Section 5.5**. Enforcement of water quality standards and the incorporation of BMPs into future projects would be expected to lessen impacts on aquatic resources in comparison to past projects that were implemented with less regard for impacts to aquatic resources (IDEQ 2006b). Remediation of inactive or abandoned mine properties would reduce existing and future selenium and COPC release to groundwater and surface water resources in the Blackfoot River basin, thereby reducing the load to the river.

5.7.5 Cumulative Activities

The Proposed Action or alternatives would add the direct loss of 9.43 acres of aquatic habitat (6.11 acres of wetlands and 3.32 acres of non-wetland waters) to the amount of overall disturbance to aquatic habitats in the CEA. However, mitigation measures include the creation of new wetland habitats that would offset this loss. Implementation of BMPs and more advanced cover designs and a Water Management Plan would control discharges of sediment to surrounding waters; therefore, the Proposed Action or alternatives would not be expected to substantially add to the effects of sedimentation in the CEA.

The toxicity effects of selenium could reduce fisheries populations via direct effects on fish or indirectly through effects on prey populations and cause changes in the structure of the food web and ecosystem functioning that result in decreased monetary revenues from fishing licenses and associated spending (equipment, lodging, and meals). Localized impacts may occur to aquatic life inhabiting Fish Pond drainage and the extent of the impact on the water quality of the Blackfoot River would depend on the alternative selected with no detectable increases of selenium expected with the implementation of Alternatives 1A or 1B. Furthermore, proposed BMPs and other permit requirements for the Blackfoot Bridge Mine would limit these cumulative effects of the mining operations.

5.7.6 Cumulative Effects

Direct loss of aquatic habitat, sedimentation, and releases of selenium would be controlled and mitigated as described in **Section 4.7**. Cumulative effects to aquatic resources resulting from the Proposed Action or alternatives are expected to be long-term and minor.

5.8 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

5.8.1 CEA Boundary

The CEA for threatened, endangered, and special status species (**Figure 5.6-1**) is the same as that for wildlife, described in **Section 5.6**. It generally includes suitable habitat for a given species within a 15-mile radius surrounding the project area.

Most impacts to threatened, endangered, and special status species would occur within or immediately adjacent to the project area and would affect individuals with home ranges overlapping or immediately adjacent to the project area. An area with a 15-mile radius is large enough to encompass the home ranges of the most mobile wildlife individuals in the project area. It is unknown to what extent wildlife individuals would be displaced and what the impacts of displacement on resident populations would be; however, given the scale of the Proposed Action or alternatives, it is unlikely that any short- or long-term adverse impacts to BLM special status species would occur beyond the identified CEA.

5.8.2 Introduction

As identified in **Chapters 3** and **4**, no threatened or endangered species exist within the project area and no impacts are expected. As a result, no cumulative impacts are expected within the CEA, and this analysis will only focus on BLM special status species.

The most common type of impacts to BLM special status species within the CEA is loss and fragmentation of habitat associated with agriculture, construction of roads and buildings, phosphate mining, timber harvest, and livestock grazing. These activities are expected to continue and increase in the future for the CEA and the southeastern Idaho region. The impact of these activities and the future trend would be the increasing displacement and disappearance of species from the region that require large tracts of relatively undisturbed forest. Other impacts to BLM special status species that might cause mortalities or large-scale avoidance of the region's high-activity areas include increased noise and dust, increased human activity, and degradation of water quality.

Table 5.8-1 summarizes the amount of existing habitat for each BLM special status species within the CEA.

Table 5.8-1 Predicted Existing Habitat[1] for BLM Special Status Species in the CEA

Species	Habitat Preferences	Predicted Existing Habitat in CEA
Type 1 - Threatened, Endangered, Proposed, and Candidate Species		
Bald Eagle (*Haliaeetus leucocephalus*) *(Note: the BLM special status classification for the bald eagle has not been reclassified since the species was federally delisted.)*	Forested areas adjacent to fish-bearing waterbodies	36,935 acres
Type 2 - Rangewide/Globally Imperiled Species		
American White Pelican (*Pelecanus erythrorhynchos*)	Open water.	21,945 acres
Greater Sage-grouse (*Centrocercus urophasianus*)	Low- and mid-elevation shrub, and dry conifer.	329,729 acres
Northern Leopard Frog (*Rana pipiens*)	Riparian, wetlands.	99,326 acres
Yellowstone Cutthroat Trout (*Oncorhynchus clarki bouveri*)	Riparian.	47 miles of stream[2]
Type 3 - Regional/State Imperiled Species		
Trumpeter Swan (*Cygnus buccinator*)	Open water.	21,794 acres
Prairie Falcon (*Falco mexicanus*)	Low- and mid-elevation and shrub mountain, cliffs.	338,394 acres
Ferruginous Hawk (*Buteo regalis*)	Low- and mid-elevation shrub, especially on cliffs.	175,839 acres
Black Tern (*Chlidonias niger*)	Marsh/wetlands.	21,945 acres
Flammulated Owl (*Otus flammeolus*)	Dry conifer and aspen-conifer mix.	93,251 acres
Willow Flycatcher (*Empidonax trailii*)	Riparian.	86,147 acres
Olive-sided Flycatcher (*Contopus borealis*)	Dry conifer and wet/cold conifer.	46,122 acres
Brewer's Sparrow (*Spizella breweri*)	Low- and mid-elevation shrub.	143,563 acres
Common Garter Snake (*Thamnophis sirtalis*)	Dry conifer, aspen/aspen conifer mix, mountain shrub, and riparian.	71,872 acres
Type 4 - Peripheral Species		
Uinta Chipmunk (*Tamias umbrinus*)	Found, at about 6,560 to 11,155 feet in coniferous forests, often near logs and brush in open areas, and at edge of forests.	39,803 acres
Hoary Willow (*Salix candida)*	Wet, hummocky, quaking swamp/meadows or fens, with low shrubs (*Salix planifolia* and *Salix*	Not available

