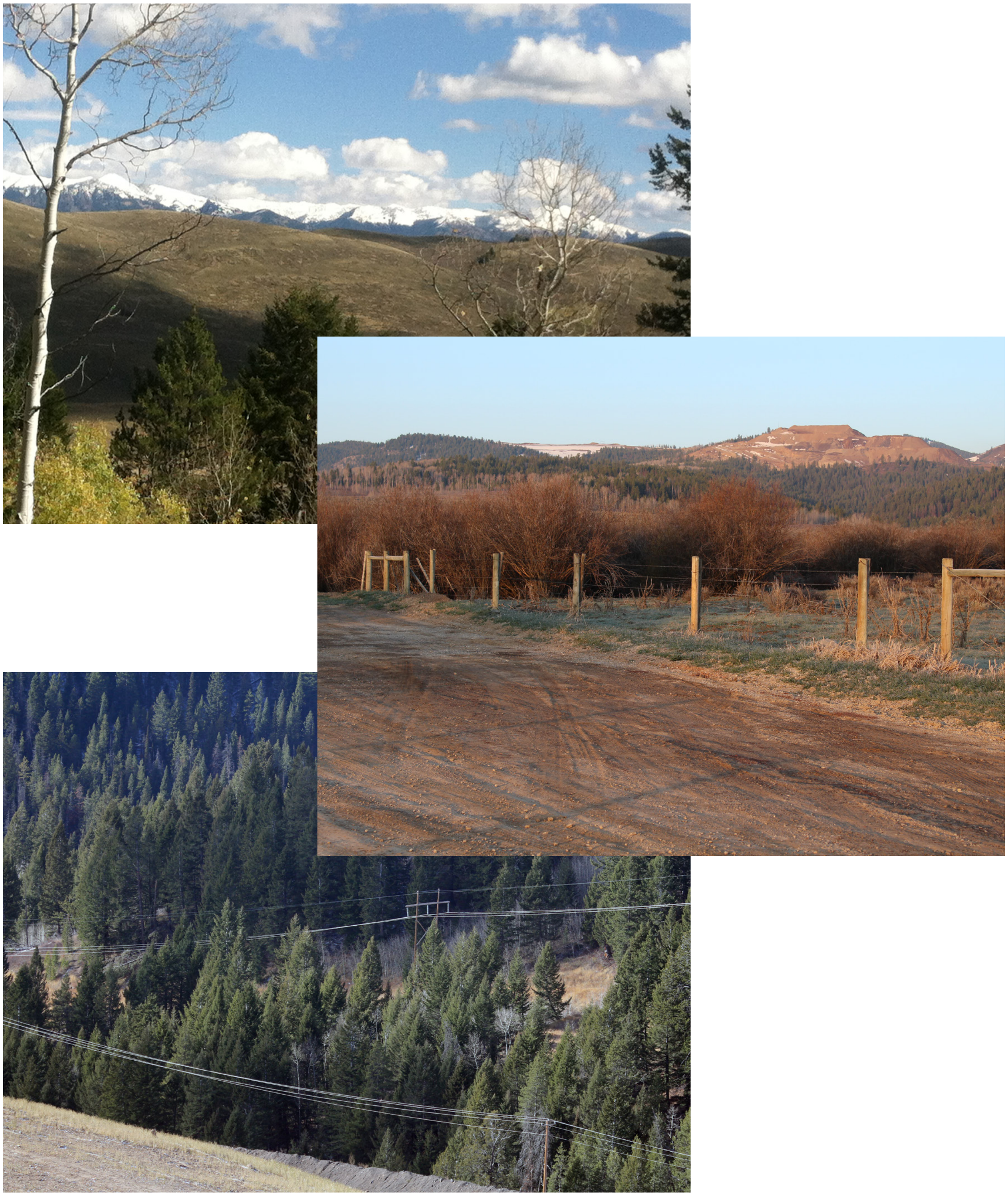
Final Environmental Impact Statement for the Proposed East Smoky Panel Mine Project at Smoky Canyon Mine



The estimated cost of producing this EIS by the proponent was $8.9 million
The estimated cost of producing this EIS by the BLM was $92,000

February 2020

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BLM Mission Statement

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DOI-BLM-ID-I020-2014-0046-EIS

USDA Forest Service
Caribou-Targhee National Forest
http://www.fs.fed.us/r4/caribou-targhee

1405 Hollipark Drive
Idaho Falls, Idaho 83401
208-524-7500

USDI Bureau of Land Management
Idaho Falls District
http://www.Id.blm.gov/

Dear Reader:

Enclosed for your review is the Final Environmental Impact Statement (EIS) for J.R. Simplot Company's Proposed East Smoky Panel Mine Project at Smoky Canyon Mine, which is an expansion of the existing mine. Simplot's Proposed Action includes: 1) development of three federal mineral leases for mining and reclamation of an open pit phosphate mine; 2) modification of one existing lease; 3) development, construction, and reclamation of infrastructure including transmission lines, haul roads, stormwater features, and other miscellaneous disturbances off-lease on land administered by the USFS, requiring Special Use Authorizations; 4) an amendment to the Caribou National Forest (CNF) Revised Forest Plan (RFP) that would relocate a designated utility corridor; and 5) revision of reclamation plans for Panel B to add additional backfill and the use of a store and release cover in place of the previously approved "cap" for coverage of seleniferous material. The proposed Project details were submitted to the Agencies in a Mine and Reclamation Plan (M&RP). The EIS was prepared by the Bureau of Land Management (BLM), Pocatello Field Office (lead agency) and the U.S. Forest Service, Caribou-Targhee National Forest (joint lead agency) with cooperation from the Idaho Department of Environmental Quality, Idaho Department of Lands, and Idaho Office of Energy and Mineral Resources.

