Smoky Canyon Mine
Panels F & G Draft EIS

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Chapter 5
Cumulative Effects

Cumulative effects are those environmental impacts that result when the incremental impacts of the Proposed Action or Alternatives are added to those of other past, present, and reasonably foreseeable future actions on the Cumulative Effects Areas (CEAs). Major past and present land uses in the area, which are also projected to continue into the future, include: roads/trails, timber harvesting, wildfires, livestock grazing, agriculture, and mining. Dispersed recreation (including hunting and fishing) and residential development also occur in parts of the CEAs.

The CEAs for this EIS vary by resource. The configuration of the Proposed Action and Alternatives, as well as public scoping input gathered for this EIS, provided the foundation for identifying CEAs. Cumulative effects should be evaluated in terms of the specific resource, ecosystem, and human community being impacted, and therefore, the boundaries of the CEAs vary by resource. An attempt was made for each environmental resource to determine the extent to which the environmental effect could be reasonably detected and then include the geographic areas of resources that could be impacted by the environmental effect. However, for simplicity, ease of cumulative impact analysis, and in an attempt to avoid having different CEAs for every resource, CEA boundaries were left identical for the resources where it seemed reasonable and conservative to do so. Guidance from the Council on Environmental Quality (CEQ), "Considering Cumulative Effects – January 1997," was used in identifying geographic boundaries and ultimately the CEA for each resource. The CEA for each environmental resource – and the rationale for its boundaries – is described below in the specific resource subsection. Maps for the various CEAs are also included.

5.1 Geology, Minerals and Topography

CEA Boundary

The CEA boundary for geology, minerals, and topography (**Figure 5.1-1**) was delineated to include the southeast Idaho phosphate mining area, including Known Phosphate Lease Areas (KPLAs) in Bear Lake and Caribou Counties, Idaho. This is an area of 789 square miles (504,960 acres) within which there are current leases for 38,874 acres or 7.7 percent of the total CEA area. **Figure 5.1-1** shows locations of KPLAs, phosphate mine leases, and past and present phosphate mines in Bear Lake and Caribou Counties, Idaho.

Rationale: With the exception of the Gay Mine, located on the Fort Hall Indian Reservation, impacts to geology, mineral, and topography from past, present, and future phosphate mining operations are confined to specific phosphate mining properties (KPLAs and leases) within these two counties.

Cumulative Effects

Potential effects to the geology, mineral, and topographic resources consist of mineral resource depletion, paleontological resource disturbance, topographic changes, exposure of rock bearing COPCs, and geotechnical instability. Past and present phosphate mining activities, and proposed future phosphate mining are analyzed in terms of cumulative effects for this resource.

Since phosphate mining began in southeastern Idaho, there have been a total of 31 phosphate mines in the area (USGS 2001c). Through consolidations of the original operations, there are 28 mines remaining as listed in **Table 5.1-1**. Of these, 12 were small underground mines that have been closed for years. The current surface disturbance from these underground mining operations is typically an acre or less. Three former underground mines, Waterloo, Conda, and Maybe Canyon were converted to surface mining operations, and the surface mine disturbance for these mines is still noticeable. There have been 20 open pit phosphate mines in the CEA of which those with significant production include: Waterloo, Conda, Gay, Ballard, Maybe Canyon, Georgetown Canyon, Mountain Fuel, Henry, Wooley Valley, Lanes Creek, Champ, Enoch Valley, Smoky Canyon, Rasmussen Ridge, South Rasmussen, and Dry Valley. Only the last four of these mines are still in operational status.

TABLE 5.1-1 PHOSPHATE MINES OF SOUTHEASTERN IDAHO

MINE	YEARS OF OPERATION	DISTURBED AREA (ACRES)
Waterloo	1907-1920, 1945-1960	196
Hot Springs	1907-1911, 1954-1956	0.5
Paris Canyon	1917-1926	<2 (estimate)
Rattlesnake Canyon	1920-1926	0.40
Bear Lake	1920-1921	0.1
Conda	1920-1984	1,608 (Simplot)
Home Canyon	1916-1924	0.8
Consolidated	1920-1921, 1930-1938	<1 (estimate)
Bennington Canyon	1907-1912, 1939-1942	2 (estimate)
Wyodak	1942-1943	<1 (estimate)
Gay	1946-1993	3,097
Ballard	1952-1969	635
North and South Maybe Canyon	1951-1995	1,028
Georgetown Canyon	1958-1964	251
Wooley Valley	1955-1989	808
Diamond Gulch	1960	32
Fall Creek	1955-1964	<1 (estimate)
Mountain Fuel	1966-1967, 1985-1993	716
Henry	1969-1989	1,074
Bloomington Canyon	1972-1975	<1
Pritchard Creek	1975-1976	2 (estimate)
Lanes Creek	1978-1989	29
Champ	1982-1985	392
Smoky Canyon	1982-present	2,150
Enoch Valley	1990-2003	673
Rasmussen Ridge	1991-present, idle	687
South Rasmussen	2003-present	285
Dry Valley	1992-present	847
Total All Mines	1907-present	14,250

Sources of information: USGS 2001c, Open file Report 00-425; IDEQ 2004, Final Orphan Mine Site PA Screening Report; Various 2004 Annual Operating Reports to BLM

In 1975, economically recoverable phosphate ore reserves in southeastern Idaho were estimated at one billion tons, comprising about 80 percent of reserves in the Western Phosphate Field and about a quarter of total U.S. reserves (USGS 1977). Through 1974, total phosphate ore production in Idaho was estimated to be 74 MMT (USGS 1977). Through 1985, an additional 73 MMT of phosphate ore were produced from federal leases (BLM 1987). Since

Figure 5.1-1 Cumulative Effects Area for Geology, Minerals and Topography

then, phosphate ore production in southeastern Idaho has been approximately 6 MMTPY (Buck and Jones 2002). The total phosphate ore production from southeast Idaho through 2004 is estimated to be about 261 MMT or about one quarter of the 1977 estimate of total economically recoverable ore reserves.

Overall worldwide demand for phosphate is forecast to grow at a rate of 2.5 percent per year during the next five years, and production from large mines in Florida is projected to decrease while supply from large deposits in North Africa will increase (USGS 2005). Based on this information, phosphate production from the CEA will likely also be stable or increase slightly. Over the next 15 years, between 80 and 100 MMT of total phosphate ore production, or an average annual production of about 6 MMT, is projected from southeast Idaho. With respect to depletion of mineral reserves within the CEA, the impact of the Proposed Action accounts for approximately 40 percent of the total to be mined over the next 15 years. The amount of ore produced from the proposed mining operations would represent approximately 4 percent of the 1977 estimate of economic phosphate ore reserves in southeast Idaho. Positive effects associated with recovery of this resource include making this commodity available to society now, economic growth and employment, and increased understanding of the geology of this and similar deposits.

Altogether, the phosphate mining operations in southeast Idaho have disturbed approximately 14,250 acres of surface or about 2.9 percent of the total CEA. The historic mining operations are typically not reclaimed. The mines that were in operation within the last 20 to 30 years have undergone various degrees of reclamation to restore the land to a stable and usable condition. This reclamation has typically included: removal of structures and equipment, backfilling open pits during mining where feasible, regrading overburden piles to slopes of approximately 3h:1v, stabilizing surface runoff patterns, and revegetating regraded surfaces.

At the current time, three of the phosphate mines listed in **Table 5.1-1** are operating, and one is idle. These modern mining operations work within the current environmental protection requirements by the State, BLM and USFS. A major environmental mitigation measure employed by each of these mining operations is concurrent reclamation wherein previously disturbed areas are reclaimed during the course of ongoing mining. As a result of concurrent reclamation, the total topographic disturbance of the three active phosphate mines at the end of 2004 was 1,905 acres, about 58 percent of the total area initially disturbed (3,282 acres) (**Table 5.1-2**).

TABLE 5.1-2 DISTURBED AREA STATUS OF CURRENT MINING OPERATIONS AT END OF 2004 (ACRES)

MINE	TOTAL DISTURBANCE	AREA RECLAIMED	UNRECLAIMED AREA
Smoky Canyon	2,150	756	1,394
South Rasmussen	285	69	216
Dry Valley	847	552	295
Total All Mines	3,282	1,377	1,905

Source of information: 2004 Annual Operating Reports to BLM

The total remaining unreclaimed topographic disturbance from the active mining operations at the end of 2004 was 1,905 acres or about 0.4 percent of the total area within the CEA.

The currently approved mine plans for the active mining operations would allow ongoing mining and reclamation to proceed. In addition, a new phosphate mining operation has been proposed by Monsanto at the Blackfoot Bridge property. The currently approved and proposed mine disturbance, area to be reclaimed and net unreclaimed areas are listed in **Table 5.1-3**.

TABLE 5.1-3 CURRENTLY PERMITTED AND PROPOSED MINE DISTURBANCE AREAS (ACRES)

MINE	TOTAL DISTURBANCE	AREA RECLAIMED	UNRECLAIMED AREA
Smoky Canyon[1]	2,437	2,417	20
South Rasmussen	380	303	77
Rasmussen Ridge[2]	651	579	72
Dry Valley	1,191	1,141	50
Blackfoot Bridge[3]	380	310	70
Total All Mines	5,039	4,750	289

Source of information: 2004 Annual Operating Reports to BLM, Mine and Reclamation Plans, NEPA documents, and proposed Mine Plans. 1) Includes currently permitted mine plans and tailings pond reclamation plan, excepting the Panels F&G Proposed Action. 2) Permitted but currently idle. 3) Proposed.

When all currently permitted and proposed mining operations listed in **Table 5.1-3** are fully implemented, a total of 289 acres of unreclaimed disturbance would result. This would be 0.06 percent of the total area within the CEA. The potential development of the Wells Canyon lease area was not included in **Table 5.1-3** because it has not been proposed at this time.

The total initial disturbance for the Proposed Action would be 1,340 acres, of which 1,269 acres (95 percent) would be reclaimed. The total unreclaimed area of the Proposed Action would be about 71 (parts of mine panels and haul/access roads) acres or 0.01 percent of the total area within the CEA and when added to the permitted and proposed unreclaimed mining area of the mining operations listed in **Table 5.1-3**, the total projected unreclaimed mining disturbance from the current and proposed mining operations would be about 0.07 percent of the total area in the CEA.

Within the CEA, impacts on the discovery, destruction, and removal of paleontological resources occur primarily from mining activities. The effects from mining activities can be positive as well as negative. Mining activities can destroy buried and unidentified fossils but can also uncover paleontological resources and information that would otherwise not be uncovered, thereby increasing scientific understanding. To date, the paleontological impacts within the CEA have occurred at all the phosphate mines, and the Proposed Action and Alternatives would not cause significant additional impacts.

Effects on highwall and overburden fill stability within the CEA occur primarily from mining activities, but can also occur from other major earth moving activities such as the construction of surface water impoundments and road cuts and fills. Potential geotechnical instability from these activities usually affects only a relatively small area, in the immediate vicinity of the disturbance. The analysis conducted for the Proposed Action and Alternatives assessed overall stability. Small failures of highwalls or overburden fills might still occur. It is not possible to account for all factors affecting stability on a small scale. With advances in geotechnical analysis methods and the benefit of previous experience, the potential for future geotechnical instability impacts will likely be diminished. The predicted minor potential impacts to geotechnical stability from the Proposed Action, alternatives, and future foreseeable activities would be insignificant with respect to the CEA. By reducing the amount of external overburden, Alternatives B and C would also reduce the cumulative number of features subject to possible instability.

Selenium mobilization within the CEA can be affected by a variety of activities. However, phosphate mining activities have the most significant impact due to the disturbance of geologic units with elevated selenium concentration and the exposure of these materials during mining.

Prior to 1997, selenium was not recognized by the mining industry or regulatory agencies in southeast Idaho as the primary contaminant released to the environment from phosphate overburden. Since 1997 the mining industry and regulatory agencies have conducted extensive studies throughout the phosphate mining area of southeast Idaho, which have identified the sources and potential effects of selenium releases (Buck and Jones 2002). It has been determined that selenium contained in phosphate overburden can be in chemical forms amenable to uptake by plants or direct ingestion by animals, movement in surface runoff, and leaching from overburden fills into underlying groundwater. Former phosphate mining disturbances that result in exposure of seleniferous overburden to these potential exposure pathways can be sources of selenium contamination to the environment. Unfortunately, prior to the understanding of the importance of vegetative uptake of selenium from seleniferous shale overburden, a reclamation practice endorsed by agencies and mining companies included covering regraded areas with overburden shales to be used as growth medium for reclamation vegetation. Consequently, some of these areas are currently sites of elevated selenium concentrations in vegetation, which can have deleterious effects on surface resources.

A complete accounting of estimated surface areas presenting enough risk from elevated selenium to require remediation has not been done on a regional basis and is planned to be accomplished on a mine-specific basis. A conservative estimate of the potential source area of selenium contamination in southeast Idaho would be the total disturbed area from phosphate mining (**Table 5.1-1**). However, it is unlikely that this entire disturbed area is a source requiring remediation because of the documented wide variations in selenium concentrations of mine overburden in the area (Montgomery Watson 1999, IDEQ 2002c).

Mining companies in southeast Idaho have entered into Administrative Orders on Consent (AOCs), with the State and federal regulatory agencies, leading to site investigations of their mined areas in order to describe the environmental effects of the past mining and reclamation practices. These Site Investigations will lead to Engineering Evaluations/Cost Analyses (EE/CAs), which will describe appropriate remedial actions proposed to mitigate the environmental effects of the past mining. In addition, the agencies have conducted preliminary site assessments of orphaned mine properties throughout the CEA to determine the conditions and identify any mitigative measures required. At the Smoky Canyon Mine, the Site Investigation for Area A (historic mining on federal lands) and Area B (the tailings impoundment on private ground) has been completed. The EE/CA is scheduled to be released for public review in early 2006 and an agency decision document is expected in the fall of 2006.

Agency NEPA analyses and mine-specific studies conducted to date, as well as investigations by the USFS and USGS, have identified a number of potential operational practices that are expected to limit the environmental effects of the selenium contained in the overburden. All the reasonably available mitigative measures determined to date have been proposed by Simplot to be incorporated into the Proposed Action (**Sections 2.4 and 2.5**). As a consequence of these proposed mitigative measures and BMPs, the overburden surface of the Proposed Action is not expected to present a risk from selenium exposure and release. Thus the area of the Proposed Action is not expected to be additive to the existing mining disturbances in the CEA in a cumulative manner with regard to exposure of seleniferous overburden. The covered and capped seleniferous overburden in the Proposed Action would be additive to the other seleniferous overburden fills in the CEA with regard to potential sources of groundwater contamination. However, site-specific characteristics at each overburden would control the pathway of selenium release to groundwater, so an accurate estimate of the cumulative effects of this impact between the Proposed Action and the other mine sites in the CEA cannot be made.

5.2 Air and Noise

CEA Boundary

The CEA boundary for air and noise (**Figure 5.2-1**) was delineated to include the past, present, and reasonably foreseeable Smoky Canyon Mine operations, and the Wells Canyon Lease Area. It also includes the area along the Crow Creek, Wells Canyon, and Diamond Creek roads that could be affected by air emissions and/or noise along various transportation alternatives.

Rationale: Air pollutants are expected to comply with all federal and State air quality standards within the direct effects Study Area, so cumulative effects are not anticipated outside of this area.

Noise from mining is attenuated by vegetation and topography to levels that are not discernable to humans. Noise related to access traffic and haul roads is of importance to persons along nearby public roads and in nearby residences.