Table 5.8-1 Predicted Existing Habitat[1] for BLM Special Status Species in the CEA

Species	Habitat Preferences	Predicted Existing Habitat in CEA
	candida dominate) occupying the hummocks, and sedges (*Carex aquatilis*, *C. rostrata*, and others) dominating in the standing water between hummocks. Soil typically consists of a layer of peat 1-decimeter or thicker, overlying wet silty muck more than 1 meter deep. Known sites are located in broad, open valley bottoms with mountain sagebrush and low sagebrush on the upland. Hoary willow has a close affinity with calcareous fens.	
Type 5 - Watch List		
Swainson's Hawk (*Buteo swainsoni*)	Forested or shrub areas adjacent to riparian zones.	362,782 acres
Blue Grouse (*Dendragapus obsurus*)	Coniferous forests, mostly open with a mix of deciduous trees and shrubs.	277,398 acres
Long-billed Curlew (*Numenius americanus*)	Open, recently grazed shrub steppe.	336,462 acres
Short-eared Owl (*Asio flammeus*)	Prairies, meadows, tundra, moorlands, marshes, savannas, dunes, fields, and open woodlands.	362,511 acres
Red-naped Sapsucker (*Sphyrapicus nuchalis*)	Coniferous/deciduous forests that include aspen and cottonwood.	128,836 acres
Green-tailed Towhee (*Pipilo chlorurus*)	Thickets, chaparral, shrublands, riparian scrub.	175,172 acres
Brewer's Blackbird (*Euphagus cyanocephalus*)	Shrub, riparian woodlands, aspen parklands, cultivated lands, marshes, human habitation areas.	446,277 acres

[1] Except where noted, values presented here are from the Idaho Gap Analysis Project, which predicts species' occurrence based on wildlife habitat relationship models that take into account known habitat associations, land cover, elevation, climate zones, distance to hydrologic features, and known species' range (Landscape Dynamics Lab 2001).

[2] This value is from IDFG 2003.

Source: IDFG 1997

5.8.3 Past and Present Activities

Within the CEA, major past and present anthropogenic disturbances (**Table 5.6-2**) have resulted from grazing (152,648 acres, not shown in table), agriculture (70,282 acres), mining (7,697 acres), roads and buildings (8,940 acres), vegetation management (2,231 acres since 2005), and recreation. Wildfires have also been an important cause of disturbance, having burned 9,012 acres in the CEA between 1937 and 2007.

Past and present timber harvests in the CEA have resulted in habitat changes that affect BLM special status species. The majority of habitat conversion is in the form of forest removal followed by reforestation with a short period of early seral conditions. This habitat conversion would cause forest-dependent wildlife using the affected areas to disperse in search of new areas. In contrast, most wildfires have affected the scrub/shrub (largely sagebrush) vegetation type. Wildfires in sagebrush may result in the establishment of cheatgrass, which establishes quickly after fire and excludes native perennials, reducing habitat for sagebrush-dependent species (Zouhar 2003).

In general, BLM special status species are affected by livestock grazing due to competition for forage, direct mortality by trampling (e.g., hoary willow, northern leopard frog, common garter snake) or overgrazing (hoary willow), and habitat removal or conversion. Grazing can also impact

aquatic species, such as Yellowstone cutthroat trout, as described in **Section 5.7.3**. Both domestic livestock and wild ungulate grazing may change the structure or composition of native plant communities. Proper rotation and stocking rates can minimize these negative effects.

Human presence tends to disturb many species of wildlife. Past and present recreational uses in the area include hunting, fishing, ATV and snowmobile use, camping, and picnicking. BLM Special Status raptors residing in the CEA are particularly sensitive to human disturbance during the nesting season.

Past and present disturbances from roads and mining activities have resulted in fragmentation of certain wildlife populations and their habitats. Fragmentation effects within the CEA have not been quantified by the land management agencies.

Other nearby phosphate mines have increased concentrations of selenium and other metals in water, aquatic plants, aquatic invertebrates, and fish near the project area (Hamilton and Buhl 2003). Increasing concentrations of selenium in surface water and groundwater seeps and springs may lead to reduced reproductive success in the terrestrial and aquatic wildlife of the region including BLM special status species.

5.8.4 Foreseeable Future Activities

Table 5.6-3 lists some proposed activities that could impact BLM special status species habitat throughout the CEA. Fifty-three percent (277,593 acres) of the CEA is located on private land. Past and present actions on private land within the CEA have mainly included agriculture and grazing activities. Housing developments have also occurred on some large ranches within the CEA. Specific land impacts on private lands in the CEA are difficult to quantify due to lack of specific data. Disturbance of habitat caused by these private land impacts is also not quantified with existing data.