The Project is located about 10 miles southwest of Afton, Wyoming, in Caribou County, Idaho. The existing operation has been in place since 1983. An alternative to the Proposed Action was developed to address issues brought forth through the scoping process. The Proposed Action, one Action Alternative, and the No Action Alternative were analyzed. Alternative 1 would be similar to the Proposed Action except the ultimate pit shell footprint would be reduced by approximately 78 acres compared to the Proposed Action. The pit would be steeper and deeper and would avoid cherty shale, which contains a high concentration of seleniferous material. A topsoil-only cover would be used on overburden disposal areas within the East Smoky Panel and the currently approved cover would be used on the Panel B backfill. The Agency-preferred alternative is Alternative 1.

Concurrent with the distribution of the Final EIS, the Draft USFS ROD is also being released. The U.S. Environmental Protection Agency (EPA) published a Notice of Availability (NOA) of the Final EIS in the Federal Register. On the publication date of the EPA's NOA in the Federal Register, a 30-day availability period commenced. In addition to the EPA's NOA, the BLM published a separate NOA with additional information in the Federal Register and in local newspapers.

The Final EIS is a completed document. The EIS and Draft USFS ROD are both available at the following locations:

- BLM Web site: https://go.usa.gov/xnYTG
- USFS Web site: http://www.fs.usda.gov/projects/ctnf/landmanagement/projects

If you have information for agency consideration in making our decisions, it can be sent to the following addresses and must be received by the end of the 30-day availability period:

- Email: blm_id_espm_eis@blm.gov
- Mail: East Smoky Panel Mine Final EIS
  c/o Stantec Consulting Services Inc.
  2890 East Cottonwood Parkway, Suite 300
  Salt Lake City, Utah 84121

Information provided for agency consideration, including names and street addresses of respondents, will be available for public review at the BLM Pocatello Field Office and subject to disclosure under the Freedom of Information Act (FOIA) If you wish to withhold your name and/or address from public review or disclosure under the FOIA, you must state this prominently at the beginning of your written comment. The BLM will honor such requests to the extent allowable by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, are available for public inspection in their entirety.

The BLM and USFS will each issue separate RODs for decisions regarding their respective jurisdictions. The draft USFS ROD is available for review concurrent with the Final EIS; opportunities to object to the draft ROD within the 60-day objection period are described in the draft ROD and in a legal notice in the newspaper. The draft USFS ROD is being made available to people and entities on the Project mailing list, as well as the general public via the internet. The USFS will issue their final ROD for activities under their jurisdiction following the close of the objection period, and resolution period if needed, on the draft ROD. If no objection is filed on the draft USFS ROD, the USFS can implement their decision after five business days following the end of the 60-day objection period. If objections are received and resolution to any objections on the draft USFS ROD are completed, the USFS can implement their decision immediately.

The BLM will issue a ROD for activities under their jurisdiction no sooner than the close of the 30-day availability period on the Final EIS. After publication of the BLM ROD there will be a 30-day appeal period before the BLM's decision becomes effective; the ROD will contain the appropriate instructions for appeal. Each final ROD will be made available to people and entities on the Project mailing list, as well as the general public via the internet.

The portion of the proposed Project related to USFS special use authorizations for off-lease activities is subject to the objection process pursuant to 36 CFR 218 Subparts A and B and 36 CFR 219 Subpart B. Only those who previously submitted specific written comments on the Project during designated opportunities for public comment are eligible as objectors (36 CFR 218.5). BLM appeal procedures found in 43 CFR 4 apply to the portion of the Project related to the federal mineral lease(s).

Questions can be directed to Kyle Free, BLM Project Manager, (208) 478-6352 or via email at kfree@blm.gov.

Sincerely,

Mary D'Aversa

Mary D'Aversa
District Manager
BLM Idaho Falls District

for Wes Slaton

Mel Bolling
Forest Supervisor
Caribou-Targhee National Forest

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED EAST SMOKY PANEL MINE PROJECT AT SMOKY CANYON MINE

LEAD AGENCY:	Bureau of Land Management Idaho Falls District Pocatello Field Office
JOINT LEAD AGENCY:	U.S. Department of Agriculture Forest Service Caribou-Targhee National Forest
COOPERATING AGENCY:	Idaho Department of Environmental Quality Idaho Department of Lands Idaho Office of Energy and Mineral Resources
PROJECT LOCATION:	Caribou County, Idaho
DATE FINAL EIS FILED WITH EPA:	February 2020
QUESTIONS ON THE FINAL EIS CAN BE DIRECTED TO:	Kyle Free, Project Lead BLM Pocatello Field Office 4350 Cliffs Drive Pocatello, Idaho 83204 (208) 478-6352

ABSTRACT

This Final Environmental Impact Statement analyzes impacts from developing the proposed East Smoky Panel Mining and Reclamation Plan at the J.R. Simplot Smoky Canyon Mine in southeast Idaho. The Proposed Action includes developing and mining an open pit east of the current mine on three federal mineral leases held by Simplot; modifying one of those leases to accommodate efficient pit development; amending the Revised Forest Plan for a utility corridor relocation; constructing ancillary facilities including transmission lines, haul roads, and stormwater control structures on private lands or under Special Use Authorizations; backfilling the Panel B pit with additional overburden; reclaiming mine disturbances using a store and release cover on top of the placed overburden; and topsoiling/reseeding the majority of the total disturbance. Use of existing support and mill facilities would continue. An alternative to the Proposed Action is analyzed. It is generally the same as the Proposed Action, but the pit footprint would be smaller, avoiding mining the cherty shale. This would reduce selenium in the combined overburden materials and allow a topsoil-only cover on the East Smoky Panel and the currently approved cover on Panel B. The reduced pit shell would reduce the disturbed area by 78 acres, but the pit would be mined deeper and with steeper highwalls to allow equivalent ore recovery. The No Action Alternative is also analyzed and site-specific mitigation measures developed.

RESPONSIBLE OFFICIAL FOR FINAL EIS:	Mary D'Aversa BLM Idaho Falls District Manager
EIS NUMBER:	DOI-BLM-ID-I020-2014-0046-EIS

EXECUTIVE SUMMARY

The following information is provided as a convenient synopsis for the public. However, this synopsis is not a substitute for review of the complete Final Environmental Impact Statement (FEIS). If there are any inconsistencies between this Executive Summary and the FEIS, the FEIS controls.