Cumulative Effects

Excellent air quality generally exists on National Forest System Lands (USFS 2003b). Air quality in the CNF can occasionally be adversely affected by pollutants from sources outside the CNF such as Pocatello or Soda Springs. These effects typically occur during winter inversions or when stable air masses occur under static, high-pressure weather systems. Other pollution sources outside the CNF include power plant, factory, agricultural burning, and auto emissions (USFS 2003b). Cumulative effects to air quality in the CEA from past, present, and foreseeable future activities are largely from air borne dust released by agricultural practices, mining, travel on unpaved roads, and smoke from wildfires or prescribed burns. Grazing and timber harvesting can produce fugitive dust, but the quantities are minimal and are expected to remain approximately equal to present conditions. Travel on unpaved roads in the CEA can adversely affect air quality from auto emissions, but this type of use has not adversely affected air quality measurably in the past and is considered insignificant (USFS 2003b).

Wildfire and prescribed burns have the greatest potential to affect air quality in the CNF and surrounding lands (USFS 2003b). Fire produces particulates, carbon monoxide, nitrogen oxides, and volatile organic compounds. Fuel loading in forested and non-forested vegetation in the CNF has increased, along with the risk of wildfires that may contribute to air pollution in the future. Wildfire emissions, when added to existing concentrations of air pollutants, could produce cumulative effects that result in non-attainment of the particulate standards in specific areas. Prescribed fires are conducted in compliance with State regulations for protection of air quality and only when ambient air quality standards will not be exceeded.

Mining is the major fugitive dust producing activity in the CNF. Phosphate ore production in Idaho is expected to remain stable or slightly increase over the next 15 years. The fugitive dust emissions would likely increase the same amount because the dust emission rate is roughly proportional to the mining rate. Cumulative effects of dust emissions from the mines operating in southeast Idaho is not expected because all mining must be done in compliance with IDEQ regulations requiring application of dust control BMPs and adherence to permit conditions that ensure protection of air quality.

Figure 5.2-1 Cumulative Effects for Air and Noise Resources

All the past, present, and reasonably foreseeable mining activities in the CEA are operated by Simplot, and the amount of air pollutants resulting from this activity is largely based on the mining rate and the truck haul distances. The present rate of mining is comparable to the proposed mining rate for the Proposed Action and reasonably foreseeable future mining activities. The location of the mining would change along the Simplot land position, but the mining related air emissions would stay approximately constant so the air emissions from the mining over time are not cumulative, rather would primarily just be relocated. Depending on the truck haul distances for each phase of mining, the air emissions from this activity would change over time. The volume of air emissions related to truck hauling would increase slightly when mining is shifted from Panels B and C to Panels F and G because of the longer haul. The Proposed Action and Alternatives would comply with National Ambient Air Quality Standards and applicable State and federal regulations on protection of air quality.

Current, future, or alternative operations at Smoky Canyon Mine are not forecasted to impact any federally designated Class I Areas (Grand Teton and Yellowstone National Parks).

The mining related noise within the applicable CEA, if the Proposed Action or Alternatives were selected, would basically be equivalent to existing conditions. Noise impacts from mining operations would shift in a southerly direction for the proposed mining operations. The noise from these operations would not be cumulative; rather it would be relocated along the phosphate mining trend. Noise from haul traffic between the mine panels and the mill at Smoky Canyon would also be the same as present conditions but would be relocated south of the existing mine operations. The public driving on the Smoky Canyon Road is currently exposed to the mining and haul traffic noise. This effect would be shifted south and, depending on the alternative under consideration, would impact persons on the Wells Canyon, Diamond Creek, or Crow Creek roads.

5.3 Groundwater Resources

CEA Boundary

The CEA boundary for groundwater (**Figure 5.3-1**) encompasses the area along Draney Creek from where it is crossed by the West Branch Meade Thrust Fault to the top of Webster Range, south along the Webster Range to South Fork Sage Creek, west along South Fork Sage Creek to the top of Freeman Ridge, south along Freeman Ridge and Snowdrift Mountain to Clear Creek, east along Clear Creek to the trace of the West Branch Meade Thrust Fault, and north along the West Branch of the Meade Thrust Fault to Draney Creek.

Rationale: Groundwater flow in the area affected by past, present, and future phosphate mining to the north of Pole Canyon flows to the north and northwest under Webster Ridge, where deep burial essentially isolates it from exposure to the surface environment (BLM and USFS 2002). Groundwater in the area south of Pole Canyon flows to the east from recharge areas along Freeman Ridge and the Snowdrift Mountain area to discharge points along the outcrop of the Meade Thrust Fault. The Meade Thrust Fault is considered to be permeable along the strike of the fault plane but is relatively impermeable across the fault (Maxim 2004a). The tailings pond is not included in the CEA because past studies have demonstrated that it is hydrogeologically isolated from the regional aquifer that is present west of the Meade Thrust Fault, and upward groundwater flows of naturally saline water under this facility eliminate its potential to negatively effect groundwater chemistry (JBR 2001b).

Cumulative Effects

Cumulative effects to groundwater in the CEA would consist of groundwater withdrawals from wells or chemical effects caused by surface land uses that contribute contaminants to the groundwater under or down gradient of these land uses. Effects from timber harvesting, grazing, rights-of-way, and recreational uses on groundwater resources are negligible. Mining activities within the CEA have the greatest potential to impact the groundwater resources by withdrawal for consumptive use or from infiltration from open pits and seepage through overburden disposal fills, which have the potential to affect groundwater quality. The only mining operations in the CEA are those of the Smoky Canyon Mine.

Groundwater conditions in the CEA have been described in studies conducted for the Smoky Canyon Mine. The most recent of these studies are the Final Site Investigation Report for the Smoky Canyon Mine (NewFields 2005), the Groundwater Modeling Report for Panels F and G (JBR 2005a), the Water Resources Baseline Technical Reports for Panels F and G (Maxim 2004c and 2004d), and the Water Resources Technical Report for Panels B and C (JBR 2001b). These reports also summarize the results of studies done in the area by others. The northern boundary of the groundwater impacts modeling area conducted for the Panels F and G EIS is located along South Fork Sage Creek and is a physical flow boundary as described by JBR (2005a). The groundwater conditions north of South Fork Sage Creek are outside of the direct effects Study Area for the Panels F and G EIS and have been the subject of the other studies described above.

Within the CEA, usable amounts of groundwater are known to exist within the regional-scale Wells formation/Brazer Limestone aquifer, and aquifers of local importance in the Rex Chert member of the Phosphoria formation and the Dinwoody formation. As described in **Sections 3.3 and 4.3** of this EIS, impacts to the aquifers of the Rex Chert and Dinwoody formation are expected to be of limited extent in the immediate vicinity of the mine pits and overburden fills. The primary effects would be reduction in flows or elimination of small, isolated seeps and springs that could have local importance to wildlife and livestock. The development of Panels F and G could reduce or eliminate flow at 13 such seeps and springs in the immediate vicinity of the mine disturbance. Development of the existing Smoky Canyon Mine may have already affected flow at 2 natural seeps and springs that were described as being located very near the existing mine disturbances prior to mining (BLM and USFS 2001).

The most recent searches for existing groundwater withdrawals via pumping wells in the CEA were made by Maxim (2004c) and NewFields (2005). The only pumping wells in the CEA are the culinary and industrial wells at the Smoky Canyon Mine (**Figure 5.3-2**). These wells withdraw groundwater from the Wells formation aquifer for use at the mine. There are other wells located to the east and west of the CEA, and these are located in different aquifers so they would not be affected by groundwater extraction from the Wells formation aquifer at the mine.

In groundwater studies conducted on the mine area before its construction, Ralston (1979) concluded that pumping the Culinary and Industrial wells at the mine would not cause a noticeable decrease in flow from springs discharging from the Wells formation in the vicinity of the mine (Lower Smoky Creek, Hoopes Spring and Lower South Fork Sage Creek). During preparation of the Final SEIS for Panels B and C, the cumulative discharge of these springs in 2000 was compared to that recorded in 1981, and there was no discernable reduction in flow over this time period (BLM and USFS 2001). The proposed Panel G operations would include a 100 gpm water supply well. The area of influence of this well and its potential effect on the

Figure 5.3-1 Cumulative Effects Area for Groundwater Resources

Figure 5.3-2 Site Investigation Wells

water table in the Wells formation is described in **Section 4.3** of this EIS. It was estimated that pumping this well would not affect the flow of other Wells formation springs in the area (Lower Deer Creek, Books Spring, Stewart Ranch Spring). Based on the investigations into the effects of existing groundwater pumping at the Smoky Canyon Mine and proposed pumping at Panel G, there should be no cumulative effects of this pumping on the flow of springs in the CEA.

Hoopes Spring is located along the trace of the West Sage Valley Branch Fault and is apparently a discharge point for groundwater from the Wells formation (Ralston 1979, JBR 2001b, NewFields 2005). The selenium concentration of this spring began to increase in the fall of 1997 while other parameters appeared to stay at background concentrations. During the 13-year period from 1984 to 1997, the mean selenium concentration was 0.0024 mg/l, ranging from <0.001 to 0.005 mg/l (BLM and USFS 2001). The selenium concentration then increased and ranged up to 0.0013 mg/L prior to October 2002, with concentrations in 2003 and 2004 ranging from 0.0067 to 0.015 mg/L and averaging 0.011 mg/L (NewFields 2005). The surface water aquatic criterion for selenium is 0.005 mg/L.

The reason for the increased selenium concentrations is thought to be due to seepage of seleniferous leachate from the Pole Canyon Dump entering the upper part of the Wells formation aquifer downgradient of the dump and migrating south along the West Sage Valley Branch Fault (NewFields 2005). Contribution of selenium from other parts of the Panel D and E operations is possible but has not been shown to date from existing groundwater monitoring studies.

The Panel F and G Proposed Action and Alternatives are not anticipated to impact Hoopes Spring because the groundwater regimes for these two areas are different. Groundwater flow in the Wells formation in the vicinity of Hoopes Spring is apparently flowing from west to east toward the West Sage Valley Branch Fault then from north to south along the fault zone to the spring (NewFields 2005). In the vicinity of Panel G, groundwater flow in the Wells formation is to the east, discharging in Lower Deer Creek, Books Spring, and Crow Creek. In the vicinity of Panel F, groundwater flow in the Wells formation is east to the West Sage Valley Branch Fault and then north to South Fork Sage Creek Spring where the groundwater discharges about 0.6 mile south of Hoopes Spring (**Section 3.3**). Groundwater in the Wells formation south of South Fork Sage Creek Spring likely does not flow further north. This is because South Fork Sage Creek Spring is at an elevation approximately 10 feet lower than Hoopes Spring. Groundwater studies done by NewFields (2005) at the Smoky Canyon Mine have indicated that there is a low elevation area in the Wells formation water table at the mouth of South Fork Sage Creek Canyon.

As described in **Section 4.3**, the Proposed Action for Panels F and G, and Mining Alternatives A, B, and C is estimated to result in discharges of selenium in groundwater to Lower Deer Creek, exceeding the surface water selenium standard of 0.005 mg/L. The same effect is also estimated to occur at South Fork Sage Creek Spring. These water quality impacts are not expected to influence water quality at Hoopes Spring for the reasons described above. Alternative D would result in lower selenium concentrations in groundwater down gradient of Panels F and G due to reductions in seepage through the overburden, but again, this is not expected to affect water chemistry in Hoopes Spring.

The development of open pits and subsequent pit backfills in the existing Smoky Canyon Mine have the potential to increase local groundwater recharge to the Wells formation aquifer because the Meade Peak aquitard covering the Wells formation in these areas is largely

removed by mining. The same situation would be produced in the Proposed Action and Mining Alternatives for Panels F and G. Alternative D (infiltration barrier) would reduce this effect because of the designed reduction in percolation through the infiltration barrier.

The previous mine operations in the Panel A area have apparently affected groundwater quality in the underlying Wells formation aquifer, as evidenced by selenium concentrations observed in the culinary and industrial wells. In 1996, about 12 years after mining began, the selenium concentration in the well water increased to 0.017 mg/l (BLM and USFS 2001). The groundwater standard for selenium is 0.05 mg/L.

In 2000, the wells had selenium concentrations that varied from 0.007 to 0.031 mg/l averaging 0.0136 mg/l for the industrial well and 0.013 mg/l for the culinary well (BLM and USFS 2001). In 2003 and 2004, the selenium concentration in the culinary well ranged from 0.013 to 0.021 mg/L and in the industrial well the concentrations ranged from 0.011 to 0.012 mg/L (NewFields 2005).

Future groundwater quality in these wells could be affected by the recently opened Panels B and C, but these effects are not expected to extend south of these mine panels (BLM and USFS 2001). Groundwater quality in the Wells formation aquifer that may be impacted by the proposed Panels F and G would not impact water quality in the culinary and industrial wells. Groundwater in the vicinity of Panels F and G is not expected to flow north to the current mine facilities.

Panels B and C have the potential to degrade water quality of the Wells formation aquifer in a local area under and down gradient of the approved pit backfills and external overburden fill areas. This affected groundwater is not expected to discharge to the surface environment or be used by developed water wells (BLM and USFS 2001). Mitigation measures required by the approving Agencies are expected to reduce the water quality impacts to acceptable levels within a relatively short distance from the margins of the Panels B and C operations area.

The Pole Canyon overburden disposal facility was built as a canyon fill from approximately the contact of the Phosphoria and Wells formations downstream to the mouth of the canyon. A French drain was designed in the bottom of the fill to continue to convey Pole Canyon Creek under the overburden. Run of mine overburden was then placed on top of the French drain to the current surface configuration of the fill. The water chemistry exiting the French drain has contained cadmium and selenium concentrations greater than the groundwater standards for these parameters. Water with chemistry similar to that discharging from the French drain outlet is apparently infiltrating into the alluvial channel fill under the overburden fill. An alluvium monitoring well located about 750 feet downgradient of the overburden fill (GW-15) has indicated total selenium concentrations ranging from 0.31 to 0.66 mg/L, well above the groundwater standard (NewFields 2005) (**Figure 5.3-2**). Sulfate, manganese and TDS concentrations in this well also exceeded secondary groundwater standards. Other alluvial monitoring wells installed further down gradient to the east of the Pole Canyon overburden disposal facility (GW-22, 19b, and 19a, respectively) in alluvium along Pole Canyon Creek have indicated lesser concentrations at GW-22 and at background concentrations in GW-19b and 19a. Cadmium concentrations are less than the applicable groundwater standard (0.005 mg/l) in all alluvial monitoring wells indicating this solute is attenuated chemically in the flow path.

A monitoring well installed in the Wells formation down gradient of the Pole Canyon overburden fill (GW-16) indicated total selenium concentrations ranging from 0.45 to 0.64 mg/L (NewFields 2005). Another Wells formation monitoring well located between Panel E and Hoopes Spring (GW-18) indicated selenium concentrations ranging from 0.004 to 0.006 mg/L, below the groundwater standard.

Data generated during the Smoky Canyon Site Investigation have indicated that selenium and other COPCs are leached from the Pole Canyon overburden fill, primarily through the action of seasonal wetting of the lower portion of the overburden during high runoff events followed by gradual drainage of generated leachate to the French drain. This leachate combines with other stream flow in the French drain exiting to the surface channel downstream, percolating into the shallow alluvial aquifer, and also into the underlying Wells formation aquifer. Some contaminated groundwater in the alluvium migrates down gradient into Sage Valley where concentrations decrease to low levels through attenuation and dilution. Other contaminated alluvial groundwater enters the Wells formation and recharges the regional aquifer under Pole Canyon Creek. This groundwater flows east toward the West Sage Valley Branch Fault and then southward to discharge at Hoopes Spring. It should be noted that the Pole Canyon overburden fill hydrogeological setting is unique at the Smoky Canyon Mine and likely represents a worst-case condition that is not repeated anywhere else at the mine.

Groundwater quality in the alluvial and Wells formation aquifers downgradient of the Pole Canyon overburden would not be impacted by groundwater quality effects from the proposed Panels F and G because Wells formation groundwater from south of South Fork Sage Creek would not flow northward to the Pole Canyon area as described previously for Hoopes Spring.