In addition to the projects listed in **Table 5.6-3**, there are approximately 14,478 acres of not-yet-mined federal phosphate leases located in the BLM special status species CEA. While no specific plans are known for mining in these leases in the immediate future, the lease boundaries may be used as an estimate of the maximum amount of potential disturbance from future mining.

Disturbances described above under "Past and Present Disturbances" are expected to continue in the reasonably foreseeable future. Habitat fragmentation and alteration resulting from construction projects, grazing, mining, vegetation management, conversion of land to agriculture, wildfires, and noxious weed invasions would continue. Individuals of small, less mobile species would continue to be vulnerable to direct mortality from crushing by vehicles, construction equipment, and livestock. Nesting raptors may be subject to increased harassment by recreationists, particularly if available nest trees are reduced by other activities. Recreation use in the area can be expected to reflect local changes in population and interest in outdoor activities.

All species are potentially vulnerable to the toxic effects of selenium accumulation. Selenium contamination is expected to continue to occur below operating and reclaimed phosphate mines in the foreseeable future. New phosphate mines are likely to incorporate BMPs that limit the potential

for selenium contamination of the environment, unlike past mines that were constructed without regard for selenium contamination (IDEQ 2006b).

5.8.5 Cumulative Activities

Implementation of the Proposed Action and alternatives could potentially disturb suitable habitat for BLM special status species as described in **Table 4.8-1** in **Section 4.8**. The highest percentage of BLM special status species habitat that would be directly affected in the CEA by the Proposed Action or alternatives would be 1 percent of the predicted habitat in the CEA for the common garter snake. This is a conservative estimate because the overall amount of habitat in the CEA is predicted by the Idaho Gap Analysis, which considers many variables when determining potential habitat, whereas the amount of habitat affected in the project area is based solely on broad categorizations of cover types (e.g., aspen, sagebrush). In the CEA, 98,741 acres of this species' habitat have already been, are being, or would likely be impacted by agriculture, development, mining, wildfires, and vegetation management. Therefore, the Proposed Action or alternatives would account for approximately 0.7 percent of the disturbance to this species' habitat within the CEA.

In general, wildlife dispersal from habitat disturbance decreases survival rates of affected individuals to some degree and increases competition. The effects to specific species from disturbance related to the Proposed Action were described in detail in **Section 4.8**. Mine construction and operation could temporarily limit the attractiveness of the CEA to BLM special status species such as raptors, which generally prefer areas free from anthropogenic noise and activity. Bald eagles usually modify their activities and movements to avoid human disturbance, but implementation of the Eagle Management Plan (P4 2009b) would minimize disturbance to the eagles nesting in the project area.

Implementing the Proposed Action or alternatives would result in additional fragmentation to wildlife habitat and could isolate populations of small, immobile wildlife, such as amphibians and reptiles. Therefore, a minor cumulative effect to wildlife from fragmentation impacts would potentially occur for the duration of the Proposed Action.

In terms of mining activities exposing BLM special status species in the area to potentially harmful levels of selenium, the Proposed Action or alternatives would not result in placement of growth medium or soil with elevated amounts of selenium or trace metals in reclaimed areas. As discussed in **Section 4.6**, however, plant roots and burrowing animals may still be able to reach seleniferous materials and introduce elevated levels of selenium into the food chain.

The Proposed Action is likely to result in selenium concentrations in Fish Pond exceeding the cold water aquatic life CCC standard of 0.005 mg/L, which could pose a risk to wildlife residing in or drinking the water. Modeling results for non-laminated GCL cover types reduce expected selenium concentrations to levels that are slightly above or slightly below the aquatic standard depending on the amount of overburden covered with the non-laminated GCL. Alternatives 1A and 1B, incorporating a GCLL, are expected to further reduce concentrations to be below this standard. Therefore, although BMPs would limit the potential for selenium exposure relative to some past mining operations, minor, long-term cumulative impacts to BLM special status species may still occur as a result of the Proposed Action and alternatives depending on which cover design is selected by the agencies.

Implementation of BMPs and a Water Management Plan would control discharges of sediment to surrounding waters; therefore, the Proposed Action or alternatives would not be expected to substantially add to the effects of sedimentation in the CEA.

5.8.6 Cumulative Effects

Adding the Proposed Action or alternatives disturbances to past, present, and foreseeable future disturbances would result in long-term, minor cumulative effects to the BLM special status species. Effects would be temporary, and disturbances are small in area compared with species' ranges and overall amount of habitat available in the CEA.

Direct loss of aquatic habitat, sedimentation, and releases of selenium would be controlled and mitigated as described in **Section 4.7**. Cumulative effects to aquatic BLM special status species resulting from the Proposed Action or alternatives are expected to be long-term and minor.

5.9 VISUAL RESOURCES

5.9.1 CEA Boundary

The CEA is the Southeastern Idaho Phosphate District, including KPLAs, in Bear Lake and Caribou Counties, Idaho, as shown on **Figure 5.1-1**. The CEA boundary was selected because there are vantage points from which the Proposed Action and alternatives, and other past, present, and reasonably foreseeable disturbances can be observed. Visual resources should not be affected beyond this area because of the topographic features that delineate the boundary and restrict line of sight.