BACKGROUND

J.R. Simplot Company's (Simplot) existing Smoky Canyon mining and milling operations were authorized in 1982 by a mine plan approval issued by the Bureau of Land Management (BLM) and Special Use Authorizations (SUAs) issued by the U.S. Forest Service (USFS) for off-lease activities, supported by the Smoky Canyon Mine Final EIS and Record of Decision (ROD). Mining operations began in 1984 and have continued ever since with the mining of Panels A through G. As mining progressed through each mine panel, mine and reclamation operations were reviewed and the environmental effects assessed under the National Environmental Policy Act (NEPA). Supplemental Mine and Reclamation Plans detailing the development and reclamation of each panel were approved with subsequent decisions made by the BLM for on-lease operations and by the USFS for operations conducted off lease. Mining operations are now complete in Panels A, C, D, and E and those areas are reclaimed. Mining continues in Panels B (immediately adjacent to portions of the proposed East Smoky Panel Mine Project Area), F, and G with concurrent pit backfilling and reclamation.

This Environmental Impact Statement (EIS) is being prepared by the BLM, Pocatello Field Office, and the U.S. Forest Service (USFS), Caribou-Targhee National Forest (CTNF), in response to the proposed Mine and Reclamation Plan (M&RP) and lease modification for the Smoky Canyon Mine, East Smoky Panel (the Project).

PROPOSED ACTION

The Proposed Action consists of the following:

- Development of three federal mineral leases that Simplot currently holds, and development and reclamation of an open pit phosphate mine with a store and release cover over backfilled overburden and associated infrastructure;
- Modification of one existing lease by adding 120 acres for mining-related disturbance for a portion of the pit and associated backfill;
- Development, construction, and reclamation of infrastructure including portions of transmission lines, haul roads, and other miscellaneous disturbances off-lease on federal land administered by the USFS, requiring SUAs;
- Amendment to the Caribou National Forest (CNF) Revised Forest Plan (RFP) that would relocate a designated utility corridor south around the southern end of the proposed open pit; and,
- Revision of reclamation plans for Panel B to add additional backfill, resulting in contours closer to the original topography, and use of a store and release cover in place of the previously approved "cap" for coverage of seleniferous material.

The development of the East Smoky Panel would require the removal, transportation, and placement of overburden, most of which would be used to backfill the mined out East Smoky Panel pit. The remaining overburden would be placed in previously disturbed mining areas at Panel B.

All run-of-mine (ROM) overburden would receive a geologic store and release cover system consisting of chert, overlain by Dinwoody and/or Salt Lake Formation, and a topsoil layer. This type of cover system is designed to limit the percolation of meteoric water into the seleniferous overburden beneath, by increasing runoff and retaining moisture within some of the cover layers that would be available to plants and evapotranspiration. By reducing water movement into the seleniferous overburden, the intent of the store and release cover is to reduce the amount of selenium that can be transported by groundwater away from the overburden pile.

The existing processing and ancillary facilities for the East Smoky Panel would continue to be used. Electric power for the proposed mining operations would be provided with the existing power lines. However, two segments of existing power lines are proposed for reroute around the proposed East Smoky Panel. A Revised Forest Plan (RFP) amendment would be required to change the management prescription of the lands contained in the proposed transmission line reroute to allow designation of a 200-foot wide utility corridor for the new route and revised SUA. This Project would both use existing SUAs and require additional new SUAs.

Applicable Environmental Protection Measures (EPMs) described in previous FEISs and RODs for the Panels B and C and the Panels F and G projects would continue to be implemented. EPMs specific to the Proposed Action and Action Alternative for this Project would also be implemented.

The mine life of the East Smoky Panel pit would be up to 12 years, depending on different blending scenarios with the ore from the remaining permitted Smoky Canyon Mine panels. Concurrent reclamation work is proposed and would continue on both federal and split estate lands for approximately two to three years following completion of mining. The East Smoky Panel would add approximately three years to the overall life of the Smoky Canyon Mine.

The reclamation plan covers approximately 98 percent of the total new disturbance, in addition to the areas of redisturbance, with a small pit area situated on private land owned by Simplot that would be left unreclaimed.

ACTION ALTERNATIVE

One Action Alternative was fully evaluated in the FEIS: Alternative 1 – Reduced Pit Shell with Soil-only Cover. Under Alternative 1, the overall mining operations, mining sequences and other associated ancillary operations and disturbances would remain the same as described for the Proposed Action, including the need for the lease modification. However, the ultimate pit shell footprint would be reduced by approximately 78 acres compared to the Proposed Action. The reduction in area results from the steeper pit wall slopes that would be used to reduce mining the cherty shale that contains a high concentration of seleniferous material.

The East Smoky Panel pit under this alternative would receive a topsoil cover, but the currently approved cover would be used for Panel B. Not encountering the cherty shale under Alternative 1 would reduce the seleniferous nature of the combined overburden materials, so the geologic store and release cover would not be needed.

NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed M&RP for development of the East Smoky Panel and proposed SUAs would not be approved, no modification to the existing mineral lease would occur, the CNF RFP would not be amended, and mining at other panels of the Smoky Canyon Mine would continue as currently authorized. Mining in Panel B would proceed as currently planned by Simplot and authorized by the BLM. Simplot would retain and be eligible to invoke the mining rights granted in their existing federal leases at another time, with a revised M&RP that meets all regulatory and other established requirements.