Existing groundwater monitoring at Smoky Canyon Mine has not indicated water chemistry impacts to alluvial or Wells formation groundwater related to operations at Panels D or E.

Based on the available hydrogeological information for the areas north and south of South Fork Sage Creek, it appears that groundwater from under the past and present mining operations at Smoky Canyon Mine would not mix with groundwater from under the proposed Panels F and G operations. Thus, the water quality effects would remain physically separated. The geographic area (footprint) of the Wells formation regional aquifer that could potentially become impacted by Panels F and G with regard to water quality would be in addition to that already and potentially impacted at the Smoky Canyon Mine.

Current impacts to groundwater, from the existing Smoky Canyon Mine, are not expected to continue in perpetuity. Simplot has entered into an AOC with the State and federal regulatory agencies. The AOC implements measures to determine the nature and extent of COPC releases. A response action will be developed by the regulatory agencies and implemented by Simplot. As mentioned previously, the Site Investigation for Area A (historic mining on federal lands) and Area B (the tailings impoundment on private ground) has been completed. The EE/CA is scheduled to be released for public review in early 2006 and an agency decision document is expected in the fall of 2006.

5.4 Surface Water Resources

CEA Boundary

The CEA boundary for surface water (**Figure 5.4-1**) includes the Crow Creek Watershed (HUC 5) to its confluence with the Salt River, the Tygee Creek Watershed (HUC 5) to its confluence with Stump Creek, and Diamond Creek Watershed (HUC 6) that extends to the confluence with Timber Creek. There are 148,956 acres (232.7 square miles) in the surface water CEA.

Rationale:
This delineation incorporates natural watershed boundaries including all past, present, and reasonably foreseeable phosphate mining and transportation-related disturbances upstream of Stump Creek, the Salt River, and Timber Creek. As flows progress downstream, localized effects become more and more diluted and eventually reach a point where effects become non-measurable. This point varies between watersheds, season, flow events, and type of pollution element. Typical annual transport distances are estimated to be approximately 10, 2, and 0.2 kilometers for suspended sediment, sand, and coarse particles, respectively (Bunte and McDonald 1998). IDL (2000) suggests that watershed areas greater than 20,000 acres in size (approximately a 6^{th} HUC watershed) have such diversity in the complexity of streams, soils, geology slopes, and land use that meaningful cumulative effects are difficult to detect. Therefore, surface water resources should not be significantly affected by the Project beyond this area.

Cumulative Effects

Potential cumulative effects to surface water resources within the CEA can occur from road construction and maintenance, livestock grazing, timber harvesting, agricultural activities and mining. Simplot's current mining activities span two watersheds, both of which ultimately are part of the Salt River system. The northernmost watershed is the Tygee Creek basin (**Figure 5.4-1**). The existing Smoky Canyon access road, mill, offices, maintenance facilities, tailings pond, and mine Panels A, B, and C are located within the Smoky Creek watershed that drains to Tygee Creek, or are located in the Tygee Creek watershed (tailings pond). Tygee Creek is a tributary of Stump Creek, which drains to the Salt River approximately 5 miles downstream of Tygee Creek.

The existing mine Panels D and E are located along tributaries to Sage Creek. These tributaries include Pole Canyon Creek, mainstream Sage Creek, and South Fork Sage Creek. After exiting the Webster Range, Sage Creek drains to the south through Sage Valley. With a total watershed area of approximately 25 square miles, it joins Crow Creek in the approximate center of the Water Resources CEA (**Figure 5.4-1**). Crow Creek flows northeastward into Wyoming, combining with flow from Spring Creek, and enters the Salt River about 8 miles upstream from the confluence of Stump Creek with the Salt River. The southern portion of the CEA (from South Fork Sage Creek south) is largely the same as the direct effects Study Area for this EIS, while the northern portion of the CEA is outside of this direct effects Study Area.

Forest management activities including timber harvests, livestock grazing, and public recreational uses occur within the CNF located on the east and west slopes of the Crow Creek watershed upstream (south) of its confluence with Sage Creek. The CNF comprises most of the west slopes of the Sage Creek and Tygee Creek watersheds and all of the Diamond Creek watershed. In Wyoming, the Bridger-Teton National Forest comprises most of the Spring Creek watershed which drains into Crow Creek about 5 miles upstream of the Salt River.

Figure 5.4-1 Cumulative Effects Area for Surface Water, Soils, Vegetation, Wetlands, Fisheries and Aquatics, Visual/Aesthetics, Cultural, and Noise Resources

Cultivated agriculture and livestock pasture land uses occur on private land located in the bottom of the Crow Creek Valley upstream of Sage Creek. Agricultural private lands also dominate the eastern portions of the Tygee and Sage Creek watersheds and along Crow Creek Valley from Sage Creek downstream to the confluence with the Salt River.

Forest Service GIS mapping and Idaho and Wyoming Gap Analysis Project maps indicate the past and present land uses and vegetative cover types within the Surface Water CEA as listed in **Table 5.4-1**.

TABLE 5.4-1 PAST AND PRESENT LAND USES THROUGH 2004 AND VEGETATIVE COVER TYPES WITHIN THE SURFACE WATER CEA

LAND USE	AREA (ACRES)
Mining	2,150
Mineral Exploration	62
Timber Harvests	2,150
Burned Areas	11
Agriculture Areas (private)	6,018
Utility and Pipeline Corridors	61
Roads/Trails	305
MAJOR VEGETATION TYPES	
Aspen	20,149
Aspen-Conifer	10,611
Conifer	34,897
Sagebrush/Shrub	49,244
Grassland	5,088
Riparian	3,201
POTENTIALLY SUITABLE TIMBER	
Aspen	10,503
Aspen-conifer	5,649
Conifer	23,723
LAND OWNERSHIP	
USFS	106,404
Private	37,902
State	2,616
BLM	2,034

The reasonably foreseeable developments within the CEA that could affect surface water quality or quantity, in addition to the Proposed Action and Alternatives, include ongoing development of the Smoky Canyon Mine, which would add approximately 287 acres of disturbance over what is currently present at the mine. No USFS timber sales are proposed for the CEA in the current planning cycle. Effects of potential wildfires and suppression activities in the CEA are unknown at this time and are thus not considered for this analysis. Changes to transportation and recreational uses of the CEA that could noticeably impact surface water resources have not been proposed. Changes to private agricultural lands within the CEA are likely as some of these lands are converted from traditional agricultural utilization (ranching) to more residential and recreational utilization. The Agencies are not aware of any such specific plans that could impact water resources, and these are not considered for this analysis.

None of the streams within the CEA are on the latest EPA approved (1998) State of Idaho 303(d) list of impaired waters, nor are they on the list of streams whose quality has been determined to be threatened (IDEQ 1999). According to the Idaho 1998 303(d) List (IDEQ 1999), Crow Creek, Deer Creek, Stump Creek, and Tygee Creek were all found to support their

beneficial uses according to surveys by the Division of Water Quality between 1993 and 1996. Sage Creek, while it appeared on the 1996 303(d) List as sediment-impaired, was removed from the 1998 list because it was deemed by the Division of Water Quality to support all of its beneficial uses. In 2003, IDEQ released the Draft 2002-2003 Integrated 303(d)/305(b) Report which contains the draft 2002-03 303(d) list (IDEQ 2003c). Pole Canyon Creek was listed for selenium. North Fork Deer Creek, South Fork Deer Creek, and upper Deer Creek above its confluence with the South Fork are listed due to sediments. The recommendations of the draft 2002-2003 report have not yet been finalized. Simplot, in consultation with the regulatory agencies, would take steps to ensure compliance with future EPA approved 303d lists and applicable discharge limitations, if they were to change from current conditions.

IDEQ described water quality conditions in Sage Creek in the Final 2003 Supplement to 2001 Total Maximum Daily Load Baseline Monitoring Report (IDEQ 2004d). Samples were obtained in May 2003 from Hoopes Spring, Lower Sage Creek above its confluence with Crow Creek, Sage Creek below its confluence with Pole Canyon Creek, and Lower South Fork Sage Creek. The 4-day average selenium values for Lower South Fork Sage Creek and Sage Creek below its confluence with Pole Canyon Creek were both less than 0.001 mg/L. The 4-day average for Hoopes Spring was 0.0103 mg/L and Lower Sage Creek above its confluence with Crow Creek was 0.004 mg/L. Selenium loads observed in May 2003 were comparable to selenium loads observed in May 2001 and 2002 (IDEQ 2004c). IDEQ concluded that Hoopes Spring is the source of the selenium loads in Lower Sage Creek and that selenium loads are reduced by as much as 34 percent along the Hoopes Spring – Lower Sage Creek flow path. The report also indicated that selenium in surface waters is apparently immobilized within wetlands and beaver dam complexes. Conversely, selenium was observed to be mobilized from sediment when flow velocities entrain particles. It was suggested that selenium cycling in streams and upland soils can result in selenium loads in streams reflecting releases from mines in prior years.

The Area Wide Human Health and Ecological Risk Assessment (IDEQ 2002c) contains surface water data for the CEA. The risk assessment presents data collected by Tetra Tech EM and Montgomery Watson in 2001 as part of the Selenium Project Area Wide Investigations. Samples were taken of stream surface water, stream sediment, riparian soil and plant tissue, and aquatic plant, insect and fish tissue. Within the CEA, samples were taken upstream and downstream of the Smoky Canyon Mine along Smoky Creek and Sage Creek. Samples were taken in lower South Fork Sage Creek and Sage Creek above its confluence with Crow Creek. Samples were also taken at the mouth of Deer Creek and Crow Creek just above Deer Creek. The results of these sampling events for the COPCs of interest are shown in **Table 5.4-2**.

TABLE 5.4-2 AREA WIDE INVESTIGATION SURFACE WATER RESULTS FOR THE SURFACE WATER CEA

SAMPLE SITE (SURFACE WATER STANDARDS)	TSS (NONE)	CADMIUM (1.0 UG/L)	CHROMIUM (10 UG/L)	SELENIUM (5.0 UG/L)	ZINC (105 UG/L)
Smoky Creek Above Mine	<4	0.16	<0.5	<1	46
Smoky Creek Below Mine	59	0.27	<0.5	<1	68
Sage Creek Above Mine	<4	<0.13	<0.5	<1	<10
Sage Creek Below Mine	7	0.16	<0.5	<1	<10
Lower South Fork Sage Creek	<4	<0.13	<0.5	1.4	<10
Sage Creek above Crow Creek	7	<0.13	<0.5	3.2	<10
Lower Deer above Crow Creek	4	<0.13	<0.5	1.2	94
Crow Creek above Deer Creek	11	<0.13	<0.5	<1	66

All metals shown as dissolved concentrations except selenium, which is total. TSS units are mg/L all others are ug/L.

The Area Wide Investigation results suggest that suspended sediment (TSS), cadmium, and zinc in Smoky Creek is increased downstream of the Smoky Canyon Mine, but the downstream water quality is still within surface water standards. Sage Creek also showed slight increases in TSS and cadmium but not zinc. Cadmium and chromium were not significantly increased downstream of the mining for any of the streams. Selenium did not increase downstream of the mine in Smoky Creek or Sage Creek where it flows through the active mining area. In 2001, Lower Sage Creek above its confluence with Crow Creek had a total selenium concentration of about 64 percent of the Criteria Continuous Concentration for surface water (0.005 mg/L). This is likely due to the selenium in Hoopes Spring, which was not sampled. Selenium was just above the detection level in lower South Fork Sage Creek and lower Deer Creek.

According to the 2002-2003 CTNF Monitoring Report, every major stream in the Caribou portion of the Forest has been rated on a stream-wide basis (USFS 2003e). In 2001 and 2002, 38 streams, some with multiple reaches, were field verified for Properly Functioning Condition (PFC). Of these reaches, 20 (43 percent) were considered to be in Properly Functioning Condition, 25 (53 percent) were considered to be Functioning-at-Risk, and two were considered to be Non-Functioning. Most of the evaluated reaches had improving trends.

The CTNF Monitoring Report also described that since 1997, the CNF has conducted BMP audits of 10 timber sales. No detrimental effects to or violations of water quality standards were documented. All applied BMPs appeared to be effective in controlling erosion/sediment and protecting water quality. Shortcomings in road maintenance were noted, but detrimental effects to surface water from these shortcomings were not observed. The report suggested that, when planned and administered properly, timber harvesting and associated roading on the CNF have little observable effects to surface water quality through the application of BMPs and other mitigating actions (USFS 2003e). In addition, the report indicates that water yields were calculated for major land-disturbing timber sales, and the analyses determined that no projects resulted in measurable changes or influences to stream channel morphology or condition. It was also reported that BMP reviews found no impacts to adjacent and downstream channels due to changes in amounts and timing of water yields.

Many of the past and current human activities within the watersheds of the CEA, including mining, livestock grazing, timber harvesting, and road construction, can increase sediment loads to streams and result in channel instability. According to the current (1998) Idaho 303d list of impaired waters, all of the streams in the CEA were found to support their beneficial uses. The Draft 2002-03 Integrated 303d/303b Report listed Pole Canyon Creek for selenium; it listed North Fork Deer Creek, South Fork Deer Creek, and upper Deer Creek above its confluence with South Fork for sediment.

On a regional basis, throughout the Snake/Blackfoot River watershed, weighted average annual suspended sediment concentrations are approximately 150 mg/l (USGS 1977). Water quality data obtained for four quarterly samples taken in 1998/1999 at the USGS gauging station on the Salt River (USGS 2001d) showed that suspended sediment concentrations ranged from 24 mg/L during fall baseline condition to 105 mg/L during spring snow melt conditions. Aquatic monitoring data for the Smoky Canyon Mine from 1981- 2003 showed suspended sediment (TSS) concentrations in lower Smoky Creek to range from non-detectible to 240 mg/L (upper Smoky ranged from non-detectable to 1120 mg/L) and in lower Tygee Creek TSS ranged from non-detectible to 28 mg/L (TRC Mariah 2004).

A recent, comprehensive study of potential mining effects on surface water resources within the CEA is described in the Site Investigation Report for the Smoky Canyon Mine (NewFields 2005). Surface water and sediment samples were obtained from streams upstream and downstream of the Smoky Canyon Mine and from seeps issuing from the bases of some of the overburden fills at the mine.

A survey of existing overburden seeps resulted in six areas of seepage from the overburden fills being found. Five of the six seeps contained selenium concentrations greater than the IDEQ removal action levels for livestock extended use (0.05 mg/L) and transient use (0.201 mg/L). Total selenium concentrations for these five seeps ranged from 0.27 to 13.6 mg/L. All of these seeps are contained within fenced detention basins in the mine area and are therefore not regulated under State and federal water quality statutes and regulations.

Table 5.4-3 indicates the results of the surface water sampling for streams in the vicinity of the Smoky Canyon Mine. The streams that contained COPCs above surface water quality standards were Pole Canyon Creek below the Pole Canyon Overburden Fill for cadmium, nickel, selenium and zinc; Hoopes Spring for selenium; South Fork Sage Creek for selenium; and, Lower Sage Creek (between Hoopes Spring and Crow Creek) for selenium.

TABLE 5.4-3 2003 – 2004 SITE INVESTIGATION SAMPLING OF STREAM WATER IN THE CEA

STREAM	# OF SAMPLES TAKEN AT ALL SITES ALONG STREAM	# OF SAMPLES EXCEEDING SW STANDARDS	CONSTITUENTS EXCEEDING SW STANDARDS
Tygee Creek	5	0	
Smoky Creek	10	0	
Roberts Creek	4	0	
Pole Canyon Creek	10	10	Cd, Ni, Se, Zn
Upper Sage Valley	13	0	
Upper Sage Creek	5	0	
Hoopes Spring	11	11	Se
S.F. Sage Creek	22	1	Se
Lower Sage Valley	32	14	Se
Crow Creek	5	0	

Beginning in 1987, for lower Pole Canyon Creek below the overburden fill, every sample collected at that site has contained selenium concentrations greater than 0.005 mg/l. None of the samples taken from that site before that time had values greater than 0.005 mg/l, nor have any of the samples taken from the stream above the overburden fill had values greater than 0.005 mg/l. Concentrations of selenium since 1991 in Lower Pole Canyon Creek, below the French drain, have ranged from 0.07 mg/l to 1.5 mg/l.

