Smoky Canyon Mine
Panels F & G Final EIS

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Chapter 5
Cumulative Effects

Cumulative effects are those impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions on the Cumulative Effects Areas (CEAs). They can result from individually minor, but collectively significant actions taken over a period of time. 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 only slightly different CEAs for some resources, CEA boundaries were left identical for the resources where it seemed reasonable and conservative to do so. The CEA boundaries are reasonably sized to prevent dilution of the cumulative effects over large areas. 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 Southeastern 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.

Introduction

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 to these resources.

Phosphate rock production generates a variety of waste streams including: maintenance wastes such as used petroleum products or hazardous wastes, trash and debris, mill tailings, and mine overburden. The existing Smoky Canyon Mine operations produce all of these waste streams, which are described in **Section 2.3**. The proposed Panels F and G operations would be an extension of the existing Smoky Canyon Mine such that the annual quantities of small volume wastes (i.e., used petroleum products, hazardous wastes from maintenance activities, and general trash) would remain approximately the same as the existing conditions. Thus, there would be no incremental change in the cumulative effects of these waste management activities from the proposed operations within the CEA. The mill tailings waste stream would continue to be disposed of within the existing tailings disposal facility at the Smoky Canyon Mine within essentially the same disturbed area as described for the existing approved mine operations. Thus there would be essentially no incremental increase in the waste management area for this waste stream within the CEA due to the proposed Panels F and G operations. The mine overburden waste stream from the Proposed Panels F and G operations would be disposed of within the proposed acreage of the mine expansion. The cumulative effects of this increased disposal area are included within the following discussion of mine disturbance areas within the CEA. All of the seleniferous portions of the expanded overburden disposal area at Panels F and G would be covered as described in Alternative D, **Section 2.6,** to minimize the environmental effects of selenium contained within the overburden.

There are several limestone claims located on public lands owned by Chemical Lime Company but their limestone production on private land near Bancroft, Idaho is out of this CEA. Other land uses within the CEA such as agriculture and forest management may disturb surface acreage but typically conform closely to the local topography and have negligible impacts on geology, mineral resources, and topography compared with phosphate mining.

Past and Present Disturbances

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, listed in **Table 5.1-1 and 5.1-2**. Of these, 12 were small underground mines that have been closed for years. The remaining 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.

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

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

TABLE 5.1-1 PAST DISTURBANCE: 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 Disturbance		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

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 Southeastern 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 Action would represent approximately 4 percent of the 1977 estimate of economic phosphate ore reserves in Southeastern 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 past phosphate mining operations in Southeastern Idaho have disturbed approximately 14,250 acres of surface or about 2.8 percent of the total CEA. The historic mining operations, which account for about two-thirds of the 28 mines, are typically not reclaimed to the same standards as today. 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.

Within the CEA, other major earth-moving activities such as construction of highways, railroad lines, dams, aggregate pits, and hard rock mines can also potentially affect geology, mineral resources, and topography. These features do exist in the CEA and have resulted in some impacts to these resources but not nearly to the degree of phosphate mining. Transportation features can disturb significant surface areas but are purposely designed to have minimal excavations in solid rock so they do not affect geology and mineralogy to a significant degree. They are also designed to have minimal cut and fill volumes so their effects on topography are not as severe as phosphate mining. There are small to moderately sized aggregate mining operations located with the CEA. They tend to only involve disturbance of unconsolidated earth materials and therefore only impact surficial deposits with minor effects on geology, mineral resources, and topography.

There is no known past oil and gas production in Southeastern Idaho. Although, a few exploration projects were drilled in the recent past, no commercial production has been indicated.

Gold and copper mining was historically important on the CNF and small-scale, gold placer mining is still practiced (USFS 2003b). A small amount of gold prospecting occurs in the CEA. There are few disturbances in the CEA for metals exploration or development.

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 PRESENT DISTURBANCE: CURRENT MINING OPERATIONS AT END OF 2004 (ACRES)

MINE	TOTAL DISTURBANCE	AREA RECLAIMED	PRESENT DISTURBANCE AS 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.

As stated above, current phosphate production remains at about 6 MMTPY. Under the No Action Alternative, phosphate production would decrease to approximately 4 MMTPY.

There is no current oil and gas production in the CNF or anywhere in Southeastern Idaho.

Foreseeable Future Disturbances

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 areas to be reclaimed and net unreclaimed areas are listed in **Table 5.1-3**.

TABLE 5.1-3 FORESEEABLE MINE DISTURBANCE AREAS (ACRES)

MINE	PERMITTED DISTURBANCE	PERMITTED AREA TO BE RECLAIMED	FUTURE NET 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.

The reasonably foreseeable disturbance (excluding Proposed Panels F and G) expected from phosphate mining activity in the CEA would be the difference in the total disturbance areas for **Tables 5.1-2** and **5.1-3**, or approximately 1,757 acres. The cumulative effect of phosphate mining disturbance from past and present activities (14,250 acres) and reasonably foreseeable activities (1,757 acres) would be approximately 3.2 percent of the CEA. The disturbance of the Agency Preferred Alternative (1,449 acres) would increase this total to about 17,456 acres or about 3.5 percent of the CEA.

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, thus creating a residual change in topography. This would be 0.06 percent of the total area within the CEA.

The total initial disturbance for the Agency Preferred Alternative would be 1,449 acres, of which 1,378 acres (95 percent) would be reclaimed. The total unreclaimed area of the Agency Preferred Alternative would be about 71 acres (parts of mine panels and haul/access roads) 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.

Mining of other phosphate mineral leases in the CEA is possible in the future and the unmined lease area comprises approximately 4.8 percent of the total area in the CEA. However, actual impacts to geology, mineral resources, and topography are site-specific to the proposed mine design within each lease.

Given the current mine ownership and rates of mining, Monsanto, including the Blackfoot Bridge project, would have more than 15 years of mine reserves. Agrium has about 11 years of reserve, and with Proposed Panels F and G, Simplot would have about 16 years of mine reserves. Several leases have delineated deposits that could be minable. The BLM does not expect to receive another mine plan submittal for several years. The Agencies have no control over which leases get mined at which time. Pending submission of mining plans for these future operations, inclusion of their impacts in this cumulative effects analysis would be speculative and premature. As such, the potential development of the Wells Canyon lease area was not included in **Table 5.1-3.** Although the Wells Canyon lease is adjacent to the Proposed Panels F and G, the Agencies have no reason to assume it will be mined in the foreseeable future. Monsanto owns this lease and Simplot has conducted phosphate resource exploration on the lease under agreement with Monsanto. At the time this cumulative impacts analysis was conducted, Monsanto had not proposed mining of the lease, Simplot had not purchased the mining rights for the lease, nor proposed to mine it.

Future oil/gas exploration and possibly production could occur in the CEA, but would have minimal effect on geology and topographic resources. An Expression Of Interest (EOI) was received by the BLM for some potential oil/gas leasing areas in Southeastern Idaho, none of which are located in the CEA. Of the lands listed in the EOI, only those recommended by the federal surface management agency (i.e., BLM or FS) will go to a competitive sale. At the sale, typically, only a portion of those lands will be bid upon. The remainder will be available for non-competitive leasing. The leasing of lands for oil and gas only conveys a right to the mineral production, but does not constitute permission to conduct activities or create disturbance. If there were to be any future oil and gas disturbance it would be analyzed under a separate NEPA document. Mineral resource development of oil/gas would not likely affect phosphate mining and future phosphate mining would have no affect on oil/gas resources in the area.

Cumulative Disturbances

The total initial disturbance for the Agency Preferred Alternative would be 1,449 acres, of which 1,378 acres (95 percent) would be reclaimed. The total unreclaimed area of the Proposed Action would be about 71 acres (parts of mine panels and haul/access roads) 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.

The Agency Preferred Alternative (1,449 acres), when combined with past and present disturbance (14,250 acres), and foreseeable future disturbance (1,757 acres), totals about 17,456acres of disturbance in the CEA.

Cumulative Effects

The cumulative result of this action when combined with other past, present, and foreseeable future disturbances in the CEA would be a total of 17,456 acres for which there is a residual change in topography following mineral development. This would be approximately 3.5 percent of the CEA.

As stated above, current phosphate production remains at about 6 MMTPY. This is expected to continue under all of the Mining Alternatives including the Proposed Action and Preferred Alternative. Under the No Action Alternative, phosphate production in the CEA would decrease to approximately 4 MMTPY.

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 Southeastern 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 Southeastern 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. Past 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 Southeastern 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 (MW 1999, IDEQ 2002c). Conservatively correlating potential selenium source area with disturbed area at historic and existing phosphate mines in the CEA results in a total area of 14,250 acres out of the total CEA area of 504,960 acres. The Agency Preferred Alternative area (1,449 acres) in Proposed Panels F and G would incorporate modern BMPs that would essentially prevent release of selenium from the ground surface following reclamation. For this reason, cumulative effects of selenium contamination from surface exposure of seleniferous overburden at Proposed Panels F and G would not occur.

Overburden fills and tailings ponds at phosphate mines can be potential sources of COPCs that can potentially contaminate surface water and groundwater. Studies conducted at existing phosphate mines west of the Webster Range in the Blackfoot River watershed have documented surface water contamination potentially caused by phosphate mines. The Smoky Canyon Mine, including Proposed Panels F and G, is located east of the Webster Range in the Salt River watershed, which is completely isolated from the Blackfoot River watershed so impacts to surface water and groundwater from the Proposed Panels F and G would not be cumulative to existing phosphate mining areas west of the Webster Range.

A comprehensive summary of applicable regional and site-specific studies on COPCs that may be present at phosphate mines in the CEA is presented in **Section 3.1.6** of this EIS.

Mining companies in Southeastern 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 Investigations for Area A (historic mining on federal lands) and Area B (the tailings impoundment on private ground) have been completed. The EE/CA was released for public review in June 2006 and an agency decision document was approved 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, or any of the Alternatives, 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 traffic 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 for long distances to humans. Noise related to access traffic and haul roads is of importance to persons along nearby public roads and in nearby residences.

Introduction

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 typical pollution sources outside the CNF may 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 not considered a concern (USFS 2003b).

Past and Present Disturbances

Air quality conditions in the CNF and the CEA are generally good to excellent (EPA 1998 as cited in USFS 2003b). Occasionally air quality in this area is affected from pollutants from upwind sources to the south and west (particularly during winter inversions). Activities within the forest including wildfires, prescribed burning, and road use produce fugitive dust, nitrogen oxides, VOCs, and CO that would be additive to the estimated emissions from the Proposed

Action. Prescribed fires on the CNF are conducted only when favorable meteorological conditions and air quality conditions exist and when State and federal ambient air quality standards will not be exceeded. Emission estimates of forest fires were provided in the CNF RFP FEIS and ranged from 62 lbs/acre for sagebrush to 822 lbs/acre for spruce/fir (USFS 2003b).

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 remain stable or increase the same amount because the dust emission rate is roughly proportional to the mining rate. Current mining dust emissions at Smoky Canyon Mine would not be added to the emissions from the projected emissions from Proposed Panels F and G because mining of Panels F and G would replace the current mining operations. Cumulative effects of dust emissions from the mines operating in Southeastern Idaho are 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. As indicated in the CNF RFP FEIS, air quality in the Forest is typically good to excellent (USFS 2003b), thus cumulative impacts to air quality from existing mining activities in the CNF are minimal.

Foreseeable Future Disturbances

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.

Other mining operations are proposed in the vicinity of the CNF (see **Section 5.1** for details). These would generate dust and exhaust emissions.

Cumulative Disturbances

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. Depending on the proximity of prescribed fires to the Proposed Action, and the prevailing wind direction, however, emissions from the fires could be additive to those from the mining operations. Smoke disperses rapidly in most cases and impacts from smoke on air quality are short-lived. It is not possible to quantify these effects in this CEA due to the uncertainty of these conditions so it is not possible to determine the cumulative effects of adding the particulate emissions from the Proposed Action to potential smoke emissions from fires. The RFP FEIS states, “Burning will be permitted only when management-caused smoke emissions combined with other residual pollutants does not create cumulative effects that could adversely affect air quality, human health, and visibility” (USFS 2003b: 4-248).

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 generally progress southward along the Simplot land position, but the mining related amounts of air emissions would stay approximately constant so the air emissions from the mining over time are not cumulative. Rather they 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 Proposed 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.

Calculations of average settling rates for dust from mining conducted for this EIS (**Section 4.2**) have indicated that most dust will settle to the ground within less than a mile from the dust emitting mining activity. The nearest present mining operation to Smoky Canyon is the Dry Valley operation approximately 11 miles away so there should not be a cumulative effect from dust emissions due to the Smoky Canyon and Dry Valley mining operations. In addition to the dust emissions from mining and transportation, the mining and haulage equipment produce gaseous emissions of NO_x, SO_2, CO, CO_2, and VOCs. These would combine with other emissions from present and reasonably foreseeable emitting sources.