AGENCY PREFERRED ALTERNATIVE

Following their review of the environmental impacts as discussed in the FEIS, the BLM and USFS have identified Alternative 1: Reduced Pit Shell with Soil-only Cover as their Preferred Alternative for this Project because this alternative:

- Reduces the size of the proposed pit and new surface disturbance by approximately 78 acres.
- Increases the amount of overburden proposed to be placed in Panel B, returning the topography in this area back closer to original contours.
- Reduces the amount of unreclaimed highwall by approximately three acres.
- Eliminates mining the cherty shale material which would reduce the seleniferous nature of the combined overburden materials, resulting in a soil-only cover needing to be used.
- Reduces the amount of discount service acre years (DSAYs) under the Habitat Equivalency Analysis (HEA) by approximately 5,500.

The Agency Preferred Alternative would reasonably accomplish the purpose and need for the federal action, while giving consideration to environmental, economic, and technical factors.

ENVIRONMENTAL IMPACTS

The environmental effects of the Proposed Action have been evaluated and compared to Alternative 1 in **Chapter 4** of the FEIS. A listing of the primary environmental impacts for the Proposed Action and Alternative 1 is shown in **Table 2.8-1**. The environmental impacts of the Proposed Action and Alternative 1 are only briefly summarized in the following narrative and a detailed impact analysis is provided by resource in **Chapter 4**.

Geology, Minerals, Topography, and Paleontology

The Proposed Action and Alternative 1 would commit phosphate resources to development. Approximately 60.2 million Bank Cubic Yards (BCY) of overburden would be removed from the pit area as part of exposing the mineral resource, and then either placed back in the East Smoky Panel pit or added to the already mined Panel B area. This would be a long-term, major, local impact on geologic resources. This mining activity would result in physical changes to topography; creation of man-made slopes and highwalls that are designed for stability; and movement of overburden to pit backfills. Final reclaimed configurations would mimic the pre-mining landforms and slope aspects. This would be a minor but long-term impact. Under the Proposed Action, about 12 acres of the topographic disturbance for the East Smoky Panel pit would be permanent where a portion of highwall and pit would not be reclaimed due to lack of available backfill. Under Alternative 1, it would be slightly fewer at 9 acres.

Effects to paleontological resources could occur from the disturbance of the ore and overburden removal during mining, along with road construction and other miscellaneous disturbance activities. Rock units disturbed would be in the Dinwoody Formation, various members of the Phosphoria Formation, Wells Formation, and alluvium. Fossils in the geologic units that would be disturbed are not restricted only to the Smoky Canyon area and are likely to be found throughout the outcrop area of these formations in Southeastern Idaho. This is expected to present a negligible impact.

Impacts from Alternative 1 would be similar, although the pit would have a smaller footprint, by approximately 78 acres.

Air Resources

Mining operations would impact air resources primarily by emissions of dust and motorized equipment exhaust including particulates, nitrogen oxides, carbon monoxide, volatile organic compounds, and sulfur dioxide. With the annual emission estimates for the Proposed Action being similar to the annual quantity of previously modeled emissions, it is unlikely that the National Ambient Air Quality Standards (NAAQS) thresholds would be approached. The air emissions would occur during active operations. A large percentage of the fugitive particulate emissions generated from mining and transportation activities would settle out quickly near their point of generation.

Greenhouse gas (GHG) emissions associated with the Proposed Action would be generated from combustion of fossil fuels in mining and support equipment and include carbon dioxide, methane, and nitrous oxide. However, because neither the Proposed Action nor Alternative 1 require any additional fuel burning equipment or activities, there would be no increase to the annual GHG emissions. Instead, the current annual level of GHGs emitted would be extended by approximately 3 years.

Noise

The noise impacts from activity during operation of the Proposed Action and Alternative 1 would be primarily generated by drilling, blasting, equipment operation, haul truck use, and other vehicle use. The level of noise impact would be similar to the current noise impacts from the existing Smoky Canyon Mine. None of the expected noise levels would exceed the Environmental Protection Agency (EPA) guidelines for outdoor noise limits to protect against effects on public health and welfare. Consequently, the noise effects from the Proposed Action and Alternative 1 would be short-term and negligible or minor at the closest sensitive receptor due to the distance from the mine.

Water Resources

The Proposed Action and Alternative 1 would have negligible impacts to groundwater quantity or groundwater elevation in the Wells Formation aquifer. There would be no change to the amount of groundwater extracted for mine operations. The amount of water added to the open pit from potential isolated highwall seeps of alluvium or Rex Chert groundwater would be negligible compared with the net percolation through the surface of the pit backfills. Mining the lower benches of the later phases of the East Smoky Panel could seasonally intersect the saturated portion of the Wells Formation where mean groundwater elevations are near the base of the proposed pit excavation. Reductions in groundwater flow across the West Sage Valley Branch Fault in the vicinity of the East Smoky Panel could potentially reduce flow in downgradient springs associated with the Dinwoody Formation and the Rex Chert that are sustained by this groundwater flow.

This effect on these springs would have implications on stream flow in Roberts and Tygee Creeks, reducing or eliminating those flows for the long term. The impact to Roberts Creek would be a direct impact and the impact to Tygee Creek would be indirect and due only to potential reductions from sources (Roberts Creek, ESS-1, ESS-2, and LinS) that are tributary to it. Additionally, there would be some storm flow reductions due to stormwater management, which would be reestablished after reclamation. However, Simplot currently has a water right that allows diversion of Roberts Creek. Further, Tygee Creek streamflows increase further downstream due to contributions from other tributaries, which would compensate for the aforementioned streamflow reductions.

The primary mechanism for impacting groundwater and surface water quality would be due to the potential for contaminants of potential concern (COPCs) to leach from the pit backfills via vertical percolation of recharge, eventually reaching and impacting the underlying Wells Formation groundwater. COPCs carried through for groundwater fate and transport modeling for the Proposed Action and Alternative 1 were selenium, manganese, total dissolved solids (TDS), and sulfate. Model-simulated impacts to groundwater quality in the Wells Formation are generally greatest near the backfilled open pits. Away from the pit backfilling, these impacts diminish.