5.9.2 Introduction

Cumulative effects to visual resources from phosphate mining would result from historical, existing, and future mining in the CEA. Often, phosphate mining impacts are not considered substantial if the disturbance areas are not readily visible to the general public. Most of this activity has occurred in relatively remote areas, and are not readily visible from sensitive viewing areas, such as travelways, residences, or recreation sites. There would also be cumulative effects to visual resources from other types of planned or foreseeable activities, including various management activities on BLM and National Forest System (NFS) land, as well as development on private lands. The CEA is within a region of generally north- to northwest-trending mountain ranges and valleys. The most common landforms are foothills, which are cut at intervals by small creeks and drainages. Although scenic variety exists in the densities, arrangements, and colors of vegetation, no visually distinct landscapes are found in the CEA.

5.9.3 Past and Present Activities

Past and present developments in the CEA are primarily from rural land uses and management activities on NFS and BLM lands. The CEA is generally undeveloped other than for mining; visual modifications to the federal lands in the area have been in the form of timber cuts, roads, mining operations, range improvements, power lines, recreation sites (campgrounds), and pipelines. Other

visible land uses that have occurred on private lands include road construction, vegetation management and fuels treatments, power line and utility corridors (water and gas lines), communication sites, campgrounds, day use facilities, trailheads, hiking trails, fuel wood gathering, agricultural use, and private residences. Current management activities, which are taking place at the present time, are a continuation of existing uses.

Most of the land surface in the CEA, including the majority of the historic and existing mine areas, is federal land within the CTNF in the Montpelier and Soda Springs Ranger Districts. BLM land surface constitutes a small area of land within the area. Most of the NFS land is managed with NFS Visual Quality Objectives (VQOs) of Modification and Partial Retention. BLM land in the CEA is managed with VRM Class III and Class IV objectives. VQO Modification and VRM Class IV allow for considerable modification of the characteristic landscapes and typically are compatible with phosphate mining activities. Mining activities can generally meet VQO Partial Retention and VRM Class III objectives with mitigation.

5.9.4 Foreseeable Future Activities

As described in **Section 5.1.6** cumulative effects analysis, there are permitted leases with potential future disturbances from phosphate mining in the CEA. Development of permitted areas would result in effects to visual resources similar to past and present disturbances, but would include a larger area of affected landscape. Foreseeable future effects to the visual resources of the CEA would occur from likely activities on public land administered by USFS and BLM that include timber cuts, roads, mining operations, range improvements, power lines, recreation sites (campgrounds), and pipelines. These types of activities would likely occur as a consequence of population and economic growth in the CEA, which would increase public use and consumption of public land resources.

5.9.5 Cumulative Activities

Twenty-seven historic and active phosphate mine sites are within the CEA. A total of 11,935 acres of phosphate mining-related surface disturbance are documented by the BLM and USFS (2007) for the southeast Idaho phosphate resource area. **Table 5.1-1** lists four active or idle phosphate mines (Dry Valley, South Rasmussen, Rasmussen Ridge, and Smoky Canyon) and 23 historic phosphate mines.

The proposed project surface disturbance of 739 acres would increase the total phosphate mining-related surface disturbance within the CEA by 6 percent to 12,674 acres. While the mining activities in the CEA are generally compatible with the VQOs of NFS and BLM land, the 6 percent increase in surface disturbance also increases the level of the visibility of phosphate mining facilities to the public.

5.9.6 Cumulative Effects

Under the Proposed Action and the action alternatives, phosphate mining activities would contribute to the cumulative effects that include historic and existing phosphate mines in the CEA. The effects to the scenic quality and characteristics of the existing landscape would occur over a larger area with

the implementation of the proposed project. The proposed project would extend the duration of visible mining-related disturbance in the CEA for an additional 17 years from the initiation of activities at Blackfoot Bridge Mine. It is likely that reclamation activities would occur at active mines throughout the CEA during the active mine life of Blackfoot Bridge Mine, so that there would be no substantial increase in visible mining facilities and activities despite an increase in surface disturbance. The cumulative effects of specific current and foreseeable projects that may affect scenic resources would not vary based on the inclusion of the effects of the proposed Blackfoot Bridge project.

Economic and population growth would increase recreational uses of public lands in the CEA and would also increase the number of residents and recreationists who have a concern for scenic resources. An increase in viewers and increased phosphate mining disturbance in the CEA would increase opportunities for the public to view phosphate mining facilities from sensitive viewing areas including proposed Blackfoot Bridge facilities and activities.

5.10 LAND USE AND ACCESS

5.10.1 CEA Boundary

The CEAs for land use and access vary among the topics addressed, but predominantly relate to the roads accessing the project area. The CEA for impacts to grazing management is the full extent of the two grazing allotments that overlap with the project area: Woodall Mountain and Woodall Spring (**Figure 5.10-1**). The CEA for recreation and land use (**Figure 5.10-1**) was determined by recreation opportunities that are accessed by the same roads that provide access the project area. The CEA for access and transportation is the project area and the roads that provide access to the mine site from State Highway 34 (**Figure 5.10-1**).

5.10.2 Introduction

Impacts to land use and access in the CEA consist of loss of resources or loss of access to resources. Loss of a resource can be total because of destruction of the resource by mining, or partial because of alteration of the resource or its distribution because of changes in vegetation, drainage, or the locations of roads. Mining in the CEA is expected to be a finite activity that would be followed by reclamation. Timber harvesting would continue intermittently as long as there is marketable timber and landowners allow access.