Carbon dioxide (CO_2) emissions are considered to have caused a warming trend globally and could continue to do so if atmospheric levels are not reduced. Burning fossil fuels releases carbon dioxide and this would occur with the fuel burned under the Proposed Action. Because the scale of the global warming issue is so large and the release of CO_2 from fuel burning under the Proposed Action (measured in thousands of tons over the mine life) is relatively miniscule compared to the U.S. emission rate (5.9 billion metric tons in 2005 (EIA 2006)), an assessment of the effects of the operations on global climate change would be unreliable. This effect would be countered locally by CO_2 sequestration in the vegetation of the adjacent CNF and added to by any future fires in the CNF. The CNF determined in the FEIS for the CNF RFP that estimating global climate change from these effects would be unreliable (USFS 2003b). It should be noted however that the amount of gaseous emissions from the Proposed Action would be approximately the same as the current Smoky Canyon Mine operations so there would not be an increase in the effect of the operations on global climate change.

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

Regarding noise, 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 under the Proposed Action. 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.

Cumulative Effects

Considering past, present, and foreseeable future disturbances to air and noise resources combined with disturbances from the Agency Preferred Alternative to these resources, cumulative effects would be short term and negligible. The Action Alternatives are expected to maintain status of compliance with State and federal standards. Emission from Smoky Canyon Mine would move southward but only increase a small amount. Wildfire could add additional pollutants but cannot be predicted.

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 was interpreted to be permeable along the strike of the fault plane but is relatively impermeable across the fault (Maxim 2004a). Where east/west drainages cross the thrust fault, shallow groundwater movement through the alluvial wedge can move water across the fault.

The tailings pond facility is not included in the groundwater CEA because past studies have demonstrated that it is hydrogeologically isolated from the regional Wells formation 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 in the Salt Lake formation that underlies the facility (JBR 2001c, and BLM and USFS 2002). As described in the Final SEIS for the Simplot Panels B and C (BLM and USFS 2002), not only are wells GW-13 and -14 not displaying any solute chemical signature of the tailings water, their isotopic signature indicates these two wells are, “not affected by any seepage from the tailings ponds.”

Figure 5.3-1 Cumulative Effects Area for Groundwater Resources

The SEIS also describes how construction of the tailings ponds sealed off natural saline springs that used to flow into Tygee Creek and degrade its water quality with dissolved salt. The water conductivity (an indirect measurement of dissolved salt) of Tygee Creek was 2,010 umhos/cm before the tailings pond was built and 451 umhos/cm afterwards. Thus there has been a significant improvement in the water quality of Tygee Creek from the tailings disposal operations. The lack of impacts of the tailings pond facility on groundwater is controlled by the site hydrogeology, which would not be changed by the Proposed Action.

Scientific interpretation of the existing geologic information indicates it is improbable that impacts to groundwater in the Wells formation aquifer under the Proposed Panels F and G would cause cumulative impacts to the groundwater under the tailings ponds. In a similar manner, the tailings ponds is not likely to have a cumulative effect on the Wells formation aquifer from impacts predicted from the Proposed Action. Tailings from processing the ore from the Proposed Panels F and G would be disposed in the existing tailings ponds. The chemistry of the tailings from the Proposed Panels F and G would be similar to that of the past tailings already in the tailings ponds and is not expected to result in groundwater conditions at the site noticeably different than past and current conditions.

Introduction

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 are described in studies conducted for the Smoky Canyon Mine. The most recent of these studies are the Final Site Investigation Report conducted under the Forest Service authorities to investigate the release of hazardous substances under the Comprehensive Environmental Response Compensation Liability Act (CERCLA) for the Smoky Canyon Mine (NewFields 2005b), the Groundwater Modeling Report for Panels F and G (JBR 2007), 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 2001c), and the report on increases in selenium concentrations late in 2006, and early 2007 at South Fork Sage Creek (NewFields 2007a). 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 this EIS is located along South Fork Sage Creek as described by JBR (2007). Groundwater immediately south of South Fork Sage Creek has been interpreted to move toward the east and north toward South Fork Sage Creek Spring. Groundwater immediately north of South Fork Sage Creek has been interpreted to move toward the east and south toward South Fork Sage Creek Spring. The groundwater conditions north of South Fork Sage Creek are outside of the direct effects Study Area for the Proposed Action and have been the subject of the other studies described above.

Past and Present Disturbances

The most recent searches for existing groundwater withdrawals via pumping wells in the CEA were made by Maxim (2004c) and NewFields (2005b). 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). The Culinary Well pumps at approximately 100 GPM and the Industrial Well is pumped as needed to provide makeup water for the mill that cannot be satisfied from the tailings ponds. The Industrial Well capacity is approximately 1,100 GPM. 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 2002).

Hoopes Spring is located along the trace of the West Sage Valley Branch Fault and is a discharge point for groundwater from the Wells formation (Ralston 1979, JBR 2001b, NewFields 2005b). 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 2002). The selenium concentration then increased and ranged up to 0.013 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 2005b). Hoopes Spring selenium concentrations have ranged between about 0.006 and 0.019 mg/L through early 2007 (NewFields 2006b and 2007a). The surface water aquatic criterion for selenium is 0.005 mg/L.

The reason for the increased selenium concentrations at Hoopes Spring is thought to be due to the infiltration of seleniferous leachate from the Pole Canyon Overburden Fill entering the upper part of the Wells formation aquifer downgradient of the overburden and migrating south along the West Sage Valley Branch Fault (NewFields 2005b). Contribution of selenium from other parts of the Panel D and E operations is also possible.

The previous mine operations in the Panel A area of the Smoky Canyon Mine 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 2002). The groundwater standard for selenium is 0.05 mg/L.

Figure 5.3-2 Site Investigation Wells

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 2002). 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 2005b). The selenium concentration in the Culinary Well rose from 0.0158 mg/L in March 2005 to a peak of 0.0492 mg/L in June and then fell back to 0.0178 mg/L in October. Selenium concentrations in the Culinary Well increased again in 2006 and ranged from 0.0288 to 0.0431 mg/L.

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 these approved pit backfills and external overburden fill areas. This affected groundwater is not expected to discharge to the surface environment (BLM and USFS 2002). Mitigation measures introduced by Simplot and adopted by the Agencies were designed 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 gravity sorted rock drain was incorporated into the design along the drainage bottom where the coarse rock fill could continue to convey Pole Canyon Creek under the overburden. Run of mine overburden was dumped into the drainage where gravity sorting allowed large rocks to collect at the bottom of the fill and form a drain to carry the creek water. The water chemistry exiting the rock drain has contained cadmium and selenium concentrations greater than the groundwater standards for these parameters. Water with chemistry similar to that discharging from the drain outlet is apparently infiltrating into the alluvium under the overburden fill. An alluvial monitoring well located about 750 feet downgradient of the overburden fill (GW-15) indicates total selenium concentrations ranging from 0.31 to 0.66 mg/L, above the groundwater standard of 0.05 mg/L (NewFields 2005b) (**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 and designated GW-22, GW19b, and 19a, respectively are located on the eastern side of Sage Valley in alluvium associated with the Tyghee hills. GW19a is a piezometer and was not installed for the purpose of assessing water quality. GW-22 was placed in the alluvial fan associated with Pole Canyon Creek in August 2004. Alluvial groundwater sampled at GW-22 found selenium in groundwater that exceeded Idaho's groundwater standard when constructed and sampled in 2004. Groundwater monitoring on the eastern edge of Sage Valley found background concentrations in GW-19b. 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 2005b). Another Wells formation monitoring well installed along the trace of the thrust fault east of Panel E and north of Hoopes Spring (GW-18) indicated selenium concentrations ranging from 0.004 to 0.006 mg/L. These values were found to be below the groundwater standard, and they were also lower than the values measured in discharge at Hoopes Springs. It is uncertain if GW-18 monitors the flow path between Pole Canyon and Hoopes Spring in the fault zone.

NewFields interpretation of the data collected during the Smoky Canyon Site Investigation indicates that selenium and other COPCs are leached from the Pole Canyon overburden fill, primarily through the action of seasonal wetting in the lower portion of the overburden during high runoff events followed by gradual drainage of generated leachate to the drain. Little consideration was given for precipitation infiltrating through the fill surface. This leachate combines with other stream flow in the drain exiting to the Pole Canyon stream channel downstream, percolating into the associated shallow alluvial aquifer, and deeper into the underlying Wells formation aquifer. Some contaminated groundwater in the alluvium migrates down gradient into Sage Valley.

Contaminant concentrations were measured in GW-15 above the Idaho Groundwater Rule standards, and additionally at GW-22. Groundwater sampled at three discrete intervals in GW-22 indicated a stratification of infiltrating water. Samples collected at approximately 20 feet and again at 220 feet showed impacts from the existing mine but selenium concentrations were less than the Idaho groundwater standard (0.050 mg/l). At 90 feet, the selenium concentration was 0.080 mg/L or above the Idaho groundwater standard.

Another fraction of contaminated alluvial groundwater is believed to enter the Wells formation where it contributes to the regional aquifer. Deeply infiltrating groundwater is thought to flow east toward the West Sage Valley Branch Fault and then southward where a substantial portion discharges at Hoopes Spring. It should be noted that the Pole Canyon overburden fill hydrogeological setting is a unique feature at the Smoky Canyon Mine. This valley fill likely represents the worst known condition at Smoky Canyon Mine and is not repeated anywhere else at the mine.

Groundwater quality in the Wells formation aquifer downgradient of the Pole Canyon overburden lies up gradient of predicted groundwater quality effects from the Proposed Panels F and G. Groundwater from south of South Fork Sage Creek is thought to discharge at South Fork Sage Creek spring before it can mix with groundwater from the Pole Canyon area. Alluvial groundwater in Sage Valley may discharge into gaining reaches of Sage Creek and further downgradient in the valley. Additional investigation will be necessary to determine the fate of the alluvial groundwater in Sage Valley.

Impacts to groundwater, from the existing Smoky Canyon Mine, are not expected to continue in perpetuity because Simplot entered into an AOC with the Forest Service and their supporting regulatory agencies (EPA, and Idaho Department of Environmental Quality) to investigate and develop treatment alternatives to address contaminant releases from the mine. As mentioned previously, Site Investigations for Area A (historic mining on National Forest System (NFS) lands) and Area B (the tailings impoundment on private ground) have been completed. The EE/CA for Area A was released for public review in June 2006. A subsequent letter from the Forest Service constrained the application of the EE/CA to the Pole Canyon removal alternative. The Forest Service approved portions of a removal action plan described in the EE/CA for the Pole Canyon overburden fill to divert water from upper Pole Canyon creek around the wasterock embankment in an effort to reduce downstream surface water quality impacts. This action is expected to eventually reduce contaminant levels in Hoopes Spring. An effective improvement in water quality emerging from Hoopes Spring would result in reductions in selenium concentrations in lower Sage Creek downstream. **Appendix 2A** provides a description of the removal actions implemented at the Smoky Canyon Mine including the estimated effectiveness and timing.

In October 2006, ongoing CERCLA monitoring at the Smoky Canyon Mine discovered that selenium concentrations in South Fork Sage Creek, downstream of the existing Smoky Canyon Mine operations, exceed the surface water standard. Concentrations measured in October 2006 and again in January 2007 ranged from 0.0056 mg/L in October to 0.0081 mg/L in January (NewFields 2007a). NewFields conducted a review of the available data, conditions at South Fork Sage Creek Spring, and measured fluctuation in concentrations emerging from Hoopes Spring. They believe increases are explained by a combination of site-specific factors related to E-panel operations at the Smoky Canyon Mine immediately north of South Fork Sage Creek (NewFields 2007b). The Bureau of Land Management, U.S. Forest Service, and Idaho Department of Environmental Quality (collectively the Agencies) have reviewed the recent work by NewFields and agreed that it represents one possible interpretation of the available data (NewFields 2007b and **Appendix 2A**).

NewFields asserts that proposed future mine closure activities at Panel E, along with the removal actions being constructed at the Pole Canyon overburden fill, would reduce the selenium load to South Fork Sage Creek from these two sources by approximately 80 percent within 5 to 10 years after closure of the Panel E operations (NewFields 2007b and **Appendix 2A**).

In order to better understand the release, the Forest Service expects the installation of several monitoring wells to better characterize contaminant releases along subsurface flow paths. As reclamation occurs in Panel E, monitoring data should characterize the effectiveness of Panel E reclamation on South Fork Sage Creek Spring.

Foreseeable Future Disturbances

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 a reduction in flows or elimination of small, isolated seeps and springs that could have local importance to wildlife and livestock. The development of Proposed 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 affect flow at two natural seeps and springs that were described as being located very near the existing mine disturbances prior to mining (BLM and USFS 2002).

The Proposed Panel G operations would include a new 100 GPM water supply well. The area of influence of this well and its potential effect on the 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).

Impacts to groundwater under the Proposed Panels F and G could also affect surface water quality where the groundwater discharges to the surface at lower Deer Creek, South Fork Sage Creek, Books Spring, and Crow Creek. Depending on the Mining Alternative under consideration, the selenium concentrations in the groundwater would vary, as would the concentrations at these groundwater discharge points. Selenium discharged to surface streams

would be transported downstream and affected by dilution and other natural attenuation mechanisms. It would also be available for biological interactions in the aquatic environment as described in **Sections 3.1.6, 4.8,** and **Appendix 3A**. More information on the connection between groundwater in the Project Area and surface streams is included in **Sections 3.3.5** and **4.3.1** of this EIS.