During 2003 and 2004 Site Investigation, Pole Canyon Creek was monitored in two sites above the Pole Canyon overburden fill and 5 sites downstream of the overburden. Two of the downstream sites were located close to the base of the overburden, and three sites were located along Pole Canyon Creek in Sage Valley. During the site investigations, none of the COPCs were measured above the IDEQ monitoring action levels or the surface water standards in Pole Canyon Creek above the Pole Canyon overburden fill. (Monitoring Action Levels are COPC concentrations for regulated surface water and groundwater identified in the Area-Wide

Risk Management Plan (IDEQ 2004) to identify the primary transport pathways from sources related to past mining. The surface water Monitoring Action Levels are based on the maximum Area-Wide Background Level; the groundwater Monitoring Action Levels are based on water quality criteria for protection of surface water.) Downstream of the overburden fill, concentrations of cadmium, nickel, selenium, and zinc exceeded the monitoring action levels in all samples. Cadmium and selenium concentrations also exceeded their water quality standards in all samples. Nickel and zinc exceeded their water quality standards in the sample sites closest to the base of the overburden but did not exceed the standards in the Sage Valley sample sites. Total selenium concentrations ranged from 0.164 to 1.5 mg/L and averaged 0.623 mg/L in Pole Canyon Creek downstream of the overburden fill. All COPC concentrations decreased with distance along the creek downstream of the overburden fill. Selenium concentrations decreased from over 1 mg/L at the base of the overburden to about 0.2 mg/L in Sage Valley.

The water quality discharged to the surface from Hoopes Spring ranged from 0.0067 to 0.15 mg/L total selenium and averaged 0.011mg/L total selenium. No other COPCs exceeded either IDEQ monitoring action levels or surface water quality criteria in Hoopes Spring.

In one side spring to Lower South Fork Sage Creek (LSS-SP1), 1 out of 6 samples had a selenium value of 0.008 mg/L, which exceeded the surface water quality criteria for selenium. The total selenium concentrations in the 22 samples obtained from Lower South Fork Sage Creek ranged from less than 0.001 mg/L to 0.008 mg/L and averaged 0.0017 mg/L.

None of the COPCs except selenium were present in concentrations above the monitoring action levels in Sage Creek upstream of its confluence with Hoopes Spring. Total selenium concentrations ranged from less than 0.001 to 0.0036 mg/L. In the reach between its confluences with Hoopes Spring and South Fork Sage Creek none of the COPCs other than selenium were present above the monitoring action levels and total selenium concentrations exceeded the surface water standard in all samples. Below its confluence with South Fork Sage Creek, 5 of the 18 samples exceeded the surface water standard for selenium with concentrations ranging from 0.003 to 0.0068 mg/L averaging 0.0047 mg/L.

Overall, it appeared that Hoopes Spring was the source of the elevated selenium concentrations in Lower Sage Creek with the highest concentrations occurring in the roughly 4,000-foot long reach of Sage Creek between the confluences of Hoopes Spring and South Fork Sage Creek. Downstream of South Fork Sage Creek, the main stem of Sage Creek varied with total selenium concentrations exceeding the water quality criteria during low flow periods of the year. This is consistent with the observations made by IDEQ in the 2003 Supplement to the 2001 TMDL Baseline Monitoring Report.

Water quality was monitored in Crow Creek just above and below its confluence with Sage Creek. Total selenium was higher than the monitoring action level (0.0016 mg/L) in 2 of 5 samples collected in Crow Creek downstream of Sage Creek (both had concentrations of 0.002 mg/L), but no samples were above the water quality criteria for total selenium.

The Proposed Action and Alternatives would not change the current conditions in surface streams north of South Fork Sage Creek. Therefore there would be no cumulative effect to Sage Creek upstream of its confluence with South Fork Sage Creek. There would also be no change to the Tygee Creek watershed from the Proposed Action and Alternatives. The tailings pond would be increased in size in compliance with its existing permitted expansion plan. As described in the FSEIS for the Panels B and C, construction of the tailings pond has had an overall beneficial effect on water quality in Tygee Creek compared to the baseline condition when saline spring discharge impacted the water quality of the stream (BLM and USFS 2001). This beneficial water quality effect would continue with ongoing operation of the tailings disposal facility.

As described in **Section 4.3**, the Proposed Action and Alternatives would add sediment and reduce runoff to area streams from South Fork Sage Creek to Wells Canyon. Similar and extensive mining and haul/access road construction/operation related to the existing Smoky Canyon Mine has apparently had limited TSS impact on downstream water quality due to surface runoff effects (BLM and USFS 2001). Cumulative effects to runoff and sediment from the Smoky Canyon Mine and the Proposed Action and alternatives are possible in lower Sage Creek and downstream but are not expected to be noticeable.

The primary COPC impact of the proposed mining operations on surface water in the CEA would be from construction of seleniferous overburden pit backfills and external overburden fills as part of Panels F and G. The permeable chert/topsoil cap used in the Proposed Action and Alternatives A through C would allow percolation of annual recharge water through the seleniferous overburden fills introducing COPCs into the Wells formation aquifer beneath these areas. As described in **Section 4.3** for the Proposed Action and Alternatives A through C, the transport of the COPCs in the Wells formation to points of groundwater discharge at the surface is estimated to result in peak concentrations of selenium in lower Deer Creek, Crow Creek, South Fork Sage Creek, and lower Sage Creek (**Table 4.3-16**). Under these alternatives, selenium concentrations in lower Deer Creek and South Fork Sage Creek that are currently less than the surface water standard would increase to approximately twice the surface water standard of 0.005 mg/L. Lower Sage Creek between the confluence with South Fork Sage Creek and Crow Creek, which now contains total selenium above the surface water standard during low flow conditions would contain selenium concentrations that are estimated between 0.008 to 0.009 mg/L during all times of the year. Crow Creek immediately downstream of Sage Creek under these alternatives is estimated to be at or slightly above (0.006 mg/L) the surface water standard for selenium year-round. Dilution and attenuation in Crow Creek is expected to reduce total selenium concentrations downstream of Sage Creek to less than 0.005 mg/L before the stream leaves the CEA.

Where the impact analysis predicts exceedances of applicable standards for selenium in groundwater and surface water, none of the above alternatives would be chosen by the Agencies without additional measures designed to limit releases so applicable standards were met.

Under Alternative D, lower Deer Creek and South Fork Sage Creek would maintain total selenium concentrations just below the surface water standard, but the added selenium load would result in increasing the selenium concentration in lower Sage Creek between South Fork Sage Creek and Crow Creek to approximately 0.007 mg/L year-round. The total selenium concentration in Crow Creek downstream of Sage Creek is estimated to be approximately 0.005 mg/L or less year-round.

It should be noted that the timeframe for the peak selenium concentrations at lower Deer Creek and South Fork Sage Creek are about 50 and 100 years, respectively. After these peaks, the concentrations are estimated to gradually decrease over periods of hundreds of years. In addition, the estimated concentrations in Sage Creek downstream of South Fork Sage Creek assume that the existing, seasonal concentrations continue unchanged. These concentrations are due to contributions of selenium from Hoopes Spring, which are attributed to leaching of selenium from the Pole Canyon Overburden Fill at the Smoky Canyon Mine. This is currently being addressed through the AOC between Simplot and the Agencies. Mitigation measures that would be employed at the Smoky Canyon Mine to reduce the selenium in Hoopes Spring would also reduce the estimated cumulative effects to Sage Creek from the Proposed Action and Alternatives.

5.5 Soils

CEA Boundary

The CEA boundary for soils (**Figure 5.4-1**) is the same as described in surface water (**Section 5.4**).

Rationale: This CEA boundary is the same as for surface water, primarily for simplicity in the cumulative effects analysis. Soil resources would not be affected by the Project beyond these watershed areas.

Cumulative Effects

The CEA for soil resources includes private lands, State land, BLM land, portions of the CNF in southeastern Idaho, and portions of the Bridger-Teton National Forest in southwestern Wyoming (**Table 5.4-1**). The boundary of the CEA encompasses approximately 148,956 acres. The USFS administers the largest amount of land within the CEA (71 percent) followed by private land (25 percent), with the State and BLM administering a few percent each of the total area.

The CEA encompasses five watersheds including Tygee Creek, Crow Creek, upper Diamond Fork, Deer Creek and Sage Creek. Soil resources beyond these watershed boundaries would not be affected by implementation of the Proposed Action or Alternatives. The RFP (USFS 2003a) requires that less than 30 percent of a watershed should be in a hydrologically disturbed condition. The surface water impact analysis in **Section 4.3** showed that the mining components of the Proposed Action, or any of the mining alternatives, would result in 11 percent or less hydrologic disturbance in any of the affected watersheds. The watersheds evaluated include most of the surface water CEA with the exception of the Tygee Creek watershed. None of the Tygee Creek watershed would be disturbed by the Proposed Action or Alternatives.

Major land uses in the CEA are timber harvesting, livestock grazing, agriculture, and mining. The area is also used for hunting, fishing, and other outdoor recreation where ORV use can disturb soil resources, but the effects of these activities on soils are insignificant compared to the other four major land uses. The past and present disturbances to soil resources from these land uses within the CEA are shown in **Table 5.4-1**.

According to CNF data, approximately 27,000 acres of timber harvest has occurred on the CNF since 1964 with 2,150 acres of this occurring in the CEA (**Table 5.4-1**). Removal of trees and vegetation exposes the soil resources to erosional factors, and equipment used to remove and haul the timber can cause compaction that further increases the erosion potential by increasing runoff and decreasing infiltration. Logging roads can alter water flow on the soil surface, creating impervious surfaces that concentrate runoff and increase erosion. The primary effect of these activities on soil resources is increased erosion of in situ soil with the secondary effect of increased sediment loading in downstream surface waters. The 2002-2003 CNF Monitoring and Evaluation Report (USFS 2003e) indicated that audits of 10 timber sale disturbances in the CNF showed BMPs appeared to be effective in controlling soil erosion and stream sedimentation. The same report indicated that monitoring of 24 soil erosion collection tanks on the CNF showed observed soil erosion rates ranged from 0.03 TPY to 1.05 TPY, which are below allowable soil loss levels needed to maintain soil productivity (3 – 5 TPY). The monitoring report also discussed the 13 miles of new roads constructed in the CNF in the previous 5 years and described that timber sale roads were typically being built on land types capable of this use, and no road failures or unmitigated problems were reported. The report concluded that, when planned and administered properly, timber harvesting and associated roading had little observable effects to stream water quality due to soil erosion and sedimentation.

Controlled burning for fuel management on Forest lands, and the occurrence of unplanned seasonal wildfires, increase the risk of soil erosion by removing the organic surface material from the soil. Extremely hot fires have the potential to permanently alter the top layers of the soil, changing the soil structure, productivity, chemistry, and hazard of erosion. Within the CEA, soil impacts resulting from fire would vary by location, timing of the fire, soil and vegetation type, and post-fire environment (USDA 2003a).

Livestock grazing may affect soil by decreasing the vegetation cover, destroying the microbiotic crust, increasing compaction, and thereby increasing the surface erosion of soils. Specific localized damage in riparian areas from compaction and vegetation removal by cattle can happen, allowing sediment to enter the waterway and contributing to the destruction of the stream banks. Disturbance of soil resources by livestock is also a factor in the introduction and spread of noxious and non-native vegetation species.

The 2002-2003 CTNF Monitoring Report also indirectly discussed impacts of livestock grazing on soil resources (USFS 2003e). It described WEPP modeling on 15 sites with different vegetation communities in the CNF that are commonly used for livestock grazing. The modeling results indicated that 0.03 – 0.08 TPY of soil loss was estimated for juniper, mountain mahogany, and one-third of the mountain sagebrush areas. The aspen, mountain brush, tall forb, and two-thirds of the mountain sagebrush areas were estimated to have no soil loss. The report concluded that range management activities were not causing excessive soil losses in any of the vegetation types monitored. The report described that upland vegetation is generally under-utilized by livestock grazing activities with some heavy grazing on certain sheep allotments. As a whole, the rangeland vegetation trend was reported to be upward. This past and present vegetation and soil loss condition due to grazing uses of the CTNF is applicable to the CEA and is expected to continue in the foreseeable future.

Typical recreation in the CEA consists of hunting, fishing, and other outdoor activities. Generally, these activities have a lesser impact on the soil resources than other uses due to their intermittent and seasonal nature. Potential cumulative effects are limited and would include compaction from vehicle travel.

Of all the land uses in the CEA that can affect soils, the most significant one is mining because the soils within the disturbed areas are physically removed and then replaced during reclamation activities. The only mining in the CEA is related to the Smoky Canyon Mine. Mining activity at the Smoky Canyon Mine has disturbed 2,150 acres of soil resources in the CEA (**Table 5.4-1**), including Smoky Canyon Mine Panels A, B, C, D, and E. An additional 62 acres have been disturbed due to phosphate exploration programs in the Manning, Deer, and Wells Canyon leases. Excluding the proposed Panels F and G expansion, the Smoky Canyon Mine is currently permitted to expand to a total disturbance area of 2,437 acres (**Table 5.4-2**). Most of the disturbed areas in the current mining area and all of the proposed future mining would result in topsoil salvage and reapplication during reclamation. Reclamation is conducted concurrent with mining so the total disturbed area is larger than the actual unreclaimed area at any one time.

Within the Tygee Creek watershed, approximately 13 acres within the Smoky Canyon B and C Panel area remain unreclaimed as pit highwall. Disturbance within the existing Smoky Canyon Mine operations at Panels D and E is within the Sage Creek watershed that flows to Crow Creek. Implementation of the Proposed Action or Alternatives would involve disturbances within the Deer Creek and Sage Creek watersheds, to the mouth of the Crow Creek watershed. With implementation of the Proposed Action or Mining Alternatives D, E, or F, an additional 46 acres of highwall and pit bottoms would not be reclaimed. Implementation of Mining Alternative A would yield approximately 17 acres of unreclaimed disturbance, and Alternatives B and C would have 38 and zero acres, respectively of unreclaimed permanent disturbance. In accordance with the RFP (USDA 2003a), less than 15 percent of soils in the activity area would be detrimentally disturbed.

The concentration of selenium and other metals in surficial growth medium and vegetation at reclaimed mining sites can be influenced by the mining operations. The type of reclamation treatment methods will affect the selenium concentration in the growth medium materials and vegetation. Previously, reclamation techniques at phosphate mines included the use of middle waste shales as growth medium. This was an accepted practice prior to the discovery in the late 1990s that selenium and other COPCs in the shale presented environmental risks. These past reclamation practices resulted in elevated concentrations of selenium and other COPCs in the seedbed, and reclamation vegetation rooted in this material was also likely to have elevated concentrations of some of these elements.

Simplot investigated the correlation between concentrations of COPCs in growth medium and reclamation vegetation at the Smoky Canyon Mine (JBR 2001c). Elevated levels of selenium and other COPCs were present in the root zone growth material and vegetation rooted in this material, where reclamation involved seeding directly into overburden shale. Vegetation concentrations were still elevated where a thin layer of topsoil was spread on top of the overburden and vegetation roots could penetrate through the topsoil into underlying shale. Where vegetation is rooted in topsoil on top of low selenium chert, the selenium and other COPCs levels in the root zone and the vegetation were significantly lower than vegetation rooted in shale overburden material.