Cumulative effects to grazing in the CEA occur primarily from mining and, to a lesser extent, from timber harvesting. In general, grazing is not allowed on active mine areas, livestock trailing is limited, and no watering is allowed in runoff detention ponds or water flowing from mine overburden seeps. Depending on the reclamation methods, renewed grazing may not be allowed on a closed mine for several years after closure.

The principal recreation activity in the project area is hunting, primarily big game hunting, and to a lesser extent, upland game birds. Cumulative effects to hunting occur from alteration of the habitat by mining or timber harvesting and from interruption of migration routes by new roads.

Other land uses in the general area of the project area are mining and timber harvesting. The operation of this mine would dominate the land use during its operation and displace the opportunity for future mining because of the redistribution of mined minerals and overburden. The cumulative effect to timber harvesting would depend on the extent to which re-establishment of forest is inhibited by reclamation methods.

Cumulative effects to access and transportation would be affected by the roads built and maintained for mining and those that are left in place after closure and reclamation. During mining and reclamation, these roads may be closed to public access, but some may be opened by surface owners over time.

5.10.3 Past and Present Activities

5.10.3.1 Grazing Management

Cumulative effects to grazing in the study area occur primarily from mining and timber harvesting. Effects from road improvements and recreation can also affect grazing, but to a negligible extent. There has been limited timber harvesting in the area. Timber harvesting impairs grazing in the short term, but typically opens more extensive areas suitable for grazing in the long term. There are many past and present mines in the region including the Ballard Mine to the north and the Conda Mine to the south.

5.10.3.2 Recreation

The principal dispersed recreation in the study area is big game hunting. As with grazing, cumulative effects to hunting occur primarily from mining and timber harvesting. Timber harvesting causes a short-term disruption in the distribution of big game populations, but also creates attractive clearings with new growths of forage. Exploration for mining has resulted in past disturbance in the area. During mining and reclamation, access for hunting is restricted and areas of forage are destroyed by the mining. Reclamation, like timber harvesting, results in new growth that is attractive to big game.

5.10.3.3 Land Use

Existing land uses in the study area include commercial mining, timber harvesting, livestock grazing, and dispersed recreation. The principal use of public land in the project area is livestock grazing and recreation. The proposed project is consistent with past land uses in the study area.

Previous disturbances in the project area include extensive exploration activities from as early as 1956. Exploration activities included drilling and trenching. The recent exploration was in forested areas in and around the project area. At the inactive Conda Mine south of the project area, there is extensive disturbance that includes the mine pit, overburden piles, roads, and other facilities and surface disturbance. The Conda Phosphate Plant is located along the haul road southwest of the project area and receives ore by rail along the railroad line that passes through the project area. Intermittent timber harvesting has also occurred in the study area, as reflected in clearcut patches in the south and west of the project area.

Figure 5.10-1 CEAs for Land Use and Access and Cultural Resources

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5.10.3.4 Access and Transportation

The primary route to access the study area is State Highway 34, which connects to U.S. Highway 30 at Soda Springs approximately 11 miles southwest of the project area. Access to the project area is by way of Blackfoot River Road and a gated private haul road. The project area can also be accessed by way of the private haul road to the Conda Mine and Phosphate Plant, which connect to State Highway 34 near Soda Springs. State Highway 34 also provides access to the Blackfoot Reservoir and Gray's Lake National Wildlife Refuge. Past mining at Conda Mine and other mines in the general area has contributed to increased traffic on State Highway 34 and on Blackfoot River Road. Traffic along the gated private access road and the haul road has principally been associated with the mines and phosphate plant. Public land in the immediate project area is accessible to the public only by permission through private land.

5.10.4 Foreseeable Future Activities

5.10.4.1 Grazing Management

No foreseeable future disturbances were identified within the grazing CEA except for the Proposed Action and alternatives.

5.10.4.2 Recreation

Implementation of the Proposed Action or Alternatives 1A and 1B would restrict access to areas of public land in this area for hunting and other dispersed recreation. However, public land in the project area is comparatively small, currently has limited access, and does not offer unique recreational opportunities that are not also found elsewhere in the general area.

5.10.4.3 Land Use

No foreseeable future disturbances are expected, other than the proposed mine and ongoing activities in the study area. During the life of the mine, land use in the study area would be dominated by the mine, but there would be little disruption to other ongoing land uses.

5.10.4.4 Access and Transportation

No foreseeable future disturbances, other than the proposed mine and ongoing activities in the study area, would alter access and transportation in the study area.

5.10.5 Cumulative Activities

5.10.5.1 Grazing Management

Mining disturbance affects grazing allotments by direct disturbance of the ground surface and short-term removal of forage vegetation. Grazing in the reclaimed areas is restricted until the vegetation has been adequately re-established to withstand grazing pressure. When the allotments are reopened, the replacement of woodland and brush by grasses can increase suitable forage. BMPs would be implemented to minimize selenium bioaccumulation and the introduction of noxious weeds.

5.10.5.2 Recreation

Cumulative disturbance to recreational opportunities would be mainly from active and unreclaimed disturbance from mining activities. The disturbance would not occur all at once. Unreclaimed disturbance from mining, consisting mostly of remnant pit highwalls and steep cut slopes, would be limited to about 99 acres.