As described in **Section 4.3**, the Proposed Action and mining alternatives other than Alternative D would result in selenium concentrations exceeding the surface water selenium standard of 0.005 mg/L in lower South Fork Sage Creek. Depending on the selenium attenuation in the groundwater flowpath, selenium concentrations at lower Deer Creek could also exceed the surface water standard for the Proposed Action and mining alternatives other than the Agency Preferred Alternative. As also described in **Section 4.3.1**, application of the store and release cover of Alternative D to the Proposed Action would maintain water quality of groundwater at all groundwater discharge points within applicable groundwater and surface water standards. As discussed in **Appendix 2A**, after the approved remedial actions and reclamation activities at the existing Smoky Canyon Mine are completed, the selenium concentrations in all parts of the Sage Creek watershed downstream of the mine are predicted to meet the selenium surface water standard (NewFields 2007b). Impact modeling for Panels F and G indicates that adding the predicted selenium loads from the proposed operations to Deer Creek and South Fork Sage Creek would still result in selenium concentrations in the streams below the selenium surface water standard at the times peak impacts are predicted (**Table 4.3-23**).

As discussed in **Appendix 2A**, the available data for South Fork Sage Creek Spring and fluctuating concentrations at Hoopes Spring could be explained by a combination of site-specific factors related to the existing mining operations at the Smoky Canyon Mine located immediately north of South Fork Sage Creek (NewFields 2007b). The Bureau of Land Management, U.S. Forest Service, and Idaho Department of Environmental Quality have reviewed the recent work by NewFields and agreed that it represents one possible interpretation of the available data. As shown in **Table 4.3-23,** according to the NewFields report, once the planned Pole Canyon overburden fill removal action is complete and successful, and the reclamation and remediation in the Panel E area is complete, selenium concentrations at the mouths of South Fork Sage Creek and Sage Creek and in Crow Creek downstream of Sage Creek for all of the Alternative D scenarios would be below the water quality standard of 0.005 mg/L.

Cumulative Disturbances

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 2005b). 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**). Hydrogeologic models of groundwater flow in the Wells formation south of South Fork Sage Creek Spring indicate that groundwater does not flow further north. Groundwater studies done by NewFields (2005b) 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.

Based on the available hydrogeological information for the areas north and south of South Fork Sage Creek, it appears that under typical conditions groundwater from the past and present mining operations at Smoky Canyon Mine would not mix with groundwater under the proposed Panels F and G operations. However, some mixing of these waters could occur as South Fork Sage Creek Spring discharge. The hydrogeologic modeling shows South Fork Sage Creek Spring discharges Wells formation groundwater flowing largely from the west and south of its location. Another source of groundwater from an area north of the spring may also discharge there. Underflow contributed from the upstream channel deposits and alluvium in South Fork Sage Creek is likely as an additional water source at the spring. The geographic area (footprint) of the Wells formation regional aquifer potentially affected by the Panels F and G mine proposal, with regard to water quality, is cumulative to that already and potentially impacted by the Smoky Canyon Mine.

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.

Mining operations at the Smoky Canyon Mine have impacted groundwater quality downgradient (west) of the Panel A backfill in the vicinity of the Culinary and Industrial Wells. Leachate from the Pole Canyon overburden disposal area affects groundwater quality downgradient (east) of the overburden fill. Contaminants released from Pole canyon flow south along the West Branch Sage Valley Fault to Hoopes Spring, and possibly South Fork Sage Creek Spring, where the groundwater discharges to the surface environment.

The Agency Preferred Alternative, Alternative D, would result in water quality impacts to groundwater below and downgradient (east) of the Proposed Panels F and G. The highest modeled selenium concentration in groundwater at the downgradient lease boundary was 0.032 mg/L. This concentration is above the Area Wide Risk Management action level yet below the State groundwater standard of 0.050 mg/L. Mitigation applied at Panels F and G in conjunction with the successful implementation of removal actions and reclamation at the Smoky Canyon Mine are modeled to control peak groundwater concentrations at discharge locations along South Fork Sage Creek and Deer Creek below the surface water selenium standard of 0.005 mg/L (**Section 4.3.2**).

The development of the 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 Alternatives. Alternative D (store and release cover) would reduce this effect because of the designed reduction in percolation through the cover.

Future groundwater quality in the Smoky Canyon Mine water supply 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 2002). Groundwater quality in the Wells formation aquifer affected by the development of Proposed Panels F and G would not impact water quality in the culinary and industrial wells. Groundwater in the area between about Pole Canyon and South Fork Sage Creek moves from west to east and then southward from Pole Canyon to Hoopes Spring and South Fork Sage Creek Spring. Because of this groundwater flow pattern, groundwater beneath the Proposed Panels F and G is not expected to flow north of South Fork

Sage Creek. Contaminants added to the groundwater under Proposed Panels F and G would therefore not affect the area of the current mine facilities and water supply wells.

Cumulative Effects

Because the groundwater regimes under the north and south parts of the CEA are separated by discharge at Hoopes Spring and South Fork Sage Creek Spring, the direct and indirect water quality impacts under each of these mining areas are not expected to mix and compound contaminant discharges. Because groundwater from the north and south of South Fork Sage Creek can discharge at South Fork Sage Creek Spring, there may be cumulative effects at the spring from any contamination carried in the groundwater. The contamination load from the groundwater entering the spring from north and south would be additive. **Section 4.3.2** discusses this potential effect for the Agency Preferred Alternative in the case where the predicted selenium load entering South Fork Sage Creek Spring from the proposed Panels F and G is added to the existing selenium load at the spring being contributed by existing mining disturbances to the north of the spring (**Table 4.3-22**). With a reasonable expectation that existing contaminant sources at the Smoky Canyon Mine will be remediated in the future; due to currently planned and/or approved reclamation, removal, and closure actions; projected future water quality conditions have been estimated for Hoopes Spring and South Fork Sage Creek Spring. A summary of the effect of developing Panels F and G on surface water quality, following successful reclamation, remediation, and closure actions at the existing Smoky Canyon Mine are displayed in (**Table 4.3-23**). The description, timing, and estimated effectiveness of these reclamation, removal, and closure actions are discussed in **Appendix 2A**.

The appearance of selenium above background concentration at South Fork Sage Creek Spring is a recent development. Simplot and their environmental consultant's interpretation of the monitoring data indicate most of the selenium is contributed by excavated portions of Panel E that have not yet been reclaimed, with possibly some small influence from the Pole Canyon overburden disposal area (NewFields 2007b). Currently, there is limited data related to preparation of this EIS from the Smoky Canyon Mine CERCLA efforts and from the mine environmental monitoring programs with which to draw firm conclusions regarding future impacts from Panel E to South Fork Sage Creek Spring. The final reclamation of Panel E will be under study in the ongoing CERCLA investigation. The proponent has offered a scenario, based on currently available data describing possible effectiveness and timing of reclamation at Panel E. Backfilling of Panel E would occur under any of the action alternatives presented in this FEIS and construction of the 30-acre store and release cover on Panel E is part of the Agency Preferred Alternative. There could be other scenarios. Additional monitoring data will be collected as Panel E is investigated in the CERCLA process and while Panel E is being reclaimed and potentially remediated.

As discussed in **Appendix 2A**, the available data for South Fork Sage Creek Spring and fluctuating concentrations at Hoopes Spring could be explained by a combination of site-specific factors related to the existing mining operations at the Smoky Canyon Mine located immediately north of South Fork Sage Creek (NewFields 2007b). The Bureau of Land Management, U.S. Forest Service, and Idaho Department of Environmental Quality have reviewed the recent work by NewFields and agreed that it represents one possible interpretation of the available data. As shown in **Table 4.3-23,** according to the NewFields report, once the planned Pole Canyon overburden fill removal action is complete and successful, and the reclamation and remediation

in the Panel E area is complete, selenium concentrations at the mouths of Deer Creek, South Fork Sage Creek, Sage Creek and in Crow Creek downstream of Sage Creek for all of the Alternative D scenarios would be below the water quality standard of 0.005 mg/L.

Groundwater wells at the existing Smoky Canyon Mine lie several miles north of the portion of the Wells formation aquifer located north of South Fork Sage Creek. For the reasons described in the previous section withdrawals from the culinary and industrial well would not be expected to influence groundwater availability south of South Fork Sage Creek. The proposed groundwater withdrawal for the water supply well at Panel G would remove water from the Wells formation aquifer south of South Fork Sage Creek and would not affect the groundwater availability north of South Fork Sage Creek.

The impacts to groundwater quality and quantity described above are additive within the CEA but are not interactive. The cumulative impacts would be moderate to major, local, and long-term.

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 6th HUC watershed) have such diversity in the complexity of streams, soils, geology slopes, and land use that meaningful cumulative effects are difficult to detect.

Further, in order to provide quantitative assessments of cumulative effects, for example, on selenium loading, data must be available for both the Project Area, and the downstream areas where the analysis is desired. In the case of Crow Creek and the Salt River, downstream of the areas analyzed herein, data on streamflow and selenium concentration are not available. This means that predicted Project loads cannot be quantitatively assessed in regard to their effects any further downstream than noted. **Section 4.3.2** indicates that the direct and indirect effects of the Agency Preferred Alternative on water quality in Crow Creek would comply with applicable surface water standards. Crow Creek gains flow from tributaries downstream, including the perennial Spring Creek on the east side of the CEA (**Figure 5.4-1**). This additional flow would reduce concentrations of suspended sediment and COPCs contributed to Crow Creek from the Proposed Action. Just downstream from the CEA, Crow Creek enters the main stem of the Salt River, which would result in further decreases in concentration of COPCs

contributed from the Proposed Action. Qualitatively, it can be reasonably assumed that, as the Project water quality effects move downstream into larger watersheds with greater stream flow, dilution continues to further reduce effects. Therefore, surface water resources should not be significantly affected by the Proposed Action beyond this CEA.

Introduction

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 five miles downstream (northeast) of Tygee Creek.

The existing mine Panels D and E are located adjacent to 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 eight 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 and eastern portions of the CEA are outside of this direct effects Study Area. The northern portion of the CEA includes the Tygee Creek watershed that contains the existing Smoky Canyon tailings facility and much of the existing mine disturbance. The eastern portion of the CEA includes the Spring Creek watershed and lower Crow Creek downstream of Spring Creek.

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 the CEA. In Wyoming, the Bridger-Teton National Forest holdings comprise most of the Spring Creek watershed which drains into Crow Creek about five miles upstream of the Salt River.

Past and Present Disturbances

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.

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

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 recently approved 2002-2003 Integrated 303(d)/305(b) Report (IDEQ 2005b), which contains the 2002-03 303(d) list, includes several stream segments within the CEA. Sage Creek is listed for selenium impairment. Smoky Creek, Draney Creek, and North and South Forks of Deer Creek, and the main stem of Deer Creek above South Fork Deer Creek are listed as impaired due to sediments and habitat alterations. Draney Creek is also listed for pathogens. As discussed in **Section 4.3.2**, IDEQ has stated that the predicted selenium and sediment impacts associated with the Agency Preferred Alternative would be allowed in 303(d) listed stream segments so long as beneficial uses are not further impaired, and BMPs and effectiveness monitoring are implemented.

IDEQ described water quality conditions in Sage Creek in the Final 2003 Supplement to 2001 Total Maximum Daily Load Baseline Monitoring Report (IDEQ 2004b). 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 (NONE)	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 2003d). 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 2 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 ten 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 2003d). 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. The recently approved 2002-2003 Integrated 303(d)/305(b) Report (IDEQ 2005b), listed reaches of Smoky Creek, Draney Creek, and Deer Creek as impaired due to sediments.

Regarding sediment impacts to surface waters, 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- 2006 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 160 mg/L) and in lower Tygee Creek TSS ranged from non-detectible to 28 mg/L (TRC Mariah 2004; NewFields 2006; Tegtmeyer 2006).

Existing timber harvest areas within the CEA have been stabilized with vegetation and the roads have been closed and most have been reclaimed. The effects of the existing natural conditions and forest management activities on water quality in the CNF portion of the CEA are described in the CNF RFP FEIS (USFS 2003b, pages 3-152 to 3-157). All 6th Order HUC drainages in the CNF portion of the CEA were evaluated for geomorphic integrity, water quality integrity, and watershed vulnerability. Although these evaluations were based upon limited field data, they can provide some useful information regarding watershed condition. All drainages, except two, were rated moderate in geomorphic integrity, which relates to the degree that existing disturbance compromises soil-hydrologic function of stream resilience. Deer Creek and Upper Crow Creek (upstream of Clear Creek) were both rated as having high geomorphic integrity. The Proposed Panels F and G would not affect the rating for upper Sage Creek watershed, but likely would reduce the rating for Deer Creek from high to moderate.

All drainages in the CNF part of the CEA, which accounts for 71 percent of the CEA (see **Table 5.4-1**), were rated with regard to their water quality integrity. Again, Deer Creek and upper Crow Creek were rated high in water quality integrity, meaning no segments were damaged by physical, chemical, or biological impacts such that any resource value appears to be seriously degraded. The majority of the rest of the 6th Order drainages in the CEA were rated moderate for this metric meaning less than 20 percent of segment miles are damaged such that resource

values appear to be seriously degraded. The upper Sage Creek and upper Spring Creek watersheds were ranked low in this rating meaning more than 20 percent of segment miles are damaged such that resource values appear to be seriously degraded. The Proposed Panels F and G would not affect the rating for upper Sage Creek watershed but likely would reduce the rating for Deer Creek from high to moderate or low.