Selenium does not exceed the regulatory primary groundwater standard (0.05 mg/L) at any of the four groundwater model observation points at any time during the 300-year model time frame for the Proposed Action or Alternative 1; however, under the former there would be a small area south of the northernmost observation point where selenium would reach 0.05 mg/L. Selenium concentrations of 0.001 mg/L would reach Hoopes Spring and remain at that approximate level until year 300. Under the Proposed Action, a large manganese plume greater than the secondary groundwater standard of 0.05 mg/L is predicted to extend from the East Smoky Panel west under much of the B-Panel and down to Hoopes Spring. The greater than 0.05 mg/l plume for manganese in the Wells Formation develops rapidly below and south of the pit backfill and then gradually continues to move south. Manganese concentrations would be much lower under Alternative 1. For most of the modeling done for sulfate under both the Proposed Action and Alternative 1, groundwater concentrations in the Wells Formation are much less than the 250 mg/L secondary groundwater standard. Last, TDS concentrations in Wells Formation groundwater would show a greater than 500 mg/L plume developing under the pit backfill (500 mg/L is the applicable secondary groundwater standard) under both the Proposed Action and Alternative 1. This plume increases in size and begins to degrade due to ongoing recharge through the cover, reaching about 300 mg/L by the end of 300 years. No COPCs were predicted to reach Lower South Fork Sage Creek Springs.

The selenium contributions from the East Smoky Panel under the Proposed Action and under Alternative 1 to Hoopes Spring would have a minor impact to Sage and Crow creeks, both of which are already impacted beyond the applicable aquatic life criteria for selenium in the water column. The manganese contribution under the Proposed Action would represent a greater increase than selenium, but there would be no water quality standard violated for this COPC. Manganese contribution to surface water would be negligible for Alternative 1. Sulfate and TDS contributions would be negligible under both the Proposed Action and Alternative 1.

No groundwater rights would be impacted, but water rights associated with LinS (also known as the Linford Spring) and with Tygee Creek could be negatively impacted due to potential flow reductions.

Soils

The Proposed Action and Alternative 1 would directly impact soil resources within the Project Area by removing it from areas prior to disturbance due to mining and related activities. These direct impacts to soil resources include loss of soil during salvage, loss due to erosion of stockpiles or reclaimed areas, exposure and potential mobilization of selenium, and reduced productivity. There would be no indirect impacts to soil resources. However, EPMs would reduce these types of impacts. Soil stockpiles would be protected from erosion by seeding and establishment of short-term vegetation cover and soil surveys have determined that approximately 4.3 million bank cubic yards of combined topsoil and subsoil is suitable and available for reclamation. Incorporation of slash and vegetative materials into the growth medium during stripping would increase the organic matter content of the material and elevate the production potential. Further, reclamation of disturbed areas that are no longer required for active mining operations would be conducted concurrent with other mining operations. This would reduce the time that soil remains stockpiled and would allow for direct-haul in some cases. Last, topsoil would be sampled prior to placement to determine agronomic characteristics, which would then dictate fertilizer types and application rates, if any are needed. Combined, impacts to soil resources would be major and long term for both the Proposed Action and Alternative 1, though the area of disturbance would be 78 acres fewer for the latter.

Vegetation and Wetlands

The Proposed Action would remove up to 728 acres of upland (non-wetland) vegetation and zero acres of wetland vegetation and Alternative 1 would remove 78 fewer acres, all upland vegetation. The upland vegetation that would be removed is primarily in the aspen/conifer vegetation type. Following mining activities, reclamation would revegetate 98 percent of the cleared areas, however the resulting species composition and community structure would be different than before the disturbance resulting in a long-term direct impact. Aspen, aspen mix, and conifer habitat would be permanently lost, which includes snag-producing forest habitat, which are well-represented on the landscape. Overall effects of the Proposed Action and Alternative 1 to upland vegetation would be long-term and minor. There would be no direct impacts to wetlands, but minor indirect impacts could occur due to sediment loading or flow alterations. The effects of noxious weeds from the Proposed Action or Alternative 1 would be short-term and minor due to BMP implementation. No plant species listed as threatened, endangered, or proposed; no CTNF sensitive plant species; and no CTNF Watch rare plant species are anticipated to occur or have been observed during baseline studies, thus impacts to sensitive plants are not anticipated to occur.

Wildlife

Impacts of the Proposed Action and Alternative 1 on terrestrial wildlife would include: 1) immediate, direct effects in terms of wildlife mortality, disturbance, and displacement; and 2) changes in wildlife behavior and composition associated with long-term changes in land cover and reclamation. The majority of disturbed habitat (98 percent) would be forest lands that would be reclaimed with grasses and shrubs. Over the long term, reclaimed areas would likely regain the level of wildlife habitat services provided by the baseline on-site big sagebrush and high-elevation rangeland habitat types. However, even after reclamation, the Proposed Action would result in the net debit of 33,551 DSAYs and Alternative 1 would result in 5,488 fewer DSAYs than the Proposed Action. This habitat alteration and forest fragmentation would cause long-term species composition changes. However, both the Proposed Action and Alternative 1 would unlikely impact entire populations and would have negligible to minor impact to individuals or habitat for: bald eagle, boreal owl, brewer sparrow, Columbian sharp-tailed grouse, greater sage grouse, flammulated owl, great gray owl, northern goshawk, olive-sided flycatcher, peregrine falcon, prairie falcon, sagebrush sparrow, American three-toed woodpecker, trumpeter swan, willow flycatcher, Uinta chipmunk, gray wolf, Canada lynx; amphibians/reptiles including the northern leopard frog, common garter snake, and boreal toad; migratory birds in general, and raptors in general. There could be minor impacts to bats and upland game birds and minor to moderate impacts to big game.