As part of the site investigations conducted at the Smoky Canyon Mine, concentrations of selenium and other COPCs were determined for natural soils around the mine and growth medium within the reclaimed mine disturbance (NewFields 2005). Mean concentrations of cadmium, vanadium, and zinc in the reclaimed overburden areas were less than the site-specific reference (baseline) concentrations for native soil. Nickel was slightly elevated in the overburden areas over the reference concentration. Mean copper and selenium concentrations

in the reclaimed overburden areas were greater than the reference concentration. The site-specific reference concentration for selenium was 3 mg/Kg. The average selenium concentration in the root zone of the reclaimed overburden at Panels A, D, and E was 30.5 mg/Kg.

The reclamation practices at the Smoky Canyon Mine have changed since mining began in 1983. Topsoil was not salvaged during the earliest disturbances (Panel A), and reclamation was accomplished by regrading ROM overburden, covering with weathered overburden shale, and revegetating. These areas now have some high selenium concentrations in the growth medium. In later operations (Panel D), topsoil was salvaged and spread over reclaimed ROM overburden in thicknesses ranging from zero to over 3 feet. These areas have varying levels of selenium concentrations in the growth medium. Since about 1998, overburden has been segregated into low selenium chert and ROM with the chert being used to cover ROM shale overburden. Salvaged topsoil has been spread over the chert. These areas have low selenium concentrations in the growth medium and subsoil layers comparable to most native soils. This reclamation practice has been used in the southern part of the Panel D backfill, Panel E, and the latest mining in Panels B and C (including backfilling and reclaiming the north half of Panel A). Based on the above, it can be assumed that the current and future mining activities in the Smoky Canyon Mine (Panels B, C, E and parts of A and D backfill) will preserve the salvaged topsoil and apply it on top of a low selenium chert cap to minimize selenium concentrations in the root zone.

The current reclamation technique planned for the Proposed Action and Alternatives is to reduce the exposure of seleniferous overburden to the surface environment by placing low selenium chert as a thick cover over all areas of seleniferous overburden fills and then apply a layer of salvaged topsoil. The thickness of this chert layer would be a minimum of four feet thick for the Proposed Action and Alternatives A through C and thicker on the slopes of Alternative D. The chert and topsoil would deter root penetration into underlying seleniferous overburden, thereby reducing bioaccumulation in reclamation vegetation. In this manner, the soil disturbance area of the Proposed Action and Alternatives would be cumulative with the existing and approved Smoky Canyon Mine disturbance but would not add to the existing areas of elevated selenium concentrations in the growth medium of parts of the Smoky Canyon Mine.

5.6 Vegetation

CEA Boundary

The CEA boundary for vegetation (**Figure 5.4-1**) is the same as described for surface water and soils.

Rationale: The CEA for water and soils was determined to be sufficient in size for vegetation. Vegetation effects from the Proposed Action and Alternatives would not be noticeable beyond this area.

Cumulative Effects

Disturbance of vegetation in the CEA occurs primarily through disturbances related to mining, agriculture, timber harvests, grazing, wildfires, prescribed burns, and ORV use. **Table 5.4-1** indicates the acreage/disturbance from land use that has been affected in the CEA by past and present activities. **Table 5.4-1** also provides the major vegetation types and the amount of

acreage each vegetation type encompasses within the CEA. According to the USFS GIS mapping and both the Idaho and Wyoming Gap Analysis Program (GAP) maps, the six major vegetation types cover approximately 83 percent of the CEA. The largest land use within the CEA is from agriculture, which accounts for approximately 4 percent of the CEA area. According to available data, approximately 11,000 acres of past and present land uses/disturbances have occurred within the CEA. This represents approximately 7 percent of the total CEA. Adding the largest amount of potential new surface disturbance from this Project (Mining Alternative D and Transportation Alternative 3 = 1,468 acres), with past and present known disturbances, results in approximately 8 percent of the CEA vegetation being disturbed. The majority of this disturbance to vegetation within the CEA is temporary as natural revegetation and reclamation relatively quickly reestablishes some sort of vegetation to the disturbed areas, although the vegetation composition and community type is changed and modified from its pre-disturbance state.

Past timber sales have reduced stand densities, simplified stand structure, and have resulted in the partial treatment of created fuels (logging slash) through the use of fire and mechanical means. Forest product extraction (including fuel, posts, poles, plant gathering, and Christmas trees) has and would continue to impact minor amounts of forest resources throughout the CEA. Impacts associated with timber harvests can include changes in species composition, habitat loss, habitat fragmentation from road construction, and an increase in soil erosion.

Timber harvest activities have occurred on approximately 2,150 acres within the CEA over the past 30 to 35 years, with the most recent timber harvests, not related to mining, occurring in 1999. Timber on 532 acres of the Smoky Canyon Mine Panels B and C and external overburden storage area was harvested prior to land clearing in 2002, and additional timber harvest activities for mining exploration in Manning Creek, Deer Creek, and Wells Canyon have also occurred over the past three years.

Grazing activities also occur throughout the majority of the CEA. Livestock grazing has and would continue to utilize the grass/forbs species, reducing competition for natural regeneration of tree/shrub species. In addition, grazing activities can result in specific, localized damage in riparian areas from vegetation removal by cattle as wells as increasing the introduction and spread of noxious and non-native vegetation species.

In terms of potential bioaccumulation of selenium in vegetation growing on potential, future reclaimed areas associated with Panels F and G, as stated in **Section 5.5**, the Proposed Action or Alternatives would not incorporate harmful amounts of selenium or trace metals in the soil of reclaimed areas due to the incorporation of BMPs into the mine and reclamation plan. Studies of the vegetation at the Smoky Canyon Mine (BLM and USFS 2002, NewFields 2005) have identified existing reclaimed areas at the mine consisting of vegetation with selenium concentration levels exceeding the acceptable thresholds (see **Section 5.10**). However, BMPs would apply to any future mining activities that would occur for Panels F and G so that the vegetation with high selenium levels would be confined to limited areas of the existing Smoky Canyon Mine. Thus, selenium content of growth medium and subsequently potential bioaccumulation by vegetation on new reclaimed areas in the CEA would not increase under the Proposed Action or future mining of phosphate and no cumulative impacts are expected to vegetation from this potential impact.

In terms of cumulative impacts to TECPS plant species, implementation of the Proposed Action and Alternatives could disturb potentially suitable habitat for one USFS sensitive species within

the CEA. No known observations of TECPS species are known to occur or have been identified within the CEA, with the exception of red glasswort that was discovered on private land along Crow Creek (Maxim 2004e), and this species would not be impacted by the Proposed Action and Alternatives. Potentially suitable habitat for starveling milkvetch that could be impacted by the Proposed Action and Alternatives represents less than <0.5 percent of the mapped potential habitat for this species in the Study Area, which encompasses 20,462 acres. Thus, the potential cumulative impact to this sensitive species would even be further lessened when taking into consideration the CEA that encompasses nearly 150,000 acres.

Regarding noxious weeds, past and present surface disturbances (i.e. roads, mining and exploration activities, grazing, and private land development) have introduced and increased the susceptibility for the establishment of noxious weeds in the CEA. Adding the proposed increase in additional new surface disturbance within the CEA from implementing the Proposed Action and Alternatives would have a cumulative effect on increasing the amount of disturbed acres susceptible to noxious weed invasion. However, improved prevention measures and control/treatment requirements would limit this overall cumulative effect within the CEA.

5.7 Wetlands

CEA Boundary
The CEA boundary for wetlands (**Figure 5.4-1**) is the same as described for surface water (**Section 5.4**).

Rationale: Wetlands are supported by surface water and near-surface groundwater. This delineation incorporates natural watershed boundaries including all past, present, and reasonably foreseeable phosphate mining and transportation-related disturbances upstream of Stump Creek, the Salt River, and Timber Creek. Wetland resources should not be significantly affected by the Project beyond this area.

Cumulative Effects

According to CNF, GAP, and NWI data/coverages, approximately 4,400 acres of wetlands occur with the CEA. Impacts to most wetlands within the CEA have most likely occurred mainly through mining and road building activities. The principal impact to wetlands within the CEA occurred as a result of the construction of the Smoky Canyon Mine Tailings Pond (TP2). The completed facility disturbed a total of 137 acres of wetlands. This total includes 17 acres of saline springs previously located near the confluence of Tygee and Roberts Creeks. As part of the Corps approval process, Simplot was required to provide onsite and off-site mitigation for this loss of wetlands.

Other disturbance to wetlands in the CEA has included approximately 1.5 acres of wetland impacts from fill placement and road crossings associated with mining activities at Pole Creek and Sage Creek (BLM and USFS 2002) and less than one acre of wetland disturbance from Panels B and C mining activities. Some additional wetland impacts, although unknown, likely have or are likely to occur from road maintenance, livestock grazing, and other activities, such as those conducted on private lands within the CEA.

In addition to these past impacts, implementation of the Proposed Action or Alternatives could result in a maximum disturbance of approximately three acres of wetlands depending upon

which mining component and transportation alternative was selected and ultimately approved. Thus, in total, past, present, and reasonably foreseeable future disturbance could have a cumulative impact of approximately 143 acres of jurisdictional wetlands in the CEA. This represents approximately 3 percent of the estimated wetlands in the CEA.

Although approximately 3 percent of wetlands in the CEA either have or could be disturbed, compensatory mitigation by the Corps is required for most projects that impact wetlands, thus this would greatly reduce or eliminate a potential net loss of wetlands.

5.8 Wildlife

CEA Boundary

The CEA boundary for wildlife species (**Figure 5.8-1**) generally includes suitable habitat for a given species within a 15-mile radius surrounding the Project Area.

Rationale: Most impacts to wildlife would occur within or immediately adjacent to the Project Area. Impacts would mostly be limited to temporary (during the life of the Project) displacement. Some individuals may be killed or permanently displaced; however, there should be no significant impacts to wildlife populations on a whole. The Project Area does not provide unique habitats that are not widely available adjacent to the Project Area, thus minimizing potential impacts related to displacement. However, for the boreal toad, a known breeding site (considered a unique habitat) was discovered in Sage Meadows and is the only known breeding site for this species within the CEA. How far individuals would displace, and the impacts of displacement on resident populations is unknown; however, given the scale of the Project, it is unlikely that any short-term or long-term, adverse impacts to wildlife species would occur beyond the identified CEA.

Cumulative Effects

Past, present, and reasonably foreseeable actions in the wildlife CEA have likely resulted in both beneficial and negative impacts, at various levels, on wildlife. Beneficial impacts related to timber harvesting would include increased foraging opportunities for species that utilize forest openings. Negative impacts would include loss of habitat, displacement, and fragmentation as a result of mining, timber harvesting, roads, private land development and agriculture, and recreation. Specific to small and less mobile wildlife species (i.e. small mammals, amphibians, and reptiles), past impacts from direct crushing and mortality by livestock, large wild ungulates, and vehicles has likely also occurred within the CEA. In addition, grazing can contribute impacts by increasing competition for forage and changes in the structure or composition of native plant communities.

The CEA encompasses approximately 452,000 acres, and approximately 65 percent (294,000 acres) is administered by the USFS. Within mainly the USFS lands in the CEA, major past and present disturbances and impacts have resulted from mining activities (approximately 5,100 acres), timber harvests (approximately 7,000 acres), recreation, existing roads/trails (estimated between 400 – 600 acres), and livestock grazing. In addition to the past and present disturbances and impacts described in **Sections 5.1** through **Sections 5.7** within the applicable CEAs, **Table 5.8-1** lists some additional USFS proposed activities that could impact wildlife habitat throughout the wildlife CEA. The remaining 35 percent (158,000 acres) of the 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.

TABLE 5.8-1 PROPOSED ACTIONS IN THE WILDLIFE CEA

PROJECT NAME	PROJECT TYPE	SCHEDULE	ACRES
Upper Dry	Timber Harvest	2005	272
Slug Creek Aspen Restoration	Forest Treatment	2005	783
Twin Creek	Timber Harvest	2006 - 2007	191
Aspen Range 1	Timber Harvest	2007-2008	250
Aspen Range 2	Timber Harvest	2008-2009	250
Boulevard/Little Elk	Timber Harvest	2009-2010	200
Lone Tree	Timber Harvest	2009-2010	150
Dairy Syncline Exploration Project	Exploration Drilling	2006	20
TOTAL	-	2005 - 2010	2,116

According to GAP and CNF data, coniferous forest, aspen, and sagebrush are the dominant vegetation types within the CEA. Riparian areas and other vegetation communities also occur throughout the CEA in lesser amounts. This diversity in habitat types allows for many wildlife species to utilize the area. The foremost impact to wildlife within the area has been habitat changes associated with mining activities, grazing, and timber harvest. Other impacts have included noise disturbance/displacement from mining, timber harvest, roads, and recreational activities.

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 will cause forest dependent wildlife to disperse in search of new areas. As stated previously in **Section 5.5**, approximately 25 percent of the timber harvests in the CNF since 1966 have occurred in the wildlife CEA and this represents approximately 15 percent of forested stands. In addition, as listed in **Table 5.8-1**, approximately 1,400 acres of proposed timber harvests are scheduled within the CEA over the next five years. In general, dispersal decreases survival rate and increases competition. Species such as elk may take advantage of new foraging areas.

In terms of mining activities exposing wildlife species in the area to potentially toxic levels of selenium, as discussed in **Section 5.5**, 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. Thus, although studies of existing mining disturbances within the Wildlife CEA have identified elevated selenium concentrations in some forage rooted in seleniferous overburden, BMPs applied to any future mining activities that would occur for Panels F and G would minimize this effect on any future reclaimed areas. Therefore, selenium content of growth medium and subsequently potential bioaccumulation by vegetation/potential forage on new reclaimed areas in the CEA would be controlled to levels complying with USFS requirements under the Proposed Action or future mining of phosphate, and thus no cumulative impacts are expected to wildlife from this potential impact.

Figure 5.8-1 Cumulative Effects Area for Wildlife, Including Special Status Species

The general effects of grazing are well documented. In general, wildlife are affected by livestock grazing due to competition for forage, direct mortality by trampling (i.e. amphibians and reptiles), and habitat removal/conversion. As described in the Canada Lynx Conservation Assessment Strategy (Ruediger et al. 2000), both domestic livestock and/or wild ungulate grazing may change the structure or composition of native plant communities. Proper rotation and stocking rates can minimize these negative effects. Recent USFS monitoring data (long and short term trends) indicate that allotments within the Project Area, specifically Sage Meadows, are within the objectives of the Allotment Management Plan and have improved. In addition, other trend studies within the Project Area have concluded that the rangelands are functioning with an upward trend.

Human presence tends to disturb many species of wildlife. Major 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. Implementing the Proposed Action and Alternatives would result in the displacement of wildlife and some forms of recreation (hiking, hunting, ATV use, etc.) from the Study Area into adjacent undisturbed areas. Thus, displacement of some forms of recreation from this Project has the potential to result in a minor cumulative impact to wildlife for the duration of the Project as a result of the past and present impacts from recreation on wildlife in the CEA when adding the impacts from this Project.

Past and present disturbances, from roads and mining activities, has resulted in fragmentation of certain wildlife populations and their habitats. Implementing the Project would result in additional fragmentation to wildlife habitat and could isolate populations of amphibians and reptiles as described in **Section 4.7.1.1.1**. Thus, a minor cumulative effect to wildlife from fragmentation impacts would potentially occur for the duration of the Project activities.

Bald eagles potentially utilize all areas within the CEA. Bald eagles are known to utilize the Crow Creek drainage during the winter months and were observed in the fall and winter months in 2002 and 2003 around the Simplot tailings ponds (the only large body of open water in the CEA). Bald eagles are likely attracted to this area by waterfowl utilizing the ponds. Past and present mining activities have likely resulted in temporary displacement of individuals within the CEA at various times as a result of noise and disturbances. Since some displacement of bald eagles into adjacent habitats would likely occur for the duration of the Project, cumulative effects are anticipated, although these effects should be negligible within the CEA.