All the drainages in the CNF part of the CEA were rated with regard to watershed vulnerability. All drainages but one were rated moderate meaning 20 to 50 percent of the watersheds are in sensitive lands. Sensitive lands are areas where disturbances pose a high probability of degrading watershed soil-hydrologic function. The upper Tygee Creek watershed was rated as having low watershed vulnerability meaning less than 20 percent of the watershed is in sensitive lands. The Proposed Panels F and G would not affect the rating for upper Sage Creek watershed but likely would reduce the rating for Deer Creek from high to moderate or low. The Proposed Panels F and G would not affect this rating for the affected watersheds.

Effects of potential wildfires and prescribed burn activities on the watersheds in the CEA were described in the CNF RFP FEIS (USFS 2003b). Short- and long-term effects of fire usually result in increased erosion associated with vegetation loss and this can affect associated stream channel characteristics and water quality. The extent and duration of these potential impacts are dependent on fire intensity. No prescribed burns are planned within the CEA at this time and wildfire effects in the CEA cannot be reliably evaluated and are thus not considered for this analysis.

Use of and impacts from existing roads in the CEA have been described in **Sections 4.15** and **4.3** of this EIS. Effects of existing roads on the CNF portion of the CEA are included in the 6th Order watershed ratings described previously.

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 2005b). 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 Site Investigation 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	

Note: This table only includes data collected during the Site Investigation in 2003-2004.

Five water quality samples obtained from Smoky Creek above and below the Smoky Canyon Mine operations indicated that selenium concentrations were below detection in all samples.

Three water quality samples obtained from Tygee Creek above and below the tailings ponds indicated that selenium concentrations were below detection for all upstream and two of three downstream samples. The third downstream sample had a selenium concentration at 0.002 mg/L, which is just above detection limits and well below the surface water standard of 0.005 mg/L.

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 five sites downstream of the overburden (**Figure 5.3-2**). 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 2004a) 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 during the site investigations 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 during the Site Investigation ranged from 0.0067 to 0.15 mg/L total selenium. It averaged 0.011mg/L total selenium and was on a generally increasing trend. No other COPCs exceeded either IDEQ monitoring action levels or surface water quality criteria in Hoopes Spring.

The total selenium concentrations in the 22 samples obtained from Lower South Fork Sage Creek at monitoring site LSS prior to fall of 2006 ranged from less than 0.001 mg/L to 0.003 mg/L and averaged 0.0017 mg/L. The selenium concentration at LSS was 0.0056 mg/L in October 2006 and 0.0081 mg/L in January 2007. This is an increase over the long-term average and is currently attributed by Simplot and NewFields to increased infiltration of precipitation through disturbed areas at the nearby Panel E mining operations. They assert that a portion of the discharge is attributable to the same source as the Hoopes Spring contamination. Simplot and NewFields believe approved mine reclamation and closure activities are predicted to decrease the selenium concentrations at South Fork Sage Creek by about 80 percent (NewFields 2007b and **Appendix 2A**). Further investigation of this release is anticipated under the current CERLA investigation and subsequent remedial investigation and feasibility study.

Prior to 2005, available data indicate that none of the COPCs were present in concentrations above the surface water standards in Sage Creek upstream of its confluence with Hoopes Spring (**Figure 5.3-2**). Total selenium concentrations ranged from less than 0.001 to 0.0036 mg/L in Sage Creek above its confluence with Hoopes Spring. While this site was not monitored in 2005, two spring runoff samples were analyzed for total selenium; a sample collected in May 2006 had a concentration of 0.036 mg/L total selenium, and another collected in June had a concentration of 0.0089 mg/L. A sample collected in October 2006 had a concentration of 0.0012 mg/L.

During the period of record, in the Sage Creek reach between its confluences with Hoopes Spring and South Fork Sage Creek none of the COPCs other than selenium exceeded the surface water standards. Total selenium concentrations exceeded the surface water standard (0.005 mg/L) in all samples, with the highest reported value being 0.0252 mg/L in May of 2006.

Below its confluence with South Fork Sage Creek, 5 of the 18 samples taken in lower Sage Creek prior to 2005 exceeded the surface water standard for selenium with concentrations ranging from 0.003 to 0.0068 mg/L averaging 0.0047 mg/L. In the fall of 2005, selenium, was reported at 0.007 mg/L at this location. The following spring, (2006) concentrations of 0.146 mg/L and 0.0065 mg/L were reported by Simplot in May and June, respectively. An October 2006 sample had a selenium concentration of 0.0078 mg/L. IDEQ and GYC reported similar values in Sage Creek downstream of South Fork Sage Creek.

Prior to fall of 2006, it appeared that Hoopes Spring was the primary 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. The cleaner water in South Fork Sage Creek diluted selenium concentrations in Sage Creek downstream of the confluence of South Fork Sage Creek and Sage Creek. This dilution effect was less pronounced after an increase in selenium concentrations occurred in South Fork Sage Creek in the fall of 2006. Downstream of South Fork Sage Creek, 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 below its confluence with Sage Creek. Except for one sample taken in May 2006 that had a selenium concentration of 0.0054 mg/L, no samples were above the water quality standard for total selenium (0.005 mg/L).

In 2005 and 2006, a number of entities sampled area streams at various locations and times (Greater Yellowstone Coalition 2006; Greater Yellowstone Coalition and Natural Resources Defense Council 2006; IDEQ 2005; Maxim 2005a; NewFields 2006; NewFields 2007a, Tegtmeyer 2006). For the most part, these data were within the range of historical data. High flows associated with snowmelt runoff in the spring of 2006 resulted in some occurrences of greater sediment and selenium concentrations in lower Sage Creek than had been measured during previous sampling events. As described in **Section 3.3.2**, this was attributed to contributions of surface flow from Pole Canyon Creek to its confluence with Sage Creek. Selenium concentrations were measured at 0.023 mg/L in May 2006. Following the spring runoff, this surface connection ceased and the selenium concentration in lower Sage Creek dropped to approximately 0.007 mg/L in June and October 2006.

Foreseeable Future Disturbances

The two streams that would receive the largest selenium loads from the proposed mining operations are South Fork Sage Creek and Deer Creek. As the analysis in **Section 4.3.2** shows, concentrations of selenium in these two streams would be below the surface water standard, under Alternative D once remedial and closure activities at the northern portions of the Smoky Canyon Mine are complete and found to be effective. In Crow Creek downstream of Deer Creek, the selenium concentrations are estimated to fall to be one quarter of the surface water standard (**Table 4.3-22**). In Crow Creek downstream of Sage Creek, after remedial and closure activities at the Smoky Canyon Mine are effective, the selenium concentrations would be about half the surface water standard. Therefore, compliance with applicable surface water standards is predicted within Deer, South Fork Sage, lower Sage, and Crow Creeks for the Agency Preferred Alternative. Further, flow downstream in Crow Creek would reduce the selenium concentrations in surface water due from attenuation, dilution and interaction with stream aquatic chemistry factors such as vegetation and substrate. Bioaccumulation of selenium in the aquatic habitat could occur and this is discussed further in the Fisheries and Aquatics **Sections 4.8** and **5.9**.

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. The environmental effects of this mine expansion were evaluated in the Panels B and C SEIS (BLM and USFS 2002). As described in the SEIS, surface water impacts from Panels B and C would occur in the Smoky Creek drainage, which is tributary to

Tygee Creek and Stump Creek. These streams are within the surface water CEA for Proposed Panels F and G, but are in a separate watershed from Sage Creek, Deer Creek, and Crow Creek, which contain the Proposed Panels F and G. The Tygee Creek drainage was predicted in the SEIS to experience a 2 percent reduction in watershed area and Smoky Creek was predicted to have a slight increase in turbidity.

Changes to private agricultural lands within the CEA are likely as some of these lands are converted in the future 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 cannot be evaluated for this cumulative effects analysis.

No USFS timber sales other than as a part of the Proposed Action are proposed within the surface water CEA in the current planning cycle.

Changes to transportation and recreational uses of the CEA that could noticeably impact surface water resources have not been proposed.

The Proposed Action and Alternatives would not change the current conditions in surface streams east of Crow Creek or south of Wells Canyon. 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, but this change in area would occur upstream of the existing tailings dam so there would be no new effect to Tygee Creek downstream of the dam. 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 2002). 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 west of Crow Creek and 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 2002). Turbidity values downstream of the existing mining activities were shown to be from 7 to 9 NTUs higher than upstream, but this increase above background was still low in actual turbidity values (20 NTUs or less) downstream of mining. Similar effects from the Proposed Action and Alternatives are possible in lower Sage Creek and Deer Creek, but are not expected to be noticeable in a cumulative effect in lower Sage Creek and Crow Creek.

The primary COPC impact of the Proposed Action on surface water in the CEA would be from construction of seleniferous overburden pit backfills and external overburden fills as part of Proposed 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 mining alternatives, selenium concentrations in lower Deer Creek and South Fork Sage Creek that are currently less than the surface water standard are predicted to increase. Under these conditions, the selenium concentration at South Fork Sage Creek is calculated to exceed the surface water standard of 0.005 mg/L for the range of all applicable selenium attenuations in the groundwater flow path.

To reduce water quality impacts to water resources and ensure compliance with applicable groundwater and surface water standards, the Agencies have identified Alternative D as part of the Agency Preferred Alternative.

As described in **Section 4.3.2** and **Table 4.3-22** of this FEIS, the concentrations of selenium in lower Deer Creek for Alternative D, with 15 to 25 percent attenuation, are predicted to be approximately one half the applicable surface water standard for selenium (0.005 mg/L). For South Fork Sage Creek under Alternative D, with 15 to 25 percent attenuation, the selenium concentrations are predicted to be just under the surface water standard using historic baseline conditions (**Table 4.3-22**), and about 30% less than the surface water standard for the scenario following remediation and closure of the existing selenium sources at the Smoky Canyon Mine (**Table 4.3-23**). All selenium concentrations in Crow Creek downstream of Deer Creek and Sage Creek are less than the surface water standard for Alternative D, with a range of selenium attenuation of 15 to 25 percent.

It should be noted that, under Alternative D, the timeframe for the peak selenium concentrations at lower Deer Creek and South Fork Sage Creek are about 60 and 120 years, respectively. After these peaks, the concentrations are estimated to gradually decrease over periods of hundreds of years.

Cumulative Disturbances

The existing selenium concentrations in lower Sage Creek are due to contributions of selenium from Hoopes Spring and South Fork Sage Creek Spring. These releases are thought to be the product of leaching primarily the unreclaimed Panel E and to a lesser extent attributed to leaching of selenium from the Pole Canyon Overburden Fill. Contaminant releases from the older portions of the mine are currently being addressed through the CERCLA process between Simplot and the Forest Service. A removal action alternative was implemented at the Smoky Canyon Mine to reduce the selenium discharges from the Pole Canyon cross valley fill. Consequent reductions in contaminant concentrations in Hoopes Spring could occur within 10 years. If the removal action at Pole Canyon produces the anticipated results, the contaminant reduction would reduce the estimated cumulative effects to Sage Creek from the Agency Preferred Alternative. A more detailed discussion of the removal action plans for Smoky Canyon Mine, their anticipated effectiveness in reducing selenium concentrations in Pole Canyon Creek and Hoopes Spring, and the expected time frames for these changes is included in a new **Appendix 2A** to this FEIS.

Effectively implemented mine reclamation and closure measures planned for Panel E would reduce selenium loading at South Fork Sage Creek within approximately 5 to 10 years following completion of these measures. Most of the reclamation measures for Panel E that would reduce the selenium loading have already been approved by the Agencies and are being implemented

by Simplot. The run-on diversion ditch upslope of Panel E is not in the current mine plan, so has not yet been approved by the Agencies. Some Panel E reclamation measures are contingent on the development of Panel F. The Agency Preferred Alternative in this FEIS includes the backfilling of the E-0 pit with overburden from the proposed Panel F and construction of a store and release cover over 30 acres of the Panel E overburden fill area. Again, a more detailed discussion of the reclamation and closure plans for Panel E, their anticipated effectiveness in reducing selenium concentrations in South Fork Sage Creek, and the expected time frames for these changes are included in **Appendix 2A**.

The existing plans for these removal and closure actions at the Smoky Canyon Mine are predicted to reduce selenium concentrations in Hoopes Spring, South Fork Sage Creek Spring, lower South Fork Sage Creek, and lower Sage Creek to below the surface water standard before the peak selenium concentration from the Agency Preferred Alternative would be realized at South Fork Sage Creek Spring. The addition of the selenium load from Panels F and G to the predicted future conditions in the Project Area would increase selenium concentrations to the levels described in the preceding section, and would all be less than the surface water standard.

Cumulative Effects

Under the Agency Preferred Alternative (Alternative D), effects to water quality downstream of the Proposed Action are expected to comply with all applicable water quality standards. Direct and indirect impacts of sediment and selenium to South Fork Sage Creek and Deer Creek would be minor to moderate impacts of local extent. Sediment impacts would be short-term and selenium impacts would be long-term. When these local selenium impacts are combined with downstream conditions in lower Sage Creek and lower Crow Creek the impacts would be minor to moderate and long-term. Sediment impacts to lower Sage Creek and lower Crow Creek are expected to be negligible, localized, and short-term.