5.10.5.3 Land Use

The primary short-term cumulative disturbance to land use would be the project area.

5.10.5.4 Access and Transportation

The mine would constitute a short-term disturbance to access and transportation in the study area, but in the long term, would not contribute to cumulative disturbance.

5.10.6 Cumulative Effects

5.10.6.1 Grazing Management

The availability of forage suitable for grazing in the grazing allotments would be reduced during mining operations in the Mid Pit and South Pit. During mining and the early stages of reclamation, grazing, trailing, and watering would not be allowed due to safety risks associated with mining and implementation of measures during mining and reclamation to contain potential selenium contamination from selenium-bearing overburden. BMPs would be applied to prevent the introduction of noxious weeds and the accumulation of selenium in soil, groundwater, or vegetation. Over time, reclamation of the disturbed areas would replace lost grazing resources. As reclamation progresses, the re-established vegetation is dominated by grass species that are highly suitable for grazing. Impacts to grazing would be minimal in the short term and positive in the long term because reclaimed vegetation would be dominated by grasses and forbs favorable for grazing for years after mining.

5.10.6.2 Recreation

During mining, big game would likely move to other areas with less disturbance. This would result in a short-term redistribution of hunter use in the general area. Reclaimed and re-established vegetation after mining and timber harvesting would be dominated by grass and forb species that are attractive to big game animals. In the early stages of succession, there is also relatively little cover. The effects for hunting in the short term may be more game and favorable conditions for hunting. Ideally, in the long term, the habitat would return to its pre-disturbance condition. Long-term impacts to recreation would be minor relative to the overall availability of recreational opportunities in the general area.

5.10.6.3 Land Use

The principal effect of past, present, and foreseeable actions, including the proposed project, on land use would be the removal of portions of the project area from other land uses during the operation of

the mine. Minable minerals would be removed. Over the long term, reclamation would return the land to a condition suitable for other land uses.

The BLM Pocatello Resource Area Office administers the public land and mineral leases in the study area. The BLM would apply conditions for approval, stipulations, and mitigation measures to the mineral leases in the mine area. These would not include any BLM Special Designation or Management Areas. The mine would not require other federal land use authorizations. However, Caribou County zoning may have stipulations that would affect reclamation. Long-term impacts to land use would be minimal.

5.10.6.4 Access and Transportation

In the short term, the principal impacts of past, present, and foreseeable actions would be an increase in traffic along portions of State Highway 34 during the operation of the mine. This increase in traffic would diminish during reclamation. Long-term impacts to access and transportation would be minimal.

5.11 CULTURAL RESOURCES

5.11.1 CEA Boundary

The CEA for cultural resources is defined as the project area and a 1-mile radius around it. This CEA is shown on **Figure 5.10-1**. The Proposed Action or alternatives, or reasonably foreseeable actions outside the project boundary, would not affect cultural resources outside the CEA. Records searches and literature reviews for the CEA have not identified any cultural resource investigations, except those performed within the project boundary, or any previously documented cultural resources, except those documented for this analysis.

5.11.2 Introduction

Studies for the Blackfoot Bridge Mine have recorded six cultural resources. These resources include two rock features (one prehistoric and one historic) on a ridgetop, one large prehistoric camp, one large prehistoric lithic scatter, one isolated prehistoric artifact, and one historic farming and ranching site on lower ground near the edges of the permit areas. Other studies in this high elevation region have also reported a low density of sites. Many of the historic sites are extraction or processing facilities, isolated cabins, or arborglyphs. Areas to the south and west are along the natural transportation corridor through Soda Springs that was used by early emigrant trails, and was also an important transportation corridor during the regional precious metal mining booms. Associated historic developments in those areas included railroad construction, small timber industries, and ranching.

5.11.3 Past and Present Activities

There are no other known past and present ground disturbances in the study area that have potentially affected cultural resources. Within the general area, there are other past and present phosphate mines, such as the Ballard Mine to the north, that may have affected cultural resources,

but these effects are not documented. The areas that have been extensively disturbed have been unattractive for sustained historic or prehistoric occupation, are marginal for ranching, and do not hold precious metal deposits that could have attracted early mining. Historic and prehistoric sites in the region, including emigrant trails, occur along the river valleys and in lower, more open terrain with access to reliable sources of water. Historic disturbances have been more extensive to the south along natural travel corridors through Soda Springs and to the north in the Caribou Mountains area associated with periodic mining booms from the 1860s to 1920.

5.11.4 Foreseeable Future Activities

Reasonably foreseeable disturbances in the study area are the proposed project and associated activities. There is no anticipated change in recreational activities in the area or any expectation of residential developments that would affect cultural resources.

5.11.5 Cumulative Activities

Past, present, and reasonably foreseeable disturbance to cultural resources in the study area have been and would be associated with mining. There has been no known disturbance to eligible sites. The Proposed Action or alternatives, if developed to the maximum extent of disturbance, could affect one eligible and one potentially eligible site. If these sites cannot be avoided and protected, treatment plans would be developed.

5.11.6 Cumulative Effects

The effects of adding the Proposed Action or alternatives impacts to existing cultural resource disturbances would be negligible. Section 106 of the NHPA requires consideration of effects to eligible cultural resources for federal actions. There should be no adverse cumulative impacts from the Proposed Action or alternatives and reasonably foreseeable future activities.