Fisheries and Aquatics

The Proposed Action and Alternative 1 would result in direct disturbance of approximately 21 acres of Aquatic Influence Zones (AIZs) but given the nature of the AIZs as non-perennial and lacking connection with perennial waterbodies, effects to them would overall be minor. Reductions in flow in Roberts Creek due to spring flow disruption or elimination would have a moderate impact to aquatic habitat, but impacts would be reduced to minor given the current habitat quality. Related reductions in flow to Tygee Creek would be moderate to major in the upstream areas, but negligible downstream. Impacts to aquatic habitat due to manganese, sulfate, and TDS contributions from Hoopes Spring due to development of the East Smoky Panel Mine would be negligible but long term. For selenium, due to its bioaccumulative properties, impacts to aquatic habitat from the Project would be minor but long term. Indirect impacts to macroinvertebrates in area streams would be negligible to minor due to either bioaccumulation of selenium or flow alterations in Roberts or Tygee creeks. Last, indirect impacts to fish would be minor to moderate due to predicted streamflow losses in Tygee Creek, but negligible to minor in Roberts Creek. There is the potential for indirect effects to fish populations in Hoopes Spring, Sage Creek, and Crow Creek from predicted increases in selenium, manganese, sulfate, and TDS concentrations. The predicted increases in manganese, sulfate, and TDS are expected to be small and impacts to fish populations are expected to be negligible. For selenium, there is more uncertainty with determining significance due to uncertainty regarding the impacts of existing selenium levels but impacts to fish populations from the Project are not expected to be more than minor due to the small increases.

Land Use (Grazing and Recreation) and Transportation

The Proposed Action and Alternative 1 would convert primarily undeveloped forest land to mining. It would change the character of a small portion of an adjoining private parcel owned by Simplot from forest to an industrial use, which would be a minor impact to private land uses.

The Proposed Action and Alternative 1 would result in 30 additional acres of CTNF land bound under SUAs in the Study Area. This would be a negligible reduction in CTNF land in the Study Area available for public use.

The transmission line relocation into a location with no CNF RFP designated utility corridor would be inconsistent with the RFP and would require an RFP amendment. The RFP amendment would change the land use to a utility corridor on 1.8 acres (< 1 percent) of CTNF in the Study Area which would be a negligible effect.

Mining and infrastructure development under the Proposed Action would remove 594 acres from the Pole Draney Allotment in the short term, which based upon the numerical ratios would be a loss of 23 percent of the allotment acres and AUMs in the Study Area (moderate effect) and a loss of 5 percent of the acres and AUMs in the allotment as a whole (minor effect). Under current usage the permittee only spends 13 and 19 days in the area as the sheep make their way between the Pole Canyon Dump south of the Project Area and the ground north of the Smoky Canyon Road and the Project Area. Therefore, over the life span of active mining and reclamation, the permittee would gradually lose up to approximately 19 days per year of grazing time on NFS lands. Due to active mining in the Project Area, the ability to move a band of sheep throughout the allotment while remaining on NFS lands would become extremely difficult if not impossible, especially along the southeastern portion of the allotment. Based upon the impacts from the Proposed Action combined with the effects and days lost from mining previous panels over the years, it is anticipated that the remaining permitted allotment area would not likely be sufficient to sustain the permitted number and duration of the existing permit without mitigation. This could result in a moderate and long-term impact to the permittee.

Grazing impacts would occur until the disturbed areas have been reclaimed and their rangeland capacity restored (as determined by the CTNF via restoration criteria). The long-term objective of the reclamation revegetation would be a vegetative community suitable to support the post-mining land uses of grazing and wildlife habitat. Therefore, there would be a negligible impact on long-term forage value under the Proposed Action.

In the short term, approximately 49 percent of the available CTNF land in the Study Area would be disturbed by mining or mining infrastructure and be unavailable to recreation (which are currently fairly limited) or would become unavailable to public recreation due to safety concerns and limited access related to crossing active mining operations. Once reclamation restores the land to its post-mining condition access would be restored. Given that recreation in the Study Area is not as popular as in other parts of the CTNF due to the presence of the mine, and the approximately 3,000,000 acres of greater CTNF available for recreation, this effect would be negligible to minor. Further, while the reclaimed Project Area may not be as suitable for some types of recreation due to altered topography, the revegetated areas may be more desirable for hunting due to better forage or cover for game species.

There would be approximately 4.5 miles of new haul roads constructed in the Study Area over the life of the Project. The public would not be allowed access on these roads during the life of the Project, but they would be reclaimed and access would be allowed after that time. There would not be any changes to public access on CTNF roads. Traffic would not increase on public roads in the Study Area; there would not be any additional employees traveling to the mine and the current number of haul trucks and other vehicles would continue as in the existing operations.

Visual Resources

As mining progresses under the Proposed Action and Alternative 1, it would open views of the mine from the lower elevation areas to the east because vegetation would be removed and the mine would extend over the eastern side of the ridge above Sage Valley. This would cause the mine to become more visually dominant from the east side in both the middle ground and background and would have a minor to moderate adverse effect on visual quality depending on the viewpoint. Construction of various mining components and mining operations would require disturbance that removes vegetation cover, exposes soil, and alters landforms, which would affect the form, line, texture, and color elements of the existing visual environment creating a contrast in the visual landscape. Over the life of the mine, there would be permanent facilities (topsoil stockpiles, borrow pits, haul roads, stormwater ponds, and the two power lines that would be relocated), and personnel, vehicles and heavy equipment moving around the site that may be visible from outside the Project Area.

Overall views of the mine under the Proposed Action and Alternative 1 would be most pronounced from the higher elevations although visual effects are likely to be minor due to limited viewing opportunities at higher elevations surrounding the area, the transitory nature of people moving through these areas (there are not any campgrounds or other similar facilities that would create longer period views of the site), and the locations of these areas which are typically at greater distance from the mine.

During construction and mining the landscape character would be unavoidably altered by harvesting trees, removing vegetation, and exposing soil. When newly disturbed, there would be moderate effect on visual quality due to the high contrast. In addition to soil colors, textures change depending on how the soil has been disturbed. For example, in some places the mining would result in high wall slopes with benches (up to 715 feet high) that would create straight horizontal lines. These straight lines would contrast with the irregular forms of trees and ridgelines near the site from the foreground and middle ground views. Over time these slopes would erode and weather and the horizontal lines would become less discernable.