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 due to the indirect effect that soil disturbance has on surface water quality from erosion and sedimentation. Soil resources would not be affected by the Proposed Action beyond these watershed areas, which include Tygee Creek, Crow Creek, upper Diamond Fork, Deer Creek, and Sage Creek. The RFP (USFS 2003a) requires that less than 30 percent of a watershed should be in a hydrologically disturbed condition, and the surface water impact analysis in **Section 4.3** showed that the mining components of the Proposed Action (or any of the 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, which would not be disturbed by the Proposed Action or Alternatives.

Introduction

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 southwest 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. 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.

Past and Present Disturbances

Past and present land uses (ground disturbances) in the CEA that could affect soils 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 2003d) indicated that audits of ten 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 five 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.

As shown in **Table 5.4-1**, the burned area in the CEA is approximately 11 acres. 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 from fire have varied 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. The 2002-2003 CTNF Monitoring Report also indirectly discussed impacts of livestock grazing on soil resources (USFS 2003d). 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. The effects on soil resources due to past and present recreation are limited to 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. Within the Tygee Creek watershed, approximately 13 acres of the Smoky Canyon Mine Panels B and C area remain as unreclaimed pit highwall. An additional 62 acres have been disturbed due to phosphate exploration programs in the Manning, Deer, and Wells Canyon leases. Excluding the Proposed Action, 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.

Selenium

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 2001a). 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 (see **Section 3.1.6**). 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 2005b). 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).

Foreseeable Future Disturbances

The reasonably foreseeable developments in the CEA are the same as those described in **Section 5.4**.

Cumulative Disturbances

Sediment from the mining components of the Proposed Action would be contained on site in designed sediment control structures and would not be cumulative with the existing baseline sediment releases unless an upset condition occurred. Sediment releases from the Transportation Alternatives 1 – 8 to streams in the CEA would range from 0.4 to 10.7 TPY. Baseline sediment releases from soil erosion for the Crow Creek watershed, which is about 43 percent of the CEA, were estimated in this EIS to be approximately 1,100 TPY (**Section 4.3.2**). Adding this range of sediment contribution to the baseline sediment release in the Crow Creek watershed alone would amount to an increase of approximately 0.04 to 1 percent. If the baseline sediment release from the rest of the CEA outside of the Crow Creek watershed were also included in this cumulative impact assessment, the percentage increase due to the Proposed Action would be decreased by more than half.

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 overburden as a thick cover over all areas of seleniferous overburden fills and then apply a layer of salvaged topsoil. 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 cover to minimize selenium

concentrations in the root zone. The thickness of this low selenium overburden layer would be a minimum of four feet thick for the Proposed Action and Alternatives A through C and over five feet thick in the cover design for Alternative D. This overburden layer would then be covered by one to two feet of native topsoil. For the Agency Preferred Alternative, the total cover thickness would be from six to seven feet. The low selenium overburden and topsoil cover 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 not be cumulative with the existing seleniferous surface areas on parts of the existing Smoky Canyon Mine.

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 (adding to the 13 unreclaimed highwalls and pit bottoms within Panels B and C). Implementation of Mining Alternative A would create approximately 17 acres of unreclaimed disturbance. 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. Compliance with the RFP suggests the effects of the (13+46=59) 59 acres of unreclaimed disturbance would have little effect on soil loss due to erosion.

Cumulative Effects

Considering past, present, and foreseeable future (i.e., grazing, recreation, and fire) disturbances to soil resources combined with the Proposed Action, cumulative effects to soil resources would be negligible.

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 vegetation was determined to be the same as that for soil because the disturbance of vegetation would result in the disturbance of the soil in the same area. Vegetation effects from the Proposed Action and Alternatives would not be noticeable beyond this area.

Introduction

Disturbance of vegetation in the CEA occurs primarily through activities related to mining, agriculture, timber harvests, grazing, wildfires, prescribed burns, and ORV use. **Table 5.4-1** indicates the acreage/disturbance of various types of vegetation from land use that has been affected in the CEA by past and present activities. The reasonably foreseeable developments in the CEA are the same as those described in **Section 5.4**. **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 (6,018 acres), which accounts for approximately 4 percent of the CEA area. According to available data, approximately 10,757

acres of past and present land uses/disturbances to vegetation have occurred within the CEA (**Table 5.4-1**). This represents approximately 7 percent of the total CEA.

Past and Present Disturbances

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 impacted 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 on approximately 62 acres 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/forb 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 well as increasing the introduction and spread of noxious and non-native vegetation species. Grazing management cumulative effects are discussed in **Section 5.10**.

Regarding noxious weeds, 10,757 acres of past and present surface disturbances (i.e., roads, mining and exploration activities, and private land development) have introduced and increased the susceptibility for the establishment of noxious weeds in about 7 percent of the CEA (148,956 acres).

Foreseeable Future Disturbances

The reasonably foreseeable developments within the CEA that could affect vegetation 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 foreseeable future timber sales or prescribed burns are proposed or planned within the vegetation CEA in the current CNF planning cycle. Wildfire effects in the CEA cannot be reliably evaluated and are thus not considered for this analysis. Forest product extraction (including fuel, posts, poles, plant gathering, and Christmas trees) would continue to impact minor amounts of forest resources throughout the CEA. 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. Impacts to vegetation resources would include changes in vegetative composition and possibly loss of vegetation in some areas; however, specific plans for such conversions are unknown and cannot be reliably evaluated.

Cumulative Disturbances

The potential new surface disturbance from the Agency Preferred Alternative (1,449 acres), added to past and present known disturbances, results in approximately 8 percent of the CEA vegetation being disturbed (12,206 acres out of 148,956). The majority of this disturbance to vegetation within the CEA is from agriculture (6,018 acres), which replaces the natural vegetation condition with either crops or managed pasture. A smaller amount of the cumulative disturbance is due to permanent roads and trails (305 acres), which permanently replace native vegetation with an exposed earth surface. The rest of the cumulative disturbance is temporary disturbance due to mining or timber harvest activities. Natural revegetation and reclamation relatively quickly reestablish vegetation to these disturbed areas, although the vegetation composition and community type is changed and modified from its pre-disturbance state.

The cumulative impact of timber harvesting related to past, present, and reasonably foreseeable future actions, including 1,449 acres associated with the Agency Preferred Alternative, would affect 4,193 acres of the CEA. Revegetation and reclamation would stabilize this area with vegetation; however, vegetation composition, structure, and community type would likely be different.

In terms of cumulative impacts to TECPS plant species, implementation of the Proposed Action and Alternatives could disturb 5.4 acres of potentially suitable habitat for one USFS sensitive species within the CEA. No 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 (5.4 acres) of the mapped potential habitat for this species in the Study Area, which encompasses 20,462 acres. There are no known occurrences of the plant in the CEA and impacts to suitable habitat are negligible, therefore there should be no cumulative impacts to TECPS plant species.

Adding the proposed increase in additional new surface disturbance within the CEA from implementing the Agency Preferred Alternative (1,449 acres) would increase the cumulative effect of disturbed acres susceptible to noxious weed invasion to about 8 percent. However, improved prevention measures and control/treatment requirements would limit this overall cumulative effect within the CEA.

In terms of potential bioaccumulation of selenium in vegetation growing on future reclaimed areas associated with Proposed 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 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 2005b) 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 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 in the CEA from this potential impact.

Cumulative Effects

Adding the Proposed Action or Alternatives disturbances to past, present, and foreseeable future vegetation disturbances, cumulative effects to vegetation in the CEA would be short term and minor due to the temporary nature of the disturbances. Generally mining would replace existing vegetation with grassland. Disturbed lands would be more susceptible to weed infestations but control measures would be implemented. About 292 acres would be reforested.

5.7 Wetlands

CEA Boundary

The CEA boundary for wetlands (**Figure 5.4-1**) is the same as described for surface water because wetlands are expected to largely occur along surface streams (**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 Proposed Action beyond this area.

Introduction

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 occurred mainly through mining and road building activities. Past and present ground disturbances in the CEA that could directly impact any wetlands are shown in **Table 5.4-1**. The reasonably foreseeable developments in the CEA are the same as those described in **Section 5.4**.

Past and Present Disturbances

The principal past and present impacts 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 USACE approval process, Simplot was required to provide off-site mitigation for this loss of wetlands.

Other past and present 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. Thus, the documented impacts to wetlands in the CEA amount to approximately 140 acres. The past construction of the Crow Creek Road, and USFS roads in Smoky Canyon, Wells Canyon, Deer Creek, and along Diamond Fork Creek have also disturbed an unspecified area of wetlands. The total area of road disturbance in the CEA is 305 acres and the actual acreage of this total that could have disturbed wetlands is undoubtedly much less, but there are no specific data allowing this impact to be quantified. The documented past and present impacts to wetlands (140 acres) amount to approximately 3 percent of the total wetlands area in the CEA.

Foreseeable Future Disturbances

Some additional wetland impacts, although not specifically described, 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. These impacts cannot be quantified due to lack of descriptive data.

Cumulative Disturbances

In addition to these past and present impacts, implementation of the Proposed Action or the Agency Preferred Alternative could result in a maximum disturbance of approximately three acres of wetlands, which would be mitigated, depending upon which Mining Alternative and Transportation Alternative were selected and ultimately approved. This proposed wetland disturbance would be approximately 0.07 percent of the total wetlands in the CEA. 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.

Cumulative Effects

Although approximately 3 percent of wetlands in the CEA either have or could be disturbed, compensatory mitigation by the USACE is required for most projects under their jurisdiction that impact wetlands, thus this mitigation would greatly reduce or eliminate a potential net loss of wetlands in general. Cumulative effects to wetland resources in the CEA would be long term and minor.

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. The wildlife CEA encompasses approximately 452,000 acres, and approximately 65 percent (294,000 acres) is administered by the USFS. This CEA boundary was chosen based upon the rationale described below.

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 Proposed Action) 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 western 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 any wildlife individuals would displace, and the impacts of displacement on resident populations is unknown; however, given the scale of the Proposed Action, it is unlikely that any short- or long-term, adverse impacts to wildlife species would occur beyond the identified CEA.

Figure 5.8-1 Cumulative Effects Area for Wildlife

Introduction

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. Past, present, and reasonably foreseeable actions in the wildlife CEA have likely resulted in both beneficial and negative impacts, at various levels, on wildlife. The foremost impact to wildlife within the area has been habitat changes associated with past and present mining activities, grazing, and timber harvest. These changes measure approximately 12,700 acres or 2.8 percent of the CEA. Other impacts that are not quantified have included noise disturbance/displacement from mining, roads, and recreational activities.

Beneficial impacts related to timber harvesting 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. Grazing in the CNF is conducted in compliance with standards and guidelines contained in the RFP (USFS 2003a).

Past and Present Disturbances

Within the CEA, major past and present disturbances (**Table 5.8-1**) 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 (grazing CEA totals 25,795 acres, not shown on table; see **Section 5.10**).

TABLE 5.8-1 PAST AND PRESENT DISTURBANCES IN THE WILDLIFE CEA

TYPE	PAST DISTURBANCE	PRESENT DISTURBANCE	TOTAL ACRES
Mining	3,195	1,905	5,100
Timber Harvests	7,000	N/A	7,000
Roads/Trails	N/A	400-600	400-600

Past and present timber harvests in the CEA have resulted in habitat changes that affect wildlife. The majority of habitat conversion is in the form of forest removal followed by reforestation with a short period of early seral conditions. This habitat conversion would cause forest-dependent wildlife using the affected areas to disperse in search of new areas. As stated in **Table 5.8-1**, approximately 7,000 acres of the timber harvests on the CNF have occurred in the wildlife CEA.

The general effects of grazing in the CNF portion of the CEA are discussed in the FEIS for the RFP (2003b). 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 Grazing CEA (**Section 5.10**), specifically Sage Meadows, are within the objectives of the Allotment Management Plan and have improved. In addition, other trend studies within the Grazing CEA have concluded that the rangelands are functioning with an upward trend.

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

Past and present disturbances from roads and mining activities have resulted in fragmentation of certain wildlife populations and their habitats, including western toads. Fragmentation effects within the CEA have not been quantified by the land management agencies. Past actions have likely reduced the number of western toads in the CEA below what might have historically occurred.

Past and present mining activities have likely resulted in temporary displacement of bald eagles within the CEA at various times as a result of noise and disturbances. 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. The Baseline Ecological Risk Assessment for the tailings ponds documented extensive sampling of water, sediment, vegetation, invertebrates, fish, and waterfowl (MFG 2003b), shrews, fox, elk, and mule deer. The risk for Bald Eagles was determined to be minimal unless they obtained greater than 50 percent of their food from the tailings ponds. Based on observations of the infrequent visitation of eagles to the tailing ponds, it was concluded that eagles were unlikely to feed at the ponds for more than a small percentage of time.

Effects of the tailings on waterfowl indicated that chromium concentrations in waterfowl tissue were typical of background levels reported in the literature cited by MFG (2003b). Selenium concentrations in livers exceeded guideline values for possibility of sub-lethal effects and were below lethal levels. Apparently successful reproduction at the ponds was observed for a variety of ducks, geese, and shorebirds. It was concluded that conservative, exposure-based risk estimates indicated marginal risk to individual birds, but the subpopulations were likely at little risk from the ponds (MFG 2003b). Potential risk of COPCs to herbivore mammals feeding on vegetation along the margins of the ponds was low. There may be vanadium risk to individual shrews and selenium risk to insectivores from selenium concentrations in terrestrial invertebrates. Risk to subpopulations of omnivores and predators that utilize the tailings facility for part of their feeding activities was low with some risk to individuals that might extensively utilize the tailings ponds for feeding. Large, mobile species such as elk, deer, and fox were at negligible risk at the tailings ponds in terms of feeding.