Canada lynx, wolverine, and gray wolves also potentially utilize all areas within the CEA. Disturbance associated with activities previously identified and described in earlier sections may limit the attractiveness of the CEA to these species, which generally prefer extensive tracts of undeveloped land. Conversely, the presence of livestock may attract the gray wolf, and could result in conflicts with human activities. Impacts to mature forest and riparian areas and the large disturbances associated with the Project would decrease potential Canada lynx habitat and impact travel/linkage corridors and result in a minor cumulative effect when added to the other past, present, and reasonable foreseeable actions in the CEA. However, since disturbance associated with the Proposed Action and Alternatives, including the existing Smoky Canyon Mine, are oriented in a north-south direction and forested areas are available for reasonable movement around these areas, the overall impact to travel/linkage corridors should be minimal.

Baseline surveys and other known recorded observations (USFS 2003b) have documented that the CEA is used by at least the following CNF sensitive species: boreal owl, flammulated owl, northern goshawk, sage grouse, three-toed woodpecker, potentially wolverine, and the great gray owl. **Section 4.7** identifies potential direct and indirect impacts to these species, resulting mainly from habitat loss and displacement during mining activities at Panels F and G. Disturbance associated with mining activities, which includes the removal of mature forest habitat, snags, conifer, mixed conifer or shrubland habitats could impact all of the sensitive species known to occur in the CEA. The effects of past management activities on these species is not known. Any future management activities must meet standards and guidelines specifically developed to protect habitat for these species, thus future management activities should result in negligible to minor cumulative effects to these species.

Past actions have likely reduced the number of boreal toads in the CEA below what might have historically occurred. Implementing the Proposed Action and Alternatives would vary in the potential direct and indirect impacts that would occur, mainly from the selection of the various Transportation Alternatives. Depending upon the selected Transportation Alternative, adding these direct and indirect impacts would result in cumulative impacts to boreal toad populations that could range from negligible to moderate. Major cumulative impacts are not anticipated to the boreal toad population based upon proposed installation of pipes allowed for passage of amphibians in known amphibian habitat areas and the protection of the Sage Meadows breeding site area.

The past, present, and proposed disturbances represent approximately 4 percent (approximately 12,000 acres) of the USFS lands in the CEA. When adding the maximum potential disturbance of the Proposed Action and Alternatives (1,536 acres) to that total, the overall percent of disturbance increases to about 5 percent within the USFS lands in the CEA. Cumulative effects to wildlife are expected to be negligible to minor.

5.9 Fisheries and Aquatics

CEA Boundary

The CEA boundary for fisheries and aquatics (**Figure 5.4-1**) is the same as described for surface water (**Section 5.4**).

Rationale: This delineation incorporates natural watershed boundaries including all past, present, and reasonably foreseeable phosphate mining and transportation-related disturbances upstream of Stump Creek, the Salt River, and Timber Creek, which provide sufficient dilution to reduce impacts to below all applicable surface water quality standards. Aquatic resources should not be significantly affected by the Project beyond this area.

Cumulative Effects

The effects of mining on aquatic habitat in the CEA include a temporary reduction of the runoff contribution to Project Areas streams and the potential for increased sedimentation, which could result in a loss of spawning habitat for fish and a decrease of benthic organisms used by fish for food, and the potential for introduction of higher levels of selenium into streams by surface and subsurface flow of water in addition to that introduced with sediment. These potential water

quantity and quality impacts to the surface waters in the CEA have been previously described in **Section 5.4**. A negligible amount of potential loss in large woody debris input could also occur at locations of culvert installations.

The livestock industry has been an integral part of the CEA since human settlement of the area. Following years of grazing, livestock stocking levels have been recently decreased in order to bring numbers in line with forage production. Livestock grazing would continue to be a major land use activity within the CEA but is not expected to increase above current rates. The effect of grazing near aquatic habitats is well documented (USFS 2003b). Within the Study Area, recent USFS monitoring data (long and short term trends) indicate that allotments are within the objectives of the Allotment Management Plan and have improved. In addition, other trend studies (i.e. Stream Channel Stability and Riparian Vegetation Condition) within the Project Area and on the CNF have concluded that the rangelands are functioning with an upward trend. Thus, the cumulative effect from grazing to fisheries and aquatic resources in the CEA should be minor.

As previously reported in **Section 5.5**, according to CNF data, approximately 2,150 acres of timber harvest has occurred in the CEA (**Table 5.4-1**). Removal of trees and vegetation and associated timber harvest activities increase the potential for sedimentation into nearby aquatic environments through runoff and decreasing infiltration. Logging roads can alter water flow on the soil surface, creating impervious surfaces that concentrate runoff and increase erosion. The primary effect of these activities on the aquatic systems is increased erosion with the secondary effect of increased sediment loading in downstream surface waters. However, the 2002-2003 CTNF Monitoring and Evaluation Report (USFS 2003e) indicated that audits of 10 timber sale disturbances in the CNF showed BMPs appeared to be effective in controlling soil erosion and stream sedimentation. The monitoring report also discussed the 13 miles of new roads constructed in the CNF in the previous 5 years and described that timber sale roads were typically being built on land types capable of this use, and no road failures or unmitigated problems were reported. The report concluded that, when planned and administered properly, timber harvesting and associated roading has had little observable effects to stream water quality due to soil erosion and sedimentation. It is expected that the foreseeable future timber sales proposed for the CEA (**Table 5.4-2**) would have similar, minimal effects to soil resources and stream water quality that could ultimately have a cumulative effect on the fisheries and aquatic resources in the CEA.

Whirling disease and non-native fish issues are other past and present impacts to the fisheries and aquatic resources that have occurred or are occurring in the CEA. Regarding whirling disease, it was discovered in the Salt River drainage in the mid-1990s and was reported in Crow Creek in 2004 (personal correspondence with Louis Berg, CNF Fisheries Biologist, email dated 10/24/05). According to the Idaho Fish Health Center, most cases of whirling disease in the wild are classified as “light infections” and are not considered life threatening to adult fish. In terms of non-native fish, brook trout, rainbow trout, and brown trout are considered a threat to the Yellowstone cutthroat trout (YCT). These three non-native trout species either compete for habitat with the YCT, interbreed with native YCT, or prey on them directly (USFS 2003b).

The proposed mining activity itself is not expected to result in noticeable surface water discharges of sediment to the surface streams due to the application of BMPs that contain all runoff and sediment on the mine site. This retention of runoff from the mine disturbances would also temporarily decrease water yields to the South Fork Sage Creek and Deer Creek

watersheds. Haul/access roads are predicted to increase the sediment load in the affected watersheds as described in **Section 4.3 and Appendix 4A,** representing a potential maximum increase of 3 percent above current baseline in any of the HUC 6 watersheds with fisheries and aquatic resources, depending upon the Transportation Alternative selected and approved.

Increased levels of selenium and some trace metals in water and forage have occurred as a result of past and current mining activities and natural processes, particularly in the Pole Canyon Creek watershed. According to NewFields (2005), stream sediments above and below the existing Smoky Canyon Mine operations were sampled and analyzed in 2004. Concentrations of COPCs were greater than site-specific reference (baseline) levels at lower Smoky Creek, Lower Smoky Spring, Roberts Creek, lower Pole Canyon Creek, North Fork Sage Creek, and Sage Creek just above Crow Creek. Only cadmium and nickel in lower Pole Canyon Creek and cadmium in Lower Smoky Spring exceeded the IDEQ removal action levels established to support aquatic life. Selenium concentrations in stream sediment were different above and below the Phosphoria formation outcrop. Stream sediment selenium concentrations upstream of the Phosphoria outcrop at Smoky Creek, Pole Canyon, Sage Creek, and South Fork Sage Creek were 0.51, 0.46, 0.78 and 0.47 mg/Kg respectively. The concentrations downstream of the Phosphoria outcrop in the same streams were: 1.3, 58.1, 1.8, and 1.2 mg/Kg, respectively. These data clearly show an impact to stream sediment selenium concentrations in lower Pole Canyon Creek where the ratio downstream to upstream is about 126. For the other streams, the ratio of downstream to upstream selenium concentrations ranged from about 2.3 to 2.6. This is comparable to the ratio of selenium in stream sediment measured during the Panels F and G baseline studies at SW-NFDC-500 upstream of the Phosphoria formation (0.5 mg/Kg) and downstream at SW-DC-500 (1.3 mg/Kg) (ratio = 2.6).

During the Site Investigations for Smoky Canyon Mine, aquatic invertebrate samples were obtained from 12 locations with distributions upstream and downstream of the Phosphoria formation outcrop and the Smoky Canyon Mine (NewFields 2005). These locations were also where fish were collected. Selenium concentrations in aquatic invertebrates exceeded the background range only at Hoopes Spring and lower Pole Canyon Creek. NewFields (2005) also stated that all other COPCs were elevated in invertebrates from lower Pole Canyon Creek, probably reflecting the contribution of both water quality and sediments from lower Pole Canyon Creek.

Fish tissue samples were collected from nine stream reaches upstream and downstream of the Phosphoria formation outcrop and the Smoky Canyon Mine (NewFields 2005). Concentrations were generally similar among the locations for each COPC. The COPC concentrations in fish were generally not consistent with concentrations in stream sediment or surface water. Selenium concentrations in fish were below regional background levels except for fish in Hoopes Spring and lower Sage Creek downstream of Hoopes Spring, which is consistent with the water quality data indicating selenium in surface water, do not exceed removal action levels except at these same locations. The only samples obtained in the same stream both upstream and downstream of the Phosphoria formation outcrop and Smoky Canyon Mine operations were from Sage Creek. There was little difference in selenium concentrations in fish upstream (avg. 0.949 mg/Kg ww) and downstream (avg. 0.965 mg/Kg ww) of the Phosphoria formation, and Smoky Canyon mining operations in Sage Creek.

Covering all areas of seleniferous overburden with at least 4 feet of chert and a layer of topsoil is expected to protect surface runoff from COPCs contained in the seleniferous overburden.

Therefore, surface water quality in the Deer Creek and South Fork Sage Creek watersheds is not expected to be affected by COPCs in runoff from the mine areas.

The primary impact of the proposed mining operation on surface water and, subsequently, the fisheries and aquatic resources in the CEA would be construction of seleniferous overburden pit backfills and external overburden fills as part of Panels F and G. The permeable chert/topsoil cap used in the Proposed Action and Alternatives A through C would allow significant percolation of annual recharge water through the seleniferous overburden fills introducing COPCs into the Wells formation aquifer beneath these areas. As described in **Section 4.3**, the transport of the COPCs in the Wells formation to points of groundwater discharge at the surface is estimated to result in peak concentrations of selenium in lower Deer Creek, Crow Creek, South Fork Sage Creek, and lower Sage Creek (**Table 4.3-15**). Under these alternatives, selenium concentrations in lower Deer Creek and South Fork Sage Creek that are currently well below the surface water standard would increase to approximately twice the surface water standard of 0.005 mg/L. Lower Sage Creek between the confluence with South Fork Sage Creek and Crow Creek, which now contains total selenium above the surface water standard only during low flow conditions, would contain selenium concentrations that are estimated between 0.008 to 0.009 mg/L during all times of the year. Crow Creek immediately downstream of Sage Creek under these alternatives is estimated to be at or slightly above (0.006 mg/L) the surface water standard for selenium year-round. Dilution and attenuation in Crow Creek is expected to reduce total selenium concentrations downstream of Sage Creek to less than 0.005 mg/L before the stream leaves the CEA. Where impact analyses predict exceedances of applicable standards for selenium in groundwater and surface water, none of the above alternatives would be chosen by the Agencies without additional measures designed to limit releases.

Under Alternative D, lower Deer Creek and South Fork Sage Creek would maintain total selenium concentrations just below the surface water standard, but the added selenium load would result in increasing the selenium concentration in lower Sage Creek between South Fork Sage Creek and Crow Creek to approximately 0.007 mg/L year-round. The total selenium concentration in Crow Creek downstream of Sage Creek is estimated to be approximately 0.005 mg/L or less year-round.

It should be noted that the timeframe for the peak selenium concentrations at lower Deer Creek and South Fork Sage Creek are about 50 and 100 years, respectively. After these peaks, the concentrations are estimated to gradually decrease over periods of hundreds of years. In addition, the estimated concentrations in Sage Creek downstream of South Fork Sage Creek assume that the existing, seasonal concentrations continue unchanged. These concentrations are due to contributions of selenium from Hoopes Spring, which are attributed to leaching of selenium from the Pole Canyon Overburden Fill at the Smoky Canyon Mine. This is currently being addressed through the AOC between Simplot and the Agencies. Mitigation measures that would be employed at the Smoky Canyon Mine to reduce the selenium in Hoopes Spring are expected to reduce the estimated cumulative effects to Sage Creek from the Proposed Action and Alternatives.

Since selenium risk in aquatic biota appears to be correlated with surface water quality (NewFields 2005), the potential increase in the selenium concentrations in several of the creeks in the CEA over a period of time would subsequently likely increase the concentrations in the sediment, aquatic invertebrates, and fish in these aquatic systems and result in a cumulative effect on these resources.

In terms of cumulative impacts to populations of the YCT, according to USFS (2003b), the Palisades/Salt Yellowstone Cutthroat Trout Metapopulation is robust, with a low risk of local population extinction. In addition, USFS (2003b, Appendix D-209) further states that there is an excellent potential for this metapopulation to exist over both the short and long term even after an evaluation of threats to this population was conducted as part of the RFP. Although some direct and indirect impacts would occur as described above to this species from the Proposed Action and Alternatives, these impacts are generally expected to be minor or in some instances moderate. Therefore, when these impacts are added to the past, present, and reasonably foreseeable impacts in the CEA, cumulative effects would occur, but a determination of "May Impact Individuals or Habitat but Will Not Likely Contribute to a Trend Toward Federal Listing or Cause a Loss of Viability to the Population or Species" for the YCT would still apply.

5.10 Grazing Management

CEA Boundary

The CEA boundary for grazing management (**Figure 5.10-1**) includes the full extent of the seven allotments that are potentially impacted by the Proposed Action and Alternatives – Manning Creek Sheep Allotment, Deer Creek Sheep Allotment, Green Mountain Sheep Allotment, Sage Creek Sheep Allotment, Sage Valley Cattle Allotment, Wells Canyon Allotment, and the State section. The total area of this CEA is 25,595 acres.

Rationale: Portions of each of these allotments occur within the Direct Effects Study Area and could be impacted by the Project.

Cumulative Effects

Cumulative effects to grazing in the CEA primarily occur from mining and timber harvesting. Recreation and road building can also affect grazing but to a negligible extent compared to the other two land uses. Restrictions have been placed in the past on grazing permit holders in the CNF as a result of mining and timber sales on the affected allotments. Currently, grazing is not allowed on active mine areas, livestock trailing is limited across mine areas, and no watering is allowed in runoff detention ponds or water flowing from mine overburden seeps. No grazing is allowed in new timber plantations. The grazing permit holder is required to use only certified weed-free hay or straw on USFS lands. **Table 5.10-1** shows the past and present disturbance areas within the CEA.

TABLE 5.10-1 PAST AND PRESENT DISTURBANCE IN THE GRAZING CEA

DISTURBANCE TYPE	AREA (ACRES)
Smoky Canyon Mine	712
Mining Exploration	62
Timber Harvests	743 [1]
Roads [2]	45 (37 miles)

1 Approximately 100 acres of this area is still restricted from grazing.
2 Road width assumed to average 10 feet

Grazing is currently not approved by the USFS on the Smoky Canyon Mine, although some grazing of reclaimed areas has been reported. The mining exploration areas are reclaimed and open to grazing. The timber harvest areas within the CEA date back to the 1970s, so grazing would be allowed in these areas.

Figure 5.10-1 Cumulative Effects Area for Grazing Management

The foreseeable future disturbances within the grazing CEA, excepting the Panels F and G Proposed Action and Alternatives, includes a proposed 191-acre Timber Sale (Twin Creek) scheduled for 2006-2007.