Relocation of the transmission lines could alter views to various levels depending upon the segment and potential viewers. Lighting would affect the night sky in the Project vicinity and would be noticeable due to the lack of lighting in the general area (existing sources of light outside the mine are from a few residences and the occasional vehicles passing through the area).

Reclamation activities would also produce visual effects that contrast with surrounding areas. These impacts would mostly be temporary until revegetation occurs but could produce strong contrasting elements in the viewscape. These temporary effects could be negligible to minor in intensity depending on the viewer and location.

Cultural Resources

The entire Area of Potential Effect (APE) has been inventoried for the presence of cultural resources. Two cultural resources were identified but were found as not eligible for the National Register of Historic Preservation (NRHP). Therefore, no historic properties (cultural sites eligible for the NRHP) have been identified in the cultural resources survey area. Under the Proposed Action and Alternative 1, no historic properties are within the areas of proposed disturbance. Neither the Proposed Action nor Alternative 1 would affect known historic properties.

Native American Concerns and Treaty Rights Resources

The Proposed Action and Alternative 1 would affect certain natural resources within the Project Area that are the subject of Shoshone-Bannock Tribal Treaty rights. There would be temporary impacts to the access of those resources. In consultations with the Shoshone-Bannock Tribes, they noted that any loss of Treaty Rights is significant to them and could potentially affect all tribal members.

The overall impact to Treaty Rights access from the Proposed Action and Alternative 1 would be local, short-term, and negligible (less than 0.1 percent of the CTNF). Neither would change the status of federal lands on the CTNF. After reclamation, Tribal access would be restored as vegetation would be replanted, wildlife would return, and water would be usable. Unreclaimed areas on private land for the Proposed Action and Alternative 1 would not return to their original character.

Social and Economic Resources

From a socioeconomic perspective, the primary impact of the Proposed Action and Alternative 1 would be to extend the mine's operations for approximately three years past what is currently predicted. The Proposed Action and Alternative 1 would have essentially no impact other than to extend current conditions regarding land ownership, population and demographics, housing availability and pricing, local government finances and services including community services, employment, and wages and income. Overall, the impacts of the Proposed Action and Alternative 1 would be beneficial, short-term, and major.

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CHAPTER 1 INTRODUCTION, PURPOSE AND NEED

1.1 INTRODUCTION

This Environmental Impact Statement (EIS) is being prepared by the Bureau of Land Management (BLM), Pocatello Field Office, and the U.S. Forest Service (USFS), Caribou-Targhee National Forest (CTNF), in response to the proposed Mine and Reclamation Plan (M&RP) and lease modification for the Smoky Canyon Mine, East Smoky Panel (the Project). J.R. Simplot Company (Simplot) submitted the original M&RP in November 2013 (Simplot 2013) and an amendment to the M&RP in July 2015 (Simplot 2015). Simplot proposes: 1) development of federal mineral leases IDI-015259, IDI-026843, and IDI-012890 held by Simplot and, development and reclamation of an open pit phosphate mine and associated infrastructure on a combination of federal and split estate[1] lands; 2) modification of Lease IDI-015259 by adding 120 acres along the southwest side of the existing lease for mining-related disturbance; 3) development, construction, and reclamation of infrastructure including portions of transmission lines, access roads, and other miscellaneous disturbances off-lease on federal land administered by the USFS, requiring Special Use Authorizations (SUA); 4) an amendment to the Caribou National Forest (CNF) Revised Forest Plan (RFP) that would relocate a designated utility corridor south around the southern end of the proposed open pit in order to relocate an existing 115 kilovolt (kV) line; and 5) revising reclamation plans for Panel B to provide a complete backfill rather than the existing previously approved partial backfill. This would occur by backfilling with overburden from the East Smoky Panel and use of a store and release cover in place of the previously approved "cap" for coverage of seleniferous material. The general location of the Project is shown on **Figure 1.1-1**. The Project Area is generally defined as the geographic area that includes the proposed disturbance footprints of the Project.

1.1.1 Background

The existing Smoky Canyon mining and milling operations were authorized in 1982 by a mine plan approval issued by the BLM and SUAs issued by the USFS for off-lease activities, supported by the Smoky Canyon Mine Final EIS and Record of Decision (ROD). Mining operations began in Panel A in 1984 and have continued ever since with the mining of Panels A through G. As mining progressed through each mine panel, mine and reclamation operations were reviewed and the environmental effects assessed under the National Environmental Policy Act (NEPA). Supplemental M&RPs detailing the development and reclamation of each panel were approved with subsequent decisions made by the BLM for on-lease operations and by the USFS for operations conducted off lease.

A supplemental EIS was prepared in 2002 approving additional mining and expansion of Panels B and C, Panel B occurring within the northern portion and immediately adjacent to portions of the proposed Project Area. BLM and USFS completed an EIS for the Panels F and G Mine Plan

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[1] Split estate lands are those where the surface rights are in private or State of Idaho ownership and the mineral resources are owned and managed by the federal government. In this Project, the surface rights of split estate lands are owned by Simplot.

in 2007. BLM and USFS completed an EIS for the Panels F and G Lease and Mine Plan Modification Project in March 2015. Mining operations are complete in Panels A, C, D, and E and those areas are reclaimed. Mining continues in Panels B, F, and G with concurrent pit backfilling and reclamation.

1.1.2 About This Document

This document follows regulations promulgated by the Council on Environmental Quality (CEQ) for implementing the procedural provisions of the NEPA (40 Code of Federal Regulations (CFR) 1500-1508), regulations promulgated by the Department of the Interior (DOI) applicable to BLM for implementing the procedural provisions of the NEPA (43 CFR 46); regulations promulgated by USFS for implementing the procedural provisions of the NEPA (36 CFR 220); BLM's NEPA Handbook (H-1790-1), and the USFS Handbook of Environmental Policy and Procedures (FSH 1909.15).