Foreseeable Future Disturbances

Risks from the tailings ponds, as described above, are not expected to continue into the future. As required in the Closure Plan (NewFields 2005a), Simplot has removed the adjacent habitat.

In addition to the reasonably foreseeable actions described in **Sections 5.1** through **5.7** within the applicable CEAs, **Table 5.8-2** lists some additional USFS proposed activities that could impact wildlife habitat throughout the wildlife CEA. The remaining 35 percent (158,000 acres) of the wildlife CEA occurs on private lands. Past and present actions on private land within the CEA have mainly included agriculture and grazing activities. Housing development has also occurred on the large ranches within the CEA. Specific land impacts on private lands in the CEA are difficult to quantify due to lack of specific data. Disturbance of wildlife habitat caused by these private land impacts is also not quantified with existing data, but would be an area less than the private land ownership area.

TABLE 5.8-2 REASONABLY FORESEEABLE 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

As listed in **Table 5.8-2**, 1,313 acres of proposed timber harvests are scheduled within the wildlife CEA over the next five years. The plan for future timber harvests is not affected by the location of the haul/access roads for the Proposed Action.

Cumulative Disturbances

The reasonably foreseeable disturbances due to phosphate mine expansion (1,757 acres – see Geology, **Section 5.1**) and timber harvests (1,313 acres), when added to the past and present disturbance, would increase the disturbance of USFS lands in the CEA to about 5.3 percent When the potential disturbance of the Agency Preferred Alternative (1,449 acres) is added to that total, the overall percent of disturbance increases to 5.8 percent within the USFS lands in the CEA.

Impacts to wildlife from past and proposed forest management activities, including timber harvests, were evaluated in the CNF RFP FEIS (USFS 2003b). Risk assessment results for the CNF preferred alternative on a wide variety of wildlife species indicated low risk to wildlife with the exception of moderate risk for boreal owl, great gray owl, sage grouse, and pine marten. The impacts to these same species from the Proposed Action are also low or low to moderate with the exception of flammulated owl, northern goshawk, and three-toed woodpecker, which were concluded to have moderate impacts from the Proposed Action compared to low impacts for the RFP. In general, wildlife dispersal from forest removal, whether for timber harvest only or phosphate mining, decreases survival rates of affected individuals to some degree and increases competition. The effects to specific species from forest removal related to the Proposed Action were described in detail in **Section 4.7**. Species such as elk may take advantage of new foraging areas.

Cumulative impacts to MIS species (northern goshawk, sage grouse, and sharp-tailed grouse), would occur mainly due to habitat losses from past, present, and foreseeable future habitat disturbances. Habitat impacts to northern goshawk would be the most severe of any MIS species, as forest habitat would be lost within the CEA for the long term and may increase competition in undisturbed suitable habitat within the CEA. Past, present, and reasonably foreseeable timber harvests within the wildlife CEA have and would continue to contribute to the loss of suitable habitat areas for nesting and fledging of young goshawks. Because the CNF (and hence, the CEA) is a very small portion of the total range of northern goshawk (USFS 2003b:D-132), long-term cumulative impacts to goshawk would be minor. Regarding sage grouse, cumulative impacts would be negligible, as low-elevation sagebrush most suitable for sage grouse would not be disturbed by mining. Sharp-tailed grouse are expected to occur in the CEA; cumulative impacts to sharp-tailed grouse would be negligible because the Proposed Action would not displace individuals elsewhere in the CEA.

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 (see **Sections 3.1.6** and **3.7.7**), BMPs applied to any future mining activities that would occur for Proposed 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.

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 Project Area and surrounding habitat into adjacent undisturbed areas. Thus, displacement of some forms of recreation from the Proposed Action has the potential to result in a minor cumulative impact to wildlife for the duration of the Proposed Action as a result of the past and present impacts from recreation on wildlife in the CEA when adding the impacts from the Proposed Action.

Implementing the Proposed Action 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 Proposed Action.

Bald eagles usually modify their activities and movements to avoid human disturbance (USFS 2003b:D-94), and some displacement of bald eagles into adjacent habitats in the CEA would likely occur for the duration of the Proposed Action. However, wintering bald eagles occurring along the Crow Creek drainage may be less sensitive to human disturbance as the current wintering area is along a main access route. These individuals are more likely to habituate to the increase in noise from mining. Haul trucks would not use Crow Creek Road under the Agency Preferred Alternative. After Project completion, any bald eagles displaced in the CEA by noise from mining could return to the area as habitat impacts along the Crow Creek drainage would not occur.

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 disturbances associated with the Agency Preferred Alternative would decrease potential linkage habitat for Canada lynx by about 1,449 acres resulting 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 Proposed Panels F and G. Disturbance associated with mining activities, which includes the removal of about 1,449 acres of mature forest habitat, snags, conifer, mixed conifer, or shrubland habitats, could impact sensitive species known to occur in the CEA. The effects of past management activities in the CEA 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 via habitat losses and displacement.

Implementing the Proposed Action or Alternatives would vary in the potential direct and indirect impacts to western toads, 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 western toad populations that could range from negligible to moderate and be long term. Major cumulative impacts are not anticipated to the western toad population based upon proposed installation of pipes allowing for passage of amphibians in known amphibian habitat areas and the protection of the Sage Meadows breeding site area.

Cumulative Effects

Cumulative effects to wildlife are expected to be long term and negligible to minor. Cumulative effects due to displacement of wildlife would negligible.

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 and impacts to fisheries upstream of Stump Creek, the Salt River, and Timber Creek. Stump Creek to its confluence with the Salt River and the Salt River from its confluence with Crow Creek to its confluence with Stump Creek have not been included in the CEA for fisheries because water sources outside of the CEA dominate the hydrology in the Salt River and would provide sufficient dilution to reduce selenium impacts to below all applicable surface water quality standards from potential bioaccumulation effects from the Proposed Action. Further, quantitative analysis of Stump Creek and the Salt River is not possible due to a lack of selenium data (see **Section 5.4**), although predicted selenium loads are qualitatively assessed for these areas in the text below. Cumulative impacts from the Project are expected to end at the CEA boundary, but some fish (i.e., YCT) could migrate into or out of the area: therefore the Salt River from the confluence of Crow Creek to the Palisades Reservoir is also discussed in this section. Aquatic resources should not be significantly affected by the Proposed Action beyond this area, even over the long term.

Introduction

The effects of mining on aquatic habitat in the CEA include a temporary reduction of the runoff contribution to Project Areas streams, the potential for increased sedimentation (through grazing, road construction and use from timber harvests and mining, and/or culvert installations), 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**. In addition, cumulative effects could include a negligible amount of potential loss in large woody debris input at locations of culvert installations, where roads/power lines encroach upon riparian areas, and where intermittent streams are removed due to mining.

Past and Present Disturbances

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) and is typically detrimental towards fisheries. 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.

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 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).

As previously reported in **Section 5.5**, according to CNF data, approximately 2,150 acres of timber harvest (unrelated to mining) 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 ten 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 five 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.

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. Stream sediments above and below the existing Smoky Canyon Mine operations were sampled and analyzed in 2004 (NewFields 2005b). 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 2005b). 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 (2005b) 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. In 2005 and 2006, high flows associated with snow melt runoff, particularly in the spring of 2006, resulted in some occurrences of greater sediment and selenium concentrations than had been measured during previous sampling events (see **Section 5.4**). In particular, this was noted in lower Sage Creek, and as described in **Section 4.3**, was attributed to contributions of selenium-contaminated surface flow from Pole Canyon Creek, which ceased by June 2006 and is not expected to recur due to the removal actions currently being constructed in Pole Canyon.

Fish tissue samples were collected by NewFields from nine stream reaches upstream and downstream of the Phosphoria formation outcrop and the Smoky Canyon Mine (NewFields 2005b). 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, and do not exceed removal action levels except at Hoopes Spring and lower Sage Creek downstream of Hoopes Spring. 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 (average 0.965 mg/Kg ww) of the Phosphoria formation, and Smoky Canyon mining operations in Sage Creek. In contrast to the NewFields data, most fish analyzed by Maxim (2004k and 2006) upstream of the Phosphoria formation outcrop (from North Fork Deer Creek, Deer Creek, and Crow Creek) had levels of selenium that exceeded the biological effect threshold, and many exceeded the EPA's draft chronic exposure value (7.9 mg/Kg) in both the summer of 2003 and winter of 2006 (**Section 3.8.5**). Likewise, all fish analyzed by GYC (2005) and Hamilton and Buhl (2003; see **Section 3.8.5**) from the Study Area exceeded the biological effect threshold, including fish from Smoky Creek within the CEA (not in **Section 3.8.5**), and many exceeded the EPA's draft chronic exposure value. Elevated selenium values observed in fish from the undisturbed North Fork Deer Creek and Deer Creek suggest that fish in these streams may already be affected by exposure to natural sources of selenium unrelated to mining activities.

Foreseeable Future Disturbances

In general, many activities that are occurring in the CEA are expected to continue in the foreseeable future. These activities may collectively increase sediment delivery to streams, which can adversely impact native fishes by filling gravels and interstitial spaces used for reproduction and cover. Activities that may introduce sediment include road construction, agriculture, housing developments, wildfires, and prescribed burns. Regarding timber, sales proposed within the fisheries CEA within the reasonable foreseeable future are listed in **Table 5.4-2**.

Selenium inputs in the foreseeable future would peak at lower Deer Creek and South Fork Sage Creek in 60 and 120 years, respectively. After these peaks, the concentrations are estimated to gradually decrease over periods of hundreds of years. The predicted concentrations in Sage Creek downstream of South Fork Sage Creek under the Agency Preferred Alternative and

assuming that the existing, seasonal concentrations continue unchanged are shown in **Table 4.3-22**. These concentrations are due to contributions of selenium from Hoopes Spring and South Fork Sage Creek Spring, which are primarily attributed to leaching of selenium from the Pole Canyon Overburden Fill and Panel E disturbances at the Smoky Canyon Mine respectively. Contaminant releases from the mine are being addressed through the CERCLA process between Simplot and the Forest Service, EPA and IDEQ. Remediation and reclamation measures that would be employed at the Smoky Canyon Mine to reduce the selenium in Hoopes Spring and South Fork Sage Creek Spring are expected to reduce the estimated cumulative effects to Sage Creek from the Agency Preferred Alternative to the levels shown in **Table 4.3-23**. These concentrations are below the cold-water criterion for selenium established for protection of beneficial uses.

As discussed in **Appendix 2A**, the available data for South Fork Sage Creek Spring and fluctuating concentrations at Hoopes Spring could be explained by a combination of site-specific factors related to the existing mining operations at the Smoky Canyon Mine located immediately north of South Fork Sage Creek (NewFields 2007b). The Bureau of Land Management, U.S. Forest Service, and Idaho Department of Environmental Quality have reviewed the recent work by NewFields and agreed that it represents one possible interpretation of the available data. As shown in **Table 4.3-23,** according to the NewFields report, once the planned Pole Canyon overburden fill removal action is complete and successful, and the reclamation and remediation in the Panel E area is complete, selenium concentrations at the mouths of Deer Creek, South Fork Sage Creek, Sage Creek and in Crow Creek downstream of Sage Creek for all of the Alternative D scenarios would be below the water quality standard of 0.005 mg/L.

Cumulative Disturbances

The loss of intermittent stream channel from the Proposed Action combined with intermittent channel lost in past construction activities (e.g., road building, housing development) and the expected loss of intermittent channel in the future within the CEA would decrease the overall flow and flow regulation, sediment control, nutrient delivery, and number of refugia and spawning areas during high flows, all of which impact native fishes in the CEA. Regarding perennial stream channel, past and present disturbances and fish passage structures constructed in the foreseeable future within the fisheries and aquatics CEA could collectively be migration barriers to fish during low flows or when passage construction is inadequate to pass fish. The cumulative effect of inadequate fish passage structures and reduced flows from past and present activities combined with the Proposed Action could make migration more difficult for fish that regularly move between smaller tributaries (such as within the Study Area) and larger waters such as the Salt River and Palisades Reservoir.

The Proposed Action 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.

The primary impact of the Proposed Action on surface water and, subsequently, the fisheries and aquatic resources in the CEA with regard to selenium would be construction of seleniferous overburden pit backfills and external overburden fills as part of Proposed Panels F and G. The permeable chert/topsoil cover used in the Proposed Action and Alternatives A through C would allow percolation of 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 aquifer 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. Under these alternatives with the permeable chert/topsoil cover, selenium concentrations in lower Deer Creek and South Fork Sage Creek are predicted to increase to problematic levels, depending on the amount of selenium attenuation that occurred in the groundwater flowpath. Because impact analyses predict exceedances of applicable standards for selenium in groundwater and surface water, none of the above alternatives incorporating the permeable chert/topsoil cover are approvable by the Agencies without additional measures designed to limit selenium releases.