5.12 TRIBAL TREATY RIGHTS AND INTERESTS

5.12.1 CEA Boundary

The CEA for Tribal treaty rights and interests is southeastern Idaho, including portions of the Snake River Plain (**Figure 5.12-1**). This area encompasses the Fort Hall Indian Reservation and much of the area currently used by Tribal members. The Shoshone and Bannock Tribes retain treaty rights to practice their traditional culture on unoccupied public lands in the region.

5.12.2 Introduction

Federal land managers have a responsibility to protect resources essential for the Tribes to exercise their treaty rights on public lands and a responsibility to maintain the habitat of traditional natural resources in a viable and sustainable condition. Over the years, the ability of the Tribes to practice their traditional culture on these lands has been reduced by loss of unoccupied lands through land exchanges and mineral leasing and degradation of the resources valued by the Tribes. The project area includes a relatively small area of unoccupied public land in comparison to the extent of BLM

land and National Forests in the region. Nevertheless, the incremental loss of lands constitutes a cumulative impact.

5.12.3 Past and Present Activities

Past and present impacts to traditional resources include dams along the Snake River that have affected salmon runs and limited the availability of salmon for consumption. Access restrictions and land disposals or exchanges have also reduced the availability of unoccupied lands for practicing Tribal treaty rights. Fire suppression, mining, grazing, and timber harvest have changed the vegetation, and in some areas, have affected water quality. In addition, the Idaho National Engineering and Environmental Laboratory have restricted access to large areas of federal lands.

5.12.4 Foreseeable Future Activities

Reasonably foreseeable future disturbance in the study area are the proposed project and associated activities. During mining, many traditional natural resources would be destroyed and access to others would be impeded by the mine. Mining would continue until the permitted ore reserves are depleted, and reclamation of the mined areas would take many years. However, the mined areas would be reclaimed and there would not be a permanent loss of access to resources and the ability to exercise treaty rights.

5.12.5 Cumulative Activities

In recent years, the cumulative impacts to natural resources on unoccupied lands have been slowed, and more coordinated efforts have been directed to reclamation and restoration of the resources. Federal and state agencies are enhancing native fish and wildlife habitat, and these collective efforts to improve the condition of natural resources contribute to the protection and restoration of Tribal treaty rights.

5.12.6 Cumulative Effects

There are currently no generally accepted measures of the temporary or more prolonged loss of the exercise of treaty rights. The inability to exercise treaty rights is minimal to the Shoshone and Bannock Tribes and potentially affects all Tribal members.

5.13 SOCIAL AND ECONOMIC CONDITIONS

5.13.1 CEA Boundary

The CEA for cumulative effects to social and economic conditions is Caribou, Bear Lake, and Bannock Counties in Idaho, and Lincoln County (Star Valley area) in Wyoming. Most of the phosphate mines and processing facilities in the Southeastern Idaho Phosphate District, including KPLAs, are in Caribou County, Idaho with one mine in Bear Lake County however; employees are located within the four-county area. Most of the employees at the existing P4 South Rasmussen Mine and P4 Soda Springs elemental phosphorus plant live in Caribou and Bear Lake Counties. It is expected that the workforce would transfer from the South Rasmussen Mine to the Blackfoot Bridge

Mine. Similar residential patterns are typical of the phosphate mine workforce for all mines in the Southeastern Idaho Phosphate District.

5.13.2 Introduction

The types of cumulative effects that could occur to social and economic conditions in the CEA would primarily be from population growth and economic development stimulated by the exploration and development of phosphate. The local economy (Caribou and Bear Lake Counties) has increased and diversified in recent years. It is likely that diversification would continue into the future so that the overall cumulative effects of the Blackfoot Bridge Mine, as well as other phosphate development, would be a smaller component of the complex social and economic characteristics of the CEA.

5.13.3 Past and Present Activities

The contribution of past and present phosphate mining to local economies within the CEA has been major in terms of employment and revenues earned from tax collections. The four active phosphate mines, as well as historic mines, are part of the economic base of the CEA that stimulates the growth of other economic sectors through a multiplier effect. In comparison, past and present projects on federal lands, such as vegetation management or recreation activities, individually or collectively, produce few noticeable or measurable effects on the economic or social structure of the CEA. Contributions to local economies from increased employment and addition of workforce payroll to local economies have benefitted Bannock and Lincoln Counties; however, no phosphate mines are located in these counties, so that revenues earned from tax collections and equipment purchases have occurred primarily in Caribou and Bear Lake Counties.

5.13.4 Foreseeable Future Activities

Reasonably foreseeable phosphate mining within the CEA would occur on currently permitted phosphate leases that have not been developed. Future development of these leases would extend the anticipated life span of existing operations, and prolong revenue collections within the CEA. Payment of taxes on purchases of goods and services also would be prolonged. Continued employment would benefit the population of all CEA counties.

Many private properties are located adjacent to or near federal lands, and future activities on federal lands would be likely to affect the local social structure even if they are too small to noticeably affect the economy. Conversely, increased population and economic growth within the CEA are likely to result in increased activities on federal lands including mineral exploration and development, vegetation treatments, recreation and non-recreation special uses, utility corridors and infrastructure, road improvements, travel management plans, rangeland management and grazing, and additional recreation and tourism facilities.