Mining disturbance can affect a grazing allotment by directly disturbing the ground surface within the mining area. Within this footprint area, all forage vegetation is typically removed until reclamation of the disturbed area restores the forage resource. Grazing on the reclaimed areas is restricted until the agencies accept the reclamation as being ready for grazing. In addition to this temporary restriction on grazing within the mine footprint, mining disturbances and mine roads can also restrict movement of livestock within an allotment.

The combination of Panel F and G action alternatives with the greatest disturbance (Mining Alternative D with Transportation Alternative 3) would disturb approximately 1,468 acres, which is about 5.7 percent of the area within the CEA. When combined with the past, present and other foreseeable disturbances in the CEA, the total disturbance within the CEA would be about 10 percent of its area. Livestock grazing in this area would be temporarily displaced to adjacent parts of the affected allotments. The removal of the currently suitable grazing acres in the mine footprint may also result in the CNF decreasing the permitted stocking rates in the affected allotments. The Wells Canyon Allotment includes 2,163 suitable acres for sheep and is currently vacant. It could be combined with the Deer Creek Allotment or Green Mountain allotments if necessary to help accommodate the displaced grazing use from the mine disturbances. The FS would have to go through the grant priority process for the Wells Canyon Allotment, and there is no guarantee that the allotment would go to the Deer Creek or Green Mountain allotments to help accommodate the displaced grazing from the mine disturbance.

Some vegetation growing in seleniferous growth media at phosphate mines in southeast Idaho is known to bioaccumulate selenium. Consumption of selenium-enriched plants by livestock can result in selenium poisoning as the element is further concentrated in the organs of the animal. The Panels D and E of the existing Smoky Canyon Mine occur within the CEA. The Panel D area within the CEA is 320 acres, and the area of Panel E is 430 acres. This will also be the approximate final disturbance area of the existing mine within the CEA. Soil and vegetation studies on the existing reclamation areas by Simplot in support of the Panels B and C SEIS described selenium concentrations in reclamation vegetation on Panels D and E (JBR 2001c). The average vegetation selenium concentration of the test sites on Panel D was 7.1 mg/kg dw where reclamation consisted of topsoil over ROM overburden. The species-specific data for this study indicated that most of the selenium in the vegetation cover was contained in the forbs and less was contained in the grass. The average selenium concentration in reclamation vegetation over Panel E was 0.36 mg/kg dw where reclamation consisted of covering ROM overburden with chert and then salvaged topsoil. The IDEQ removal action level for selenium in vegetation for protection of wildlife and livestock is 5 mg/kg dw (IDEQ 2004a). None of the other COPCs investigated in this study exceeded their respective removal action levels.

Simplot studied the chemistry of vegetation at the Smoky Canyon Mine again in 2004 for the CERCLA site Investigation (NewFields 2005). These studies indicated that reclamation vegetation in Panel D that was growing in 12 inches of topsoil had average selenium contents of just over the removal action level (5.7 mg/kg dw). The vegetation growing in the Panel A and Pole Canyon Overburden Fill areas had mean selenium concentrations of 20.2 mg/kg dw and 9.9 mg/kg dw respectively. The average selenium content of the Panel E reclamation vegetation was less than 5 mg/kg dw. There were also limited areas of elevated selenium concentrations in terrestrial vegetation growing in the two seleniferous seeps at Panel E and one such seep at Panel D.

Both of the past studies at Smoky Canyon Mine indicate that reclamation vegetation rooted in salvaged topsoil over a chert cap has selenium concentrations at or below background and well below the IDEQ removal action level. The proposed Panel F and G mine activities and all mining alternatives within the CEA would conform to BMPs proposed to mitigate bioaccumulation of selenium in reclamation vegetation by covering all seleniferous overburden with a cap of chert and salvaged topsoil (**Section 2.5**). Thus, the reclaimed mine areas of the Proposed Action and Alternatives would not add to the current area within the CEA that has elevated selenium concentrations in some reclamation vegetation (Panel D).

Presently, livestock are not permitted to graze on the reclaimed areas of the Smoky Canyon Mine until these areas area accepted by the BLM and USFS for bond release. The areas of the Smoky Canyon Mine where current reclamation vegetation has elevated selenium concentrations would need to be mitigated to bring these concentrations below acceptable levels before grazing would be allowed.

Another potential effect on grazing within the CEA is reduction in water availability. In the higher elevations of the CEA, lack of water is a limitation on potential grazing productivity. As described in **Section 4.3**, the Proposed Action and Alternatives would result in reduction or elimination of a number of isolated spring or seep water sources. If any water sources become either temporarily or permanently unavailable for stock watering due to mining, the RFP requires the mining company to supply alternate water sources in sufficient quantity, quality, and location for continued use (USFS 2003a:4-82). When added to past, present, and future activities in the CEA, there would be no cumulative effect from the separate effects to isolated water sources.

The CEA is currently roaded with a number of Forest Routes providing good access for trailing grazing animals into the allotments. The Proposed Action and Alternatives include a variety of access and haul/access roads that could be built, depending on the selected combination of alternatives. These proposed roads would not be fenced or built in a manner that would absolutely restrict crossing by livestock. No past, present, or future activity has or will affect trailing routes for livestock in the CEA; therefore, there would be no cumulative effects to those disclosed as direct effects in Chapter 4.

The use of the mine panel areas would temporarily remove them from grazing but would also present a barrier to movement of livestock across them. Panel G would largely be located in the far eastern portion of the Green Mountain Allotment and would not present a barrier to movement of animals in the rest of that allotment or the adjacent allotments in the CEA. The Panel F disturbance would bisect the Manning Creek Allotment and disturb east-west movement of animals in that allotment but would not affect movement of animals in the rest of the CEA. Simplot has indicated they would work with the permittees to provide necessary trailing access across the mine panels. It should also be noted that concurrent reclamation in the mine panels would reduce the total area closed to trailing access by livestock. No past, present or future activity has or will create movement barriers for livestock in the CEA; therefore, there would be no cumulative effects to those disclosed as direct effects in Chapter 4.

Except for specific locations with sufficient clearance under the conveyor for livestock crossing, the proposed conveyor alternative (Alternative 6) would create a linear barrier to east-west movement of livestock through the CEA from Panel G in the eastern part of the Green Mountain Allotment northeast bisecting the Deer Creek and Manning Creek allotments. It would separate the very western portion of the Sage Valley Allotment from the rest of that allotment to the east.

It would likely restrict east-west livestock movement within the Manning Creek Allotment, except at existing FS trails where there would be sufficient clearance under the conveyor. However, that area of the allotment would also be divided by the mine panels for Panel F. Grazing and trailing access to all of the affected parts of the CEA bisected by this conveyor is available from both the east and west sides of the CEA, so the cumulative effects on the CEA from the conveyor would be minor. No past, present, or future activity has or will create movement barriers for livestock in the CEA; therefore, there would be no cumulative effects to those disclosed as direct effects in Chapter 4. If the conveyor alternative was selected by the Agencies, additional crossing locations under the conveyor could be required by the FS.

The allotments in the northern portion of the CEA have been affected by introduction of noxious weeds. CNF requires that grazing, recreation, OHV travel, timber harvest, and mining activities minimize introduction of noxious weeds, but continued grazing and mining related use of the CEA does have the potential for further encroachment by noxious weeds on grazing lands.

5.11 Recreation and Land Use

CEA Boundary

The CEA boundary for recreation and land use (**Figure 5.11-1**) includes the Direct Effects Study Area, as well as the full extent of the Sage Creek and Meade Peak Inventoried Roadless Areas and a one-half mile buffer along: Crow Creek Road to the mouth of Crow Creek, Wells Canyon Road, Diamond Creek Road (Forest Route 1102) to the intersection of Timber Creek Road (Forest Route 110) and east to the Forest Service boundary along the Smoky Canyon Road. In addition, the CEA would include the full extent of the Wells Canyon Lease to the south and east from this lease to the Crow Creek Road.

Rationale: Recreation should not be significantly affected beyond this area; people recreating outside of the identified CEA would not likely be impacted by this Project.

Cumulative Effects

The CEA for recreation and land use includes approximately 102,500 acres, mostly in Idaho (**Table 5.11-1**).

TABLE 5.11-1 LAND OWNERSHIP IN THE LAND USE AND RECREATION CEA

OWNERSHIP TYPE	AREA (ACRES)	PERCENT OF CEA
U.S. Forest Service	79,291	77.2
U.S. Bureau of Land Mgmt.	1,319	1.3
State	1,614	1.5
Private	20,494	20

Public recreation is generally available on the public lands in the CEA, which amount to about 80 percent of all the land in the CEA. The public land administered by the CNF makes up about 77 percent of the land within the CEA. The recreation management plan for the CNF land in the CEA is shown in **Table 5.11-2**.

TABLE 5.11-2 CNF RECREATION OPPORTUNITY SPECTRUM FOR THE RECREATION LAND USE CEA

RECREATION OPPORTUNITY SPECTRUM	AREA (ACRES)	PERCENT OF CEA
Roaded Modified	18,397	17.9
Roaded Natural	19,391	18.9
Semi-Primitive Motorized	27,934	27.2
Semi-Primitive Non-motorized	13,570	13.2

Enjoyment of the recreation opportunities within the CEA depends upon a reasonable degree of public access, either motorized or non-motorized as the case may be, to the various Recreation Opportunity Spectrum areas along existing roads or trails. Once the forest visitor is within the public lands, their enjoyment of the recreation depends, in part, on the relative level of introduced disturbance from other land uses, particularly in the semi-primitive areas.

A land use within the CEA that has a major effect on recreation is mining at the existing Smoky Canyon Mine. Active mining areas are off limits to public motorized access and recreation for the duration of mining and reclamation activities. Non-motorized access and recreation is allowed across mining areas except for active mine operation areas that might present a safety hazard to visitors. The currently approved Smoky Canyon Mine disturbance area includes 553 acres of private land (tailings pond) and 1,884 acres on CNF land. Visitors to the CNF adjacent to the active mining areas could notice the sight or sound of mining activities, which could detract from the recreational activity. Following completion of reclamation activities, all mine areas on CNF land would be open to recreation and should not present an ongoing distraction for recreationists.

The implementation of the Proposed Action or Alternatives could temporarily impact recreation as described above on up to 1,468 acres of CNF that are currently used for Roaded Modified and Semi-primitive Motorized recreation. The Proposed Action area does not offer unique recreational opportunities that are not also found elsewhere in the immediate vicinity. When added to the currently approved disturbance of CNF land by the existing Smoky Canyon Mine, approximately 3 percent of the CEA would be temporarily restricted from recreational use by phosphate mining.

As described in **Section 4.11**, three FS trails would be impacted by the mining components of the Proposed Action or mining alternatives. Previous mining in the CEA (Smoky Canyon Mine) has already impacted six FS trails. Following reclamation at current mines and the proposed project, impacts to trails would be minimal.

During the proposed mining operations, all disturbed areas would be open to non-motorized access except those areas where active mining operations may present a safety concern to visitors. Non-motorized access along existing trails would be allowed across all the haul/access transportation routes and most of the other mining disturbed areas. In addition, motorized access along existing public roads would not be prohibited. Upon successful reclamation of the Proposed Action or Alternatives, all disturbed areas would be available for recreation. Therefore, no long-term cumulative effects are anticipated to recreation on the public lands as a result of implementation of the Proposed Action and Alternatives.

Figure 5.11-1 Cumulative Effects Area for Recreation and Land Use

A dominant recreational use within the CEA is big game hunting. During the conductance of mining and timber harvest activities, big game would likely move to other areas with less disturbance. However, upon the cessation of timber harvest and mine land reclamation, deer and elk are likely to return to previously mined areas, mostly on the forest edge (forest to grass land) to forage. Long-term cumulative impacts to hunters are anticipated to be minimal.

5.12 Inventoried Roadless Areas

CEA Boundary

The CEA area for IRAs (**Figure 5.12-1**) includes the extent of the Inventoried Roadless Areas (IRAs) within the known phosphate mining areas on the CNF, including KPLAs in Bear Lake and Caribou Counties.

Rationale: Including all IRAs within the known phosphate mining area gives an overall, big picture approach of potential cumulative impacts to IRAs in the area.

Cumulative Effects

The CEA for IRAs encompasses approximately 161,500 acres and represents only the acreage contained in the following eight IRAs (north to south): Stump Creek, Schmid Peak, Dry Ridge, Huckleberry Basin, Sage Creek, Gannet Spring, Meade Peak, and Red Mountain. Within the CEA (eight IRAs), there are approximately 14,000 acres of KPLAs, approximately 6,300 acres of phosphate mining leases, of which approximately 1,300 acres are active leases, and 110 acres of phosphate mines. In addition, approximately 700 acres of timber harvests have occurred within the CEA (eight IRAs) and approximately 74 miles of roads and approximately 6 miles of rights-of-way exist within the CEA (eight IRAs). In addition, approximately 44 acres of temporary disturbance has occurred from phosphate exploration activities within the Huckleberry Basin IRA.

Specific to the Sage Creek and the Meade Peak IRAs, the only IRAs within the CEA that would directly be impacted by the Proposed Action or Alternatives, **Table 5.12-1** quantifies past and present disturbances within each of these IRAs. In addition to the list of disturbances in **Table 5.12-1**, other disturbances within these IRAs that are not quantifiable include impacts from livestock grazing and recreation. The greatest amounts of past and present impacts are a result of mining at the existing Smoky Canyon Mine and phosphate exploration activities in the Deer and Manning Creek lease areas. These impacts to the IRAs have largely been temporary in nature, as the majority of the disturbance caused by the exploration activities has been reclaimed.

TABLE 5.12-1 PAST AND PRESENT DISTURBANCES IN THE SAGE CREEK AND MEADE PEAK IRAS

DISTURBANCE	IRA	AREA (ACRES)
Smoky Canyon Mine	SCRA	43
Manning Creek Lease Exploration	SCRA	40
South Manning Lease Modification Exploration	SCRA	7.8
Deer Creek Lease Exploration	SCRA	20
Existing Roads	SCRA	12 (10 miles X 10' wide)
	MPRA	5 (4 miles X 10' wide)
Timber Harvests	SCRA	251
	MPRA	27

Note: The total area within the SCRA is 12,710 acres and the total area in the MPRA is 44,585 acres.

As previously described in **Section 4.11**, the Proposed Action or Alternatives would result in direct and indirect impacts to most of the roadless and wilderness attributes as many of these attributes relate to the resources described throughout this EIS. Approximately 8 percent of the SCRA and less than 1 percent of the MPRA would be impacted by the Proposed Action or Alternatives. Past and present disturbance within the SCRA totals approximately 366 acres (**Table 5.12-1**). This figure, when added to the largest potential disturbance from the Proposed Action or Alternatives, represents a cumulative impact of almost 12 percent of the total SCRA, a large portion of which has or eventually would be reclaimed.

Within the MPRA, past and present disturbance totals approximately 32 acres (**Table 5.12-1**). This figure, when added to the largest potential disturbance from the Proposed Action or Alternatives within the MPRA, still represents a cumulative impact of less than 1 percent of the total MPRA.

5.13 Visual and Aesthetic Resources

CEA Boundary

The CEA boundary for visual resources (**Figure 5.4-1**) is the same as described for surface water (**Section 5.4**) that encompasses portions of the Gannett Hills area, east of Crow Creek. This CEA includes 148,956 acres.

Rationale: The CEA boundary is selected for simplicity and the fact that vantage points from which the Proposed Action and Alternatives, and other past, present, and reasonably foreseeable disturbances that can be discerned are generally contained within these watersheds. Visual resources should not be significantly affected beyond this area, and travelers in this area are not likely to see areas beyond this CEA because of the topographic features that delineate the boundary and restrict vision.