In order to reduce the likelihood of selenium impacts from mining as much as reasonably feasible, the Agencies have identified the mining alternative that is most protective of aquatic resources from selenium contamination, Alternative D. Under the Agency Preferred Alternative, which includes Alternative D (store and release cover), groundwater quality predictions indicate that exceedances of the surface water criterion for selenium (0.005 mg/L) would not occur in any groundwater discharge downstream of the proposed mining (see **Section 4.3.1**). For the Agency Preferred Alternative under the future scenario where the remediation of existing selenium contamination of Hoopes and South Fork Sage Creek Springs was completed, selenium concentrations in Deer Creek are predicted to be about 50 percent lower than the surface water criterion that is protective of aquatic biota (**Table 4.3-22**). Crow Creek downstream of Deer Creek is predicted to have a selenium concentration that is 0.0015 mg/L or less. Including the anticipated effect of the Pole Canyon removal action and the reclamation and closure of the Panel E disturbance, lower Sage Creek selenium concentrations are predicted to be about 30 percent lower than the cold-water criterion. Crow Creek selenium concentrations downstream of Sage Creek in this case would be about half the cold-water criterion.

Regarding cumulative effects from bioaccumulation, the entire CEA can be viewed as a “mixing zone” of selenium transport and bioaccumulation in substrate and by organisms over the long term (Lemly 2002, **Appendix 3C**). From the point of infiltration into surface waters, selenium would migrate with varying rates of uptake depending on physical retention and bioavailability. As free selenium in surface waters progresses downstream, concentrations would be gradually reduced due to attenuation from dilution in selenium-free waters. With regard to bioaccumulation, however, a variety of habitats are present within the CEA, including seepage or floodplain wetlands, and other impoundments or off-channel backwater areas, in which bioaccumulation would be relatively likely and may occur. Cycling dynamics vary greatly between areas, although through deposition of biologically incorporated selenium and setting of particulate matter (sedimentation), most of the selenium reportedly accumulates in the top layer of sediment and detritus (see **Appendix 3C**). This top layer is a temporary repository for selenium until the selenium is cycled back into the biota, and is more likely to be present in slow-moving habitats such as backwaters and wetlands. In these environments, as much as 90 percent of total selenium may be found in the upper few centimeters of sediment and overlying detritus (Lemly and Smith 1987), and levels can remain at these levels after inputs have

stopped (Lemly 1997). These areas within the CEA are the most vulnerable to long-term accumulation and retention of selenium resulting from cumulative, low-level inputs into surface water. Slow-moving habitats are frequently used by juvenile salmonids, and such habitats within the CEA may be sources of selenium accumulation and associated impacts to these individuals over the long term.

Naturally occurring selenium may exacerbate any adverse impacts from selenium inputs due to mining over the long term. Winter stress syndrome (WSS) is undocumented in the CEA (discussed in **Appendix 3C**), but if WSS occurs, it could also exacerbate adverse long-term impacts from selenium inputs.

Cumulative Effects

Although it is likely that selenium impacts to YCT populations in the CEA would be minor, because of the uncertainty surrounding the life histories of fish in the CEA and the impacts of selenium on YCT in general, cumulative impacts are evaluated considering the possibility of a significant impact scenario. Even large, well-connected metapopulations are vulnerable to habitat degradation, interactions with non-natives (i.e., brown, brook, and rainbow trout), or barriers to movement isolating individual segments of the population. At least some YCT in the Study Area are thought to be migratory, residing in the Palisades Reservoir and migrating to the Study Area to spawn (see **Appendix 4B**), thus the effects from bioaccumulation could extend beyond the CEA if affected individuals from migratory populations reproduce elsewhere (i.e., other Salt River tributaries between Crow Creek and Palisades Reservoir) or disperse. Studies in other systems suggest that selenium can have serious, adverse effects on fish. Because of this, the lack of certainty associated with selenium impacts to YCT, and certain habitat impacts associated with other aspects of the Proposed Action, the evaluation of cumulative effects to native fishes are evaluated more conservatively than for other resources.

Cumulative impacts from selenium on native fishes are generally expected to be minor or in some instances moderate, as the Proposed Action would comply with surface water criteria with regard to new inputs. The surface water criteria were designed to be protective of fish. However, cumulative impacts have the possibility to be major over the short or long term in the unlikely event that unforeseen circumstances occur with regard to selenium control measures or predicting long-term bioaccumulation in native fishes in some habitats within the CEA. Monitoring of fish habitat, fish populations, and selenium levels in fish would be required with any action alternative (**Appendix 2E**). The collective impacts on fisheries in the CEA could be moderate because the implementation of BMPs in the future cannot be guaranteed.

The cumulative effect from grazing, potential migration barriers, and intermittent channel loss to fisheries and aquatic resources in the CEA would be minor. The cumulative effect of timber harvest activities would be negligible. Impacts from the Proposed Action or Alternatives would contribute to the cumulative effects upon YCT and their habitat when past, present, and foreseeable future project impacts are considered in sum. These populations are considered more susceptible to cumulative effects because of the degree of their isolation. Considering the combined effects of all past, present, and foreseeable future impacts to native fishes in the CEA, cumulative impacts to native fishes in the CEA would be long term and moderate.

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 25,795 acres.

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

Introduction

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.

Past and Present Disturbances

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. Grazing is allowed in historic timber harvest areas.

Selenium in Vegetation – Smoky Canyon Mine

Some vegetation growing in selenium bearing mine waste rock at phosphate mines in Southeastern 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

Figure 5.10-1 Cumulative Effects Area for Grazing Management

Panels B and C SEIS described selenium concentrations in reclamation vegetation on Panels D and E (JBR 2001a).

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 2005b). 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 cover has selenium concentrations at or below background and well below the IDEQ removal action level. 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 remediated to bring these concentrations below acceptable levels before grazing would be allowed.

Foreseeable Future Disturbances

The foreseeable future disturbances within the grazing CEA, excepting the Proposed Action and Alternatives, includes a proposed 191-acre Timber Sale (Twin Creek) scheduled for 2006-2007. This area would be closed to grazing and livestock would be temporarily displaced to adjacent parts of the affected allotments for an undetermined length of time. Natural foreseeable future disturbances affecting grazing resources would include insect and disease activity in forested stands, vegetation succession and drought cycles (influencing plant communities), and noxious weed invasions. Noxious weed abatement efforts by the CNF would continue. The growth of rural communities, specifically private land development in Crow Creek, may contribute to a loss of access in the CEA that would negatively affect grazing resources. As development continues, special use permits for water transmission lines may be requested.

Cumulative Disturbances

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 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. In many cases, the change from a pre-mine forested environment to reclamation grasslands can be a beneficial change for grazing animals. Over the short term, the replacement of forest by grasses could increase the amount of suitable forage for cattle and sheep, although the formal evaluation of AUMs available for grazing would not change.

In general, the allotments in the northern portion of the CEA have been affected by 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.

The Agency Preferred Alternative would disturb approximately 1,449 acres, which is 5.6 percent of the area within the Grazing CEA. When combined with the past, present and other foreseeable disturbances in the CEA, the total disturbance within the CEA would be about 12 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.

The Proposed Action and Alternatives within the CEA would conform to BMPs proposed to prevent bioaccumulation of selenium in reclamation vegetation by covering all seleniferous overburden with a cover and salvaged topsoil (**Section 2.5**). Any future phosphate mining in the CEA would also incorporate measures to prevent the uptake of selenium by reclamation vegetation. 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) and this would not be a cumulative effect.

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. Panel F mining would remove ½ mile of Trail 402 utilized for trailing livestock onto the Deer and Manning Creek Allotments.

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 would create movement barriers for livestock in the CEA; therefore, there would be no cumulative effects to those disclosed as direct effects in Chapter 4.

Water Availability

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).

Cumulative Effects

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 that are disturbed. There would also be no cumulative effects due to haul road construction interfering with trailing routes for livestock. Panel F mining would impact ½ mile of Trail 402 that is utilized for trailing livestock onto the Deer and Manning Creek Allotments, however this would be temporary until reclamation at Panel F has been completed. Impacts to grazing would generally be temporary, as described in **Section 4.9**; disturbed areas would again be suitable for grazing after they have been reclaimed and their rangeland capacity restored. The Proposed Action, as well as the Agency Preferred Alternative, would result in 46 acres of unreclaimed area within Panels F and G. Considering past, present, and foreseeable future disturbances in the grazing CEA that may impact grazing combined with the Proposed Action (or Agency Preferred Alternative), cumulative effects to grazing resources would be negligible.

5.11 Recreation and Land Use

CEA Boundary

The CEA boundary for recreation and land use (**Figure 5.11-1**) includes the 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 Proposed Action or Alternatives.

Introduction

The CEA for recreation and land use includes approximately 102,500 acres, mostly in Idaho, except for a corridor along Crow Creek Road extending approximately 1 mile on either side of the road, and approximately 5 miles into Wyoming. This area in Wyoming covers about 8,500

acres, or about 8.3 percent of the CEA (included in 'Private' ownership in below table) (**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	20.0

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 dominant recreational use within the CEA as well as within the CNF is big game hunting.

Past and Present Disturbances

Past and present disturbance in the CEA is that from previous mining and exploration operations, timber harvest, roads, agriculture, and limited development. 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 would be likely to notice the sight or sound of mining activities, which could detract from the recreational activity. Six FS trails in the CEA have been affected by previous mining.

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

Foreseeable Future Disturbances

The implementation of the Agency Preferred Alternative could temporarily impact recreation as described above on a maximum of 1,449 acres of CNF that are currently used for Roaded Modified and Semi-Primitive Motorized recreation. The Project 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 4 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 intercepted by the mining components of the Proposed Action or Mining Alternatives. Portions of these trails would either be temporarily closed and signed as such or reroutes constructed.

During the Proposed Action, 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.

Cumulative Disturbances

Cumulative disturbance in the CEA that affects recreation use is mainly the active and unreclaimed disturbance from mining and related roads and structures. Currently that figure is 2,150 acres; the Agency Preferred Alternative would add 1,449 acres (or the Proposed Action would add 1,340 acres) to this, but this would not occur all at once. Overall, the remaining unreclaimed disturbance from mining would total about 71 acres.

Cumulative Effects

During the conductance of proposed timber harvest and mining activities, big game would likely move to other areas with less disturbance. The effect of this on recreation would be a temporary re-distribution of hunter use in the general area. Previous effects to trails in the CEA include disturbance to six trails in the currently permitted Smoky Canyon Mine area. Following reclamation at current mines and the Proposed Panels F and G, impacts to trail use would be minimal. 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. Upon successful reclamation of the mining disturbed areas, all disturbed areas would be available for recreation, although actual use may differ from past use based upon factors such as user preference. Upon the completion of mined 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. Overall, minimal long-term cumulative effects are anticipated to recreation on the public lands as a result of implementation of the Proposed Action and Alternatives.

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.

Introduction

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.

Past and Present Disturbances

Past and present disturbances in the IRA CEA include 110 acres of phosphate mines, approximately 700 acres of timber harvests within the CEA (eight IRAs), approximately 74 miles of roads, and approximately 6 miles of rights-of-way within the CEA (eight IRAs). In addition, approximately 44 acres of temporary, now reclaimed, disturbance has occurred from phosphate exploration activities within the Huckleberry Basin IRA.

Table 5.12-1 quantifies past and present disturbances within the Sage Creek Roadless Area (SCRA) and the Meade Peak Roadless Area (MPRA), the only IRAs within the CEA that would directly be impacted by the Proposed Action or Alternatives. 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 Creek 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.

Figure 5.12-1 Cumulative Effects Area for Inventoried Roadless Areas

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 defined in the above table, disturbance within the SCRA represents 2.9 percent (373.8 acres) of the total CEA area. Existing disturbance within the MPRA represents 0.07 percent (32 acres) of the area, a negligible amount.

Foreseeable Future Disturbances

Foreseeable future disturbances within the SCRA and the MPRA include mainly mining disturbances associated with the already permitted Smoky Canyon Mine, as described in **Section 5.1**. Ongoing recreation and grazing activities would continue at present trends and any future actions in these IRAs would be approved and conducted under the most current and applicable IRA regulations.

Cumulative Disturbances

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 (**Section 4.11**). Past and present disturbance within the SCRA totals approximately 373.8 acres (**Table 5.12-1**). This figure, when added to the Agency Preferred Alternative, which would impact 1,114 acres within the SCRA, represents a cumulative impact of almost 11.7 percent of the total SCRA (12,710 acres), 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 Agency Preferred Alternative within the MPRA, still represents a cumulative impact of less than 1 percent of the total MPRA. Future impacts could include the continuation of grazing practices and recreation activities, which are generally not quantifiable; however management of activities on these lands would likely preclude impacts.

Cumulative Effects

Although cumulative impacts have been identified for the SCRA and the MPRA, these cumulative impacts are not anticipated to result in an increased level of direct or indirect impacts to any of the roadless and wilderness attributes than what has already been described in **Section 4.11**. This is because the majority of past and present disturbance represents a relatively small percentage of each affected IRA and more importantly, the majority of these disturbances have been or would be reclaimed and natural succession is occurring that assists in returning impacted areas back to their natural state over time.

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 of which 88,874 acres are within the CNF.

Rationale: The CEA boundary is selected because 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.