Figure 5.12-1 CEA for Tribal Treaty Rights and Interests

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5.13.5 Cumulative Effects

The cumulative effects on the social and economic structure from past, present, and reasonably foreseeable development activities have occurred within the CEA. These effects have occurred primarily in Caribou and Bear Lake Counties in terms of tax revenues and purchases of equipment and other services; however, all CEA counties benefit from employment of local populations. These phosphate mining effects (both negative and positive) have been substantial and have the potential to continue. Phosphate mining has provided benefits to county employment and county finances in the form of distributions to local school districts from the payment of property taxes. The proposed project, in addition to other existing and reasonably foreseeable phosphate mining projects, would prolong the economic benefits of continued employment and contributions to county finances.

It is not anticipated that there would be any increases in the populations of the CEA counties as a result of the Proposed Action or alternatives; therefore, there would be no additive, cumulative effect to housing, community services, and infrastructure from the proposed Blackfoot Bridge project. Other reasonably foreseeable phosphate mining activities may require the in-migration of workers that would pressure the existing capacities of housing and community services in addition to ongoing residential and commercial development in the region.

5.14 ENVIRONMENTAL JUSTICE

5.14.1 CEA Boundary

The CEA for cumulative effects on environmental justice is the Southeastern Idaho Phosphate District, including KPLAs, in Bear Lake and Caribou Counties, Idaho (**Figure 5.1-1**). Caribou and Bear Lake Counties contain most of the southeastern Idaho phosphate mines and processing facilities. The proposed Blackfoot Bridge Mine and existing P4's Soda Springs elemental phosphorus plant employees would live in the surrounding counties.

5.14.2 Introduction

The types of effects that could occur to minority and low-income populations in the CEA would primarily be from potential adverse environmental impacts of phosphate and other mineral resource exploration and development.

5.14.3 Past and Present Activities

The only minority population in the CEA is the Native American population of the Fort Hall Reservation, located partially within Caribou County. No past or present phosphate and other mineral exploration and production activities have been located near enough to the reservation to result in adverse environmental impacts. There would be no disproportionate adverse effects to minority or low-income groups from the development of past and present phosphate mining activities.

5.14.4 Foreseeable Future Activities

There are no concentrations of minority or low-income populations within any portion of the southeast Idaho Phosphate area. This includes residents of the Fort Hall Indian Reservation and other populations that are located within this area. There would be no foreseeable future effect to these populations.

5.14.5 Cumulative Effects

The cumulative effects of past, present, and reasonably foreseeable development activities that could occur to minority and low-income populations in the CEA would primarily be from potential adverse environmental impacts of phosphate and other mineral resource development. Typically, phosphate mines in the CEA are located on public and private lands that are not located in the vicinity of communities or other population clusters. There are no identified effects to minority and low-income populations in the CEA.

5.15 HAZARDOUS AND SOLID WASTE

5.15.1 CEA Boundary

The CEA for cumulative effects associated with hazardous and solid waste is the Southeastern Idaho Phosphate District, including KPLAs, in Bear Lake and Caribou Counties, Idaho (**Figure 5.1-1**). Caribou and Bear Lake Counties contain most of the southeastern Idaho phosphate mines and processing facilities.

5.15.2 Introduction

The term “hazardous wastes” designates materials defined in 40 CFR Part 261.3 and would be regulated under RCRA. The regulatory environment and hazardous waste production and management are described in **Section 2.3.9.7**. No resources in the CEA have been identified that

have been affected by the treatment and disposal of hazardous and solid wastes from mining operations in the CEA.

5.15.3 Past and Present Activities

Past and present phosphate mining in the CEA has produced hazardous and solid waste. These materials have been managed and controlled under current regulations and BMPs. Cumulative impacts would be kept within state and federal guidelines and would be minor. Development of residential subdivisions would also generate hazardous and solid wastes. It is expected that the private landowners would contract with private waste management specialists, and the cumulative effects would be minor.

Trash and non-mineral waste are hauled from mine sites by licensed waste disposal services for disposal off site. Mine facilities generally include a septic tank and drainfields to treat sewage and

other waste water from potable systems, so that municipal treatment facilities are not affected by mining operations.

5.15.4 Foreseeable Future Activities

In addition to wastes directly related to the production of phosphate rock, such as overburden, mining activities in the CEA generate other maintenance wastes that may include used petroleum products, other hazardous wastes from equipment maintenance, trash, and debris. These wastes are recycled or hauled to appropriate landfills and other disposal sites. Hazardous and solid wastes, such as petroleum products, would be hauled from the mine site and recycled. There would be no cumulative effect to the capacity of disposal facilities from the recycling of hazardous wastes from the proposed project. Trash and debris would be hauled at the mine site and disposed of at an appropriate landfill. The Caribou County Landfill is located in Soda Springs; however, within an eight-county district in southeastern Idaho, there are 22 landfills consisting of seven municipal landfills and 15 non-municipal landfills (Southeastern District Health Department 2009), so that the disposal of solid waste from phosphorus mines in southeast Idaho would not stress the capacity of any single landfill.

Hazardous and solid wastes are managed and controlled under current regulations and BMPs. Cumulative impacts would be kept within state and federal guidelines and would be minor.

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