Figure 5.12-1 Cumulative Effects Area for Inventoried Roadless Areas

Cumulative Effects

The CEA is within a region of generally north to northwest-trending mountain ranges and valleys. The most common of landforms in the area are foothills, which are cut at fairly regular intervals by small creeks and drainages. Although scenic variety exists in the topography and densities, arrangements, and colors of vegetation, no visually distinct landscapes are found in the CEA. The visual quality objectives of all CNF lands within the CEA are Modification or Partial Retention, with no areas of Retention and a small area of Preservation located in the Elk Valley area of the Gannett Hills (USFS 2003b). The VQO categories that exist within the CEA are shown in **Table 5.13-1**.

TABLE 5.13-1 CNF VISUAL QUALITY OBJECTIVES IN THE CEA

VISUAL QUALITY OBJECTIVE	AREA (ACRES)	PERCENT OF CNF IN THE CEA
Modification	55052	62
Partial Retention	33558	38
Retention	0	0
Preservation	264	<0.3

Source of information: USFS 2003b, RFP FEIS data sets

The CEA is generally not disturbed visually other than for timber harvests and mining; visual modifications have been in the form of timber cuts, roads, mining operations, range improvements, power lines, and pipelines. **Table 5.13-2** lists past and present disturbances to areas within the CEA; the largest type of disturbance is phosphate mining and exploration activity related to the existing Simplot Smoky Canyon Mine. Reclamation of the mine areas would mitigate much of the visual impact.

TABLE 5.13-2 EXISTING DISTURBANCES WITHIN THE VISUAL RESOURCES CEA

DISTURBANCE TYPE	DISTURBANCE AREA (ACRES)
Mining	2349
Mineral Exploration	62
Timber Harvests	2150
Burned Areas	483
Agriculture Areas	6018
Utilities	9 miles

Source of information: USFS 2003b, RFP FEIS data sets, Idaho GAP, Wyoming GAP

Mining activities are ongoing in Panels B, C, and E of the Smoky Canyon Mine; Panels A and D are mined out. The total permitted mine disturbance for the Smoky Canyon Mine and tailings pond is 2,437 acres. The only other mining activity that has been proposed to date in the CEA is the Panels F and G mine expansion. Exploration has occurred in the Wells Canyon Lease, but no mine plan has yet been proposed for that lease. Mining the Proposed Action could potentially add up 1,468 acres of initial disturbance to the CEA, of which all but 71 acres would be reclaimed. Reclamation would reduce the visual contrast of bare earth in the disturbed areas with adjacent forest vegetation. The reclaimed areas would be revegetated primarily with grass and forbs and patches of shrubs and trees. The reclaimed areas would still be visible but would not be as obvious a visual impact as the mining activities themselves. The total disturbed area for the Proposed Action combined with the rest of the Smoky Canyon Mine disturbance would represent about 2.6 percent of the total CEA, and the unreclaimed area for the entire mine would represent about 0.06 percent of the total CEA.

Views of the current and proposed mining activity in the CEA are blocked from the west by the Webster Range, although visitors to the higher elevation trails of the Webster Range would have views of the mining activity east of the ridge and views to the west where past mining disturbances may be noticeable. Portions of the proposed mining disturbance would be visible from locations along the Crow Creek Road, Wells Canyon Road, and from trails within the CEA. The general mine area from Smoky Creek on the north to Deer Creek on the south is a distant (about 10 miles) view for travelers on Highway 89 in Star Valley and the intervening Gannett Hills obscure most of the mine area.

The surface area of the tailings ponds (ultimate permitted area of 553 acres on private lands) has added to the permanent landscape change. The surface water-pond element was not present in the area prior to the creation of the tailings ponds. The continual expansion of these facilities will occur visually as a gradual change. There is a low level of sensitivity to this expansion due to lack of public access to views of the tailings ponds. Views from a distance are possible by recreationists or hunters on Tygee Ridge or Draney Peak.

5.14 Cultural Resources

CEA Boundary

The CEA boundary for cultural resources (**Figure 5.4-1**) is the same as described for surface water (**Section 5.4**).

Rationale: The Project should not affect cultural resources outside the Direct Effects Study Area, so the CEA was chosen mainly for simplicity purposes.

Cumulative Effects

Over thirty cultural resource inventories have been conducted within the CEA. These projects are associated with phosphate mine expansion and exploration, timber sales, utilities, land exchange, and stock pond development. These projects were completed between 1979 and 2005. The previous inventory information for the CEA was compiled from data collected for the Smoky Canyon Mine expansions and is likely not all-inclusive; even so, this information provides a general description of site types and site density found in the CEA.

These projects indicate that at least twenty known cultural resource sites are located within the CEA, including prehistoric campsites and lithic scatters, and historic sites such as a salt works facility, cabins, a sawmill, and arborglyphs (tree carvings). The prehistoric sites are generally eligible due to the paucity of sites of this type in this high elevation area. Four sites are within previous mine disturbance areas; these include one multi-component site (prehistoric and historic) on the north edge of Panel A, a historic site within Panel A, a historic site within Panel B, and another historic site within Tailings Pond 2. An additional site, prehistoric in nature, is on the north and west edge of Panel D, near Pole Canyon Creek. This site was considered eligible for the NRHP and avoidance or mitigation measures were recommended.

During the 2003 Smoky Canyon Mine Environmental Monitoring (Cunningham 2004), as required by the 2002 ROD for the Smoky Canyon Mine Panels B and C Project, it was noted that the sawmill site was destroyed.

A review of historic (pre-1950) GLO maps reveals numerous features that were historically present within the CEA including several named roads, homesteads, houses/structures, ranching facilities, ditch systems, and utility lines. The current on-the-ground status of the majority of these features has not been confirmed, but some may still exist intact and could possibly be indirectly impacted by the proposed activities.

Past, present, and reasonably foreseeable impacts to cultural resources in the CEA are the result of mining activities, timber harvesting, road development, archaeological excavation, livestock grazing, private development, and likely vandalism and artifact collection. Recreational use of the area is expected to increase four percent annually; thus increasing the potential for vandalism and/or artifact collection at sites (see **Section 3.10**). Potential historic features within the CEA may incur indirect impacts as a result of the Proposed Action or Alternatives and would constitute minor cumulative impacts when added to past and present impacts to cultural resources.

5.15 Native American Concerns and Treaty Rights Resources

CEA Boundary

The CEA for tribal treaty rights impacts is Southeastern Idaho (no figure).

Rationale: This area is chosen because it encompasses the majority of the area currently used by tribal members.

Cumulative Effects

The ability of Native Americans to practice their traditional culture in the CEA has been reduced through loss of "unoccupied lands" and degradation of the resources over time. Dams along the Snake River affected salmon runs and limited the availability of salmon for consumption. Development of open space, access restrictions, and land disposals reduced unoccupied lands for practicing tribal treaty rights. Fire suppression, grazing, mining, and timber harvest have changed the vegetation and affected water quality. The Idaho National Engineering and Environmental Laboratory (INEEL) restricted access to vast acreages of federal lands.

In recent years, however, these trends are slowly being reversed. Elk, moose, and white-tailed deer numbers have increased. Federal and State agencies are enhancing native fish and wildlife habitat. In the shift towards ecosystem management, federal land managers have reintroduced more natural processes such as fire across the landscape. These efforts to improve the condition of natural resources collectively serve to protect and begin restoration of tribal treaty rights.

The Project Area is a very small part of the CEA. Due to the distance of the Project Area from the Shoshone-Bannock reservation at Fort Hall and its location near an existing active mine, it is unlikely that the Project Area is utilized intensively for the exercise of treaty rights. As described in Chapter 4, the Project would produce a local, temporary, and negligible impact to land access by Tribal members for exercising Treaty Rights and so would present a negligible cumulative impact when added to other past, present, and reasonably foreseeable land management activities in the CEA.

The Shoshone-Bannock Tribe has requested an analysis of the direct and indirect impacts of the proposed operations on the traditional uses of the Project Area by Tribal members. To do this, a scenario was developed that would represent a typical exposure of a Tribal member to the environmental impacts of the operations. The scenario assumes an infrequent visit to the Project Area by the tribal member to hunt vegetation, small mammals, fish, and an occasional deer or elk. The Tribal member (visitor) would drive to the west side of the Project Area along the Diamond Creek Road and then hike or ride horseback eastward into the area.

During mining, the visitor could encounter an active haul/access road that would cross the countryside. This road would replace previous surface resources along the corridor with road fills, cuts, and traveled roadway. The road would be crossable at many locations to access the Forest on the other side. The natural forest environment would be impacted by the road disturbance and the appearance and noise of regular haul truck traffic on the road. Hunting traditional flora and fauna in the road corridor would not be possible, and the road disturbance would likely displace small mammals and big game in the immediate vicinity into adjacent suitable habitat. Fishing would be eliminated at any road crossings of creeks, but fishing on either side of the crossings would be possible. Culverts placed at the stream crossings would be designed to allow passage of fish so that natural upstream-downstream movement would occur.

Approaching the active mine panels the visitor would likely hear noise from the mining activity, primarily mobile equipment noise with blasting noise as described in **Section 4.2**. The mine disturbance would eliminate certain springs and other water sources (**Section 4.3**), which could affect the distribution of wildlife in the nearby areas. These would be replaced by other water sources provided by Simplot in locations off the mine panels, which could potentially attract wildlife into the vicinity of these water sources. Timber, under story vegetation, and soil would be undisturbed in the area around the active mine area, but within the mine panel footprint these resources would be removed (**Sections 4.4 and 4.5**). Wildlife would also be displaced from within the mine panel footprint area into adjacent suitable habitat (**Section 4.7**). In the area immediately adjacent to the mine area, wildlife would be disturbed by the nearby activity. Some wildlife would eventually adjust to the disturbance and would populate these areas. The degree to which small mammals and big game would be displaced in the area outside the mine footprint is uncertain.

Reclaimed or undeveloped mine panels would be crossable on foot or horseback anywhere it is safe to do so. The presence of unreclaimed pit highwalls and active mining operations could inconvenience the visitor in finding a safe route across the mining operation. After reclamation, depending on the selected mining alternative, the mine pits and highwalls would be backfilled, and overburden fills would be regraded. This would make safe crossing of the mine areas more convenient.

During mining, direct disturbance of perennial streams would be minimized so access to fishing in the undisturbed reaches would be unaffected. The mining operations would be designed with mitigation measures to minimize chemical and sedimentation impacts on aquatic plants and wildlife. Sediment increases of a few percent over background are possible in the perennial streams with potential negative impacts on fish in downstream reaches.

Concentrations of selenium may increase in South Fork Sage Creek, Sage Creek, Crow Creek, and lower Deer Creek, due to groundwater discharges, which could affect aquatic life in these streams. With the exception of lower Deer Creek, these concentrations would be within existing water quality standards established for protection of aquatic life. In lower Deer Creek, selenium

concentrations are seasonally higher than the water quality standard; this situation would be worsened by the proposed mining. The anticipated selenium concentrations in any of these streams would not present a human health hazard to the visitor unless bioaccumulation in fish could occur to the point where limitation on consumption of the fish would be advisable. This is more likely for chronic consumption of fish by children than by adults.

After mining in specific areas, the visitor would encounter regraded pits and overburden fills that are in different stages of reclamation, ultimately leading to a condition where grass and forb coverage is restored. Depending on the final seed and plant mix selected, reclamation vegetation may contain species with traditional values. Small mammals and big game would gradually re-occupy the reclaimed mine areas. The new patterns of vegetation (forest and grassland) along the reclaimed mine panels would present new wildlife habitat patterns as well, which could result in increased use of the reclaimed areas by big game, small mammals, and raptors. Increased use by wildlife could positively affect the long-term hunting success of the visitor.

The design of the cap in areas of seleniferous overburden fills would prevent the bioaccumulation of selenium and other COPCs from the overburden in the vegetation growing on the reclaimed areas. This cap would also prevent the accumulation of COPCs in the surface water and wildlife of the immediate area, so there should be no increased toxic effects on the visitor from traditional uses of vegetation and wildlife that is hunted in the reclaimed mine areas. The only toxicological effects would be from wildlife that may consume COPCs and travel to this area from existing releases at existing mine sites.

When no longer needed, haul/access roads would be largely reclaimed to approximate natural contours and revegetated with grasses and forbs. Road fills in drainages would be removed along with any culverts and the previous stream channels and riparian vegetation would be restored. Aquatic life would eventually be re-established in any restored perennial stream channels. Access across the reclaimed road corridors for hiking or horseback riding would be fully restored with exceptions of isolated road cuts and fills that would not be fully regraded because of steep terrain. Vegetation with traditional uses, small mammals, and big game would gradually re-occupy the reclaimed road corridors.

5.16 Transportation

CEA Boundary

The CEA boundary for transportation (no figure) includes existing transportation routes into the Smoky Canyon Mine and Panel G via Highway 89 and 237 in Wyoming, including Crow Creek Road, Wells Canyon Road, Diamond Creek Road, and Georgetown Canyon Road.

Rationale: Transportation into the Project Area and adjacent terrain east of Freeman Ridge will continue to primarily be from the east via established access routes. Transportation resources should not be significantly affected outside of these major roads.

Cumulative Effects

Under the Proposed Action and all action Alternatives except Transportation Alternative 7, access to the Smoky Canyon Mine in the future would be the same as past and present conditions with no change in cumulative effects.

Under Transportation Alternative 7, the mine access to Panel G for employees and vendors would be along upgraded Crow Creek and Wells Canyon access roads. The cumulative effect of this added traffic to the existing traffic would be noticeable to residents along this access route and would lead to other environmental effects such as increased noise, dust, and possible increases in traffic accidents. The upgrading of these access roads to a wider, all season condition compared to the current status would improve access and make the roads generally safer. Increased utilization of the portion of the CNF accessed via these upgraded access roads could change recreation use patterns in the Forest.

5.17 Social & Economic Conditions

CEA Boundary

The CEA boundary for socioeconomics (no figure) includes Lincoln County, Wyoming and Bannock, Bear Lake, Bingham, Caribou, and Power Counties, Idaho. The positioning of the Simplot Smoky Canyon Mine and Don Plant fertilizer facilities in the U.S. and global phosphate rock and fertilizer markets will also be described.

Rationale: Caribou and Bear Lake Counties contain most of the southeastern Idaho phosphate mines and processing facilities. Smoky Canyon Mine employees live in Lincoln County. The Don Plant and/or its employees are located in Bannock, Bingham, and Power Counties. Simplot competes with other phosphate rock and fertilizer producers in the United States. Foreign fertilizer sources compete with U.S. producers in foreign markets.

Cumulative Effects

Because this Project is a continuation of existing mining at the Smoky Canyon Mine, implementation of the Proposed Action or Alternatives would not contribute adverse effects on public services beyond existing levels. No major changes to population, housing, employment, or private and public income would occur as a result of the Proposed Action or Mining Alternatives. Continued phosphate mining would result in future private and public income at levels approximately the same as past and present conditions. This would add to the continued economic stability within the CEA that results from multiple industries and several viable facilities within an industry. The detailed discussion of the potential direct, indirect, and cumulative economic impacts of the Proposed Action and Alternatives, including No Action, for the CEA is already contained in **Section 4.16.**

If the No Action Alternative was selected and closure of the Smoky Canyon Mine occurred, closure of the Don Plant in Pocatello would also be likely. This would result in the loss of most of the jobs at these facilities. Job loss would contribute an adverse cumulative effect by increasing the unemployment rate within the CEA, which puts a greater burden on federal, state, and county public services (i.e. unemployment wages, Medicare/Medicaid, etc.). There would be a local loss in private and public income and a wider loss in secondary income to vendors and suppliers of the closed facilities. If the Project Area were not utilized for phosphate mining, it would continue to be available for other activities such as logging, grazing, and recreation that would result in socioeconomic benefits within the CEA, but these would be minor to negligible relative to implementation of the Proposed Action.