Introduction

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 only 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 (VQO'S) IN THE CEA

VISUAL QUALITY OBJECTIVE	AREA (ACRES)	PERCENT OF CNF IN THE CEA
Modification	55,052	62
Partial Retention	33,558	38
Retention	0	0
Preservation	264	<0.3

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

Past and Present Disturbances

The CEA is generally not disturbed visually other than for 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. Past and present disturbances have altered approximately 7.5 percent of the area visually. Reclamation of the mine areas would mitigate much of the visual impact. Disturbances due to mineral exploration and mining coincide with disturbances attributed to timber harvest in many cases, since timber sales are often conducted as the initial phase in a mining or exploration project. Burned areas and agricultural areas are more or less visually acceptable; burned areas if occurring as a natural wildland event are noticeable, but typically aren't perceived as man-caused or intrusive development. Agriculture is a common land use in the area, and visually is part of the present landscape.

TABLE 5.13-2 PAST AND PRESENT DISTURBANCES WITHIN THE VISUAL RESOURCES CEA

DISTURBANCE TYPE	DISTURBANCE AREA (ACRES)*
Mining	2,349
Mineral Exploration	62
Timber Harvests	2,150
Burned Areas	483
Agriculture Areas	6,018
Utilities	9 miles (~55**)

Source of information: USFS 2003b, RFP FEIS data sets, Idaho GAP, Wyoming GAP
*acreages are not necessarily exclusive and may overlap
**acreage calculated assuming a 50 foot right-of-way

Exploration has occurred in the Wells Canyon Lease, but no mine plan has been proposed for that lease. 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 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. Views of the current and Proposed Panels F and G 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.

Foreseeable Future Disturbances

The only mining activity that has been proposed to date in the CEA is the Proposed Action and Alternatives. The Agency Preferred Alternative could potentially add up 1,449 acres of initial disturbance to the CEA, of which all but 71 acres would be reclaimed. Portions of the Proposed Panels F and G disturbance would be visible from locations along the Diamond 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 continual expansion of the tailings pond facilities would 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.

Cumulative Disturbances

The total disturbed area for the Agency Preferred Alternative combined with the currently permitted Smoky Canyon Mine disturbance would represent about 2.6 percent of the total visual CEA, and the unreclaimed area for the entire mine would represent about 0.05 percent of the total CEA.

Cumulative Effects

Reclamation of mined areas in the CEA 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. VQO's described in the CNF RFP would be adjusted for these areas. As activity shifts from currently active mining areas to others, and the disturbances are sequentially reclaimed, the landform and color contrast as well as the obvious presence of mining would be lessened for those traveling the secondary roads, or recreating in the area. Over time, the landscape views inclusive of reclaimed mining areas, would become a more acceptable part of the landscape. The eventual establishment of 'islands of diversity' (clusters of planted trees & shrubs) would restore a setting more similar to the original landscape in approximately 10 to 50 years.

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 Proposed Action or Alternatives would not affect cultural resources outside the Study Area, however the CEA (**Figure 5.4-1**) was chosen to include all past, present, and reasonably foreseeable Smoky Canyon Mine operations with a surrounding buffer area.

Introduction

Over thirty cultural resource inventories have been conducted within the CEA. These projects were conducted in association 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 indicates the general site types and site density found in the CEA.

The previous 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). A total of 17 sites have been recorded within the Study Area (**Figure 1.0-2**), which encompasses 20,414 acres, which amounts to about 1 site per 1200 acres, indicating site density in the area is low. The prehistoric sites are generally eligible for the NRHP due to the paucity of sites of this type in this high elevation area.

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.

Past and Present Disturbances

Past and present ground disturbances in the CEA that potentially affected cultural resources include timber sales, mine expansion and exploration, utilities, land exchange, road construction, and other developments**.** It is not possible to quantify potential impacts to unknown cultural resource sites in areas that have not been inventoried within the CEA. Recorded sites that are ineligible for the NRHP do not have to be avoided and therefore have likely been impacted by activities requiring the inventory (i.e., timber sales, mine expansion, utilities, etc.).

Five sites are within or adjacent to previous Smoky Canyon Mine disturbance; these include a prehistoric site (10CU90) located along the Smoky Canyon Road, one multi-component site (10CU76) on the north edge of Panel A, a historic site within Panel A (10CU113), a historic site within Panel B (CB-292), and another historic site (10CU132) within Tailings Pond 2. An additional site (10CU77), prehistoric in nature, is on the north and west edge of Panel D, near Pole Canyon Creek.

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 multi-component prehistoric campsite/historic sawmill site (10CU76), located near the Smoky Canyon Road, was destroyed by timber harvest activities. This site had been previously test excavated and clearance was recommended (Druss et al. 1981). Site 10CU90 was excavated for data recovery in 1982 (Polk 1982) and recommended for clearance. Sites 10CU113 (historic arborglyph), CB-292 (historic arborglyph), and 10CU132 (historic saltworks) were considered ineligible for the NRHP, therefore did not have to be avoided and these sites were destroyed during mining activities. Site 10CU77 was considered eligible for the NRHP and avoidance or mitigation measures were recommended (Druss et al. 1980b). The site has been avoided by mining activities.

Within the Study Area it has been documented (Gray and Statham 2004) that the construction of the existing Crow Creek Road impacted the historic *Montpelier to Star Valley Road.* Further, a telegraph line that ran along side that road has been impacted by road construction and utility upgrades.

Foreseeable Future Disturbances

The reasonably foreseeable disturbances in the CEA are the same as those described in **Section 5.4**. No USFS timber sales other than as a part of the Proposed Action are proposed for the cultural resources CEA in the current planning cycle. No changes to transportation and recreational uses of the CEA have been proposed.

Changes to private agricultural lands within the CEA are likely as some of these lands are converted in the future from traditional agricultural utilization (ranching) to more residential and recreational utilization. The Agencies are not aware of any such specific plans and these cannot be evaluated for this cumulative effects analysis.

The Smoky Canyon Mine tailings pond would be increased in size in compliance with its existing permitted expansion plan; however, the area has been previously cleared and would not impact additional cultural resources.

Recreational use of the area is expected to increase four percent annually (see **Section 3.10.1**); thus increasing the potential for vandalism and/or artifact collection at sites.

Cumulative Disturbances

Past, present, and reasonably foreseeable disturbance to cultural resources in the CEA have been and would be the result of mining activities, timber harvesting, road development, archaeological excavation, livestock grazing, private development, and likely vandalism and artifact collection. Private development and vandalism/artifact collection are not quantifiable.

Past and present disturbance has impacted cultural resources. However, in the case of ineligible sites, the sites are not considered important resources and avoidance is not required. NRHP eligible sites within disturbance areas were subject to data recovery (excavation); therefore the loss of the resource was mitigated. The Proposed Action would impact two additional cultural resource sites; the Agency Preferred Alternative would impact two sites. As discussed in **Section 4.13**, these sites are currently unevaluated for the NRHP. If determined eligible, data recovery would mitigate adverse impacts.

The current on-the-ground status of the majority of the GLO features has not been confirmed, but some may still exist intact and could possibly be indirectly impacted by the Proposed Action.

Cumulative Effects

The effects of adding the Proposed Action or Agency Preferred Alternative impacts to existing cultural resource disturbances would be negligible. Section 106 of the NHPA requires avoidance and/or mitigation of impacts to NRHP-eligible cultural resources by federal undertakings; therefore there should be no cumulative impacts from the Proposed Action (or Agency Preferred Alternative) and reasonably foreseeable future activities.

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.

Introduction

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. The Project Area is 0.13 percent of the CNF and Grasslands within the CEA.

Past and Present Disturbances

Past and present impacts to resources include dams along the Snake River that have 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.

Foreseeable Future Disturbances

Reasonably foreseeable future disturbance on CNF lands within the CEA would likely include continuation of grazing, recreation, and timber sales. Mining at the Smoky Canyon Mine would continue until the permitted ore reserves are depleted. Under the Agency Preferred Alternative, some portions of Proposed Panels F and G would be temporarily closed for safety reasons. Because mining at the existing mine, also with temporary safety closures, would move to Proposed Panels F and G and reclaimed lands would be available for exercising treaty rights, there would not be an additive effect of additional loss of access to implement Treaty Rights.

Tribal Exposure Scenario

The Shoshone-Bannock Tribes have requested an analysis of the direct and indirect impacts of the Proposed Action 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 gather vegetation, and hunt 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 or gathering of 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, understory 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. It is very common to see large game on reclaimed portions of the mine, which are generally available to tribal and public use.

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 from the Agency Preferred Alternative, which could affect aquatic life in these streams. These concentrations would be about 30 to 50 percent lower than the existing water quality standards established for protection of aquatic life (**Table 4.3-23**).

As discussed in **Appendix 2A**, the available data for South Fork Sage Creek Spring and fluctuating concentrations at Hoopes Spring could be explained by a combination of site-specific factors related to the existing mining operations at the Smoky Canyon Mine located immediately north of South Fork Sage Creek (NewFields 2007b). The Bureau of Land Management, U.S. Forest Service, and Idaho Department of Environmental Quality have reviewed the recent work by NewFields and agreed that it represents one possible interpretation of the available data. As shown in **Table 4.3-23,** according to the NewFields report, once the planned Pole Canyon overburden fill removal action is complete and successful, and the reclamation and remediation in the Panel E area is complete, selenium concentrations at the mouths of South Fork Sage Creek and Sage Creek and in Crow Creek downstream of Sage Creek for all of the Alternative D scenarios would be below the water quality standard of 0.005 mg/L.

The anticipated selenium concentrations in any of these streams would be about 14 times lower than the selenium drinking water standard established for protection of human health and 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 cover 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 cover 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.

Cumulative Disturbances

In recent years, the impacts to natural resources on unoccupied federal lands are slowly being reversed. Elk, moose, and 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.

Mitigation has been included with the Action Alternatives, which is protective of resources. Sediment from the mine pits would be contained. Surface and groundwater, and therefore fisheries, would be protected from selenium increases by the cover design. Fish ladders would be provided at crossings of fish bearing streams. Wildlife would be protected by the prevention of selenium uptake from the cover design. Weed control measures would be in place.

Cumulative Effects

As described in **Section 4.14**, the EIS can generally assign a quantification (context, duration, and intensity), as required by CEQ, to the impacts to resources such as wildlife or water quality. However, it is difficult to quantify the impact of a temporary loss of a right. In consultation, the Shoshone-Bannock Tribes have noted that any loss of Treaty Rights is significant to them and could potentially affect all tribal members.

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 would continue to primarily be from the east via established access routes. Transportation resources should not be significantly affected outside of these major roads.

Introduction

The CEA contains established transportation routes, including state highways and designated forest roads.

Past and Present Disturbances

The CEA contains numerous miles of existing transportation routes that include paved, graveled, and dirt roads that provide access to the existing Smoky Canyon Mine, private lands, and areas of the CNF. These routes situated on Forest lands have been established as part of the CNF Travel Plan Revision.

Foreseeable Future Disturbances

Any future roads built in association with other projects on the CNF, such as timber harvests, mining exploration, or mining, would be required to be reclaimed, therefore there would be no net disturbances to the transportation system within the CEA in the foreseeable future.

Cumulative Disturbances

Under the Agency Preferred Alternative, access to the Smoky Canyon Mine in the future would be the same as past and present conditions with no change to existing transportation routes. The proposed haul roads would not provide public access and would be reclaimed after mining, therefore would not contribute to the transportation system in the CEA.

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. This added traffic combined with 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. A portion of the Panel G West Haul/Access Road, part of the Agency Preferred Alternative, would be adjusted during reclamation to carry portions of FR 146 (Wells Canyon Road) and FR1102 (Diamond Creek Road), providing safer transportation through these areas. The upgrading of these access roads would improve access and safety. Increased utilization of the portion of the

CNF accessed via these upgraded access roads could change recreation use patterns in the Forest.

Cumulative Effects

There would be no cumulative effects to transportation in the CEA as there would be no net increase or decrease in transportation corridors as a result of the Proposed Action or Agency Preferred Alternative.

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.

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.

Introduction

The social and economic structures and relationships that are in place in the CEA in support of previous and current mining and other activity in the area are described in **Section 3.16**, in addition to the local, mine-related employment and activity. Along with this description in **Section 3.16**, the analysis presented in **Section 4.16** of the EIS includes a detailed discussion of the potential direct, indirect, and cumulative economic impacts of the Proposed Action and Alternatives, including No Action, for the CEA. Overall, the cumulative effects of No Action would be much greater than those of the Agency Preferred Alternative, which continues existing mining activity.

Past and Present Disturbances

The past and present disturbance as related to the socioeconomics of the area is discussed in detail in **Section 3.16.**

Foreseeable Future Disturbances

Continued phosphate mining would result in future private and public income at levels approximately the same as past and present conditions. Other incoming industry or developments if proposed in the CEA would be more likely to affect socioeconomics; the Agency Preferred Alternative is a continuation of the current industry. No major changes to population, housing, employment, or private and public income would occur as a result of the Proposed Action.

Cumulative Disturbance and Cumulative Effects

Because the Proposed Action is a continuation of existing mining at the Smoky Canyon Mine, implementation of the Agency Preferred Alternative would not contribute effects on public services beyond existing levels. This would add to the continued economic stability within the CEA that results from multiple industries and several viable facilities within an industry.

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 Agency Preferred Alternative.