Chapter 1 describes the purpose of and need for the proposed Project, the roles of the Agencies, provides a general history of the Smoky Canyon Mine, outlines public participation in the EIS process, and lists the issues and indicators generated by public participation in the Project scoping process.

Chapter 2 provides applicable background information on the Smoky Canyon Mine, including this Project; describes existing and proposed operations; and presents and compares alternatives to the Proposed Action.

Chapter 3 summarizes the affected environment that is associated with the Proposed Action and Alternatives.

Chapter 4 details the environmental consequences that are associated with the Proposed Action and Alternatives and lists potential mitigation actions to reduce or minimize impacts.

Chapter 5 describes the potential cumulative impacts associated with the Proposed Action and Alternatives.

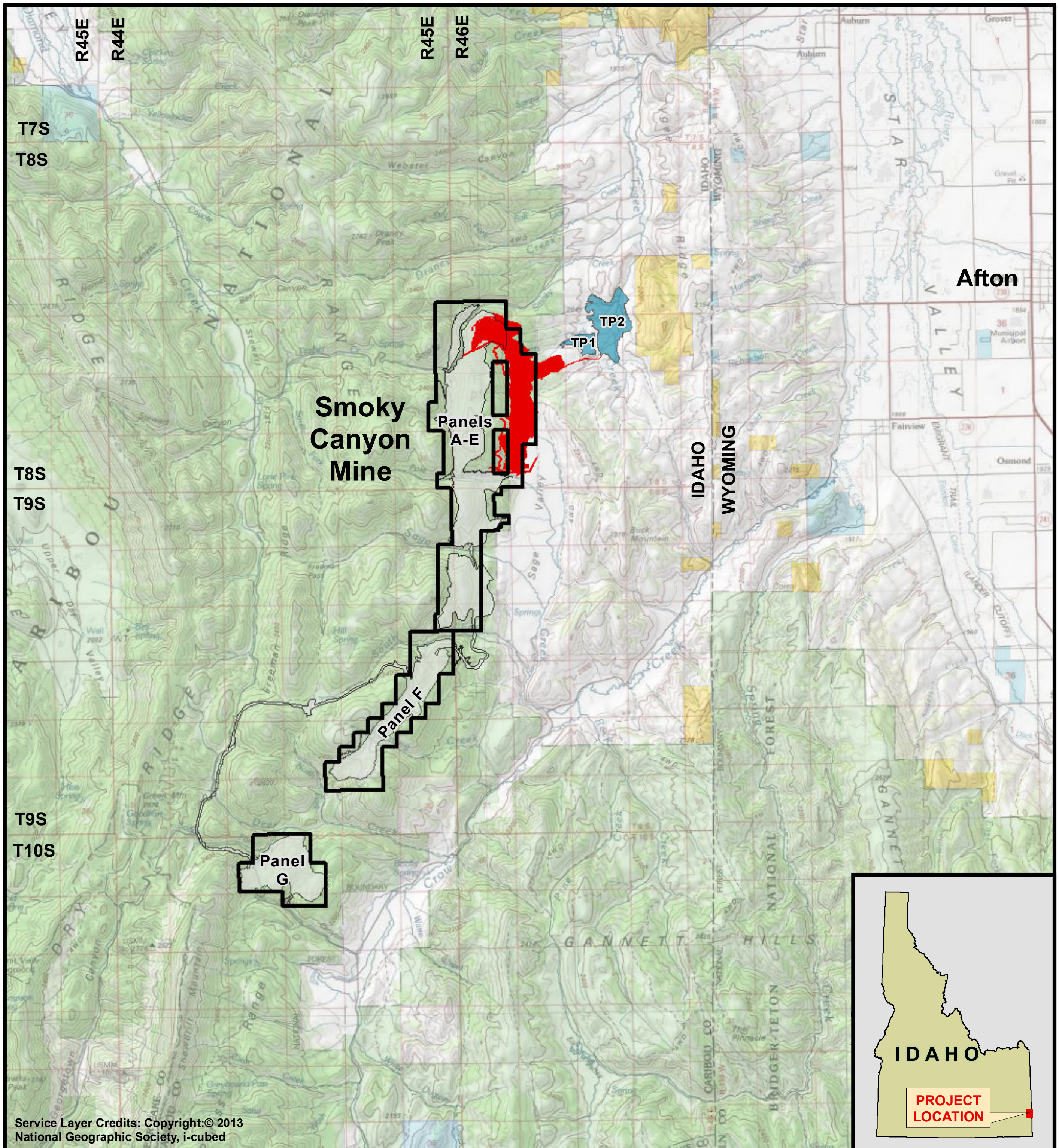
Chapter 6 describes consultation and coordination with state and federal agencies, discusses public involvement, and provides a list of the EIS preparers.

Chapter 7 lists references cited in developing the EIS and provides the index, acronyms, units of measure, and glossary of terms.

1.2 LEAD AND COOPERATING AGENCIES

The BLM is required to evaluate mining proposals and issue decisions related to the phosphate leases, as directed by the Mineral Leasing Act of 1920. This includes ensuring economically viable development of the phosphate resources, in accordance with federal law and regulations governing federal leases, including the requirement for ultimate maximum recovery (43 CFR 3594.1), and allowing the lessee to exercise its right to develop the lease. Such is the case for consideration of whether to enlarge lease IDI-015259.

USFS authorization is required for operations related to the Project located outside of the phosphate lease boundaries on National Forest System (NFS) lands, such as portions of the haul roads, borrow areas, stormwater control features, and topsoil storage areas.



Legend

Proposed East Smoky Panel Disturbance

Smoky Canyon Mine Existing Leases

Existing Mine Disturbance Boundary

Existing Tailings and Diversion Ponds (TP)

Land Ownership

BLM

Private

State

USFS

Note: Disturbance that would occur outside National Forest System Land (both on and off lease) would be on split estate land.

N

Project Location: SE Idaho, T8S, R46E, Sec. 19-21 & 29-32

0 2.5 5 Miles

Figure 1.1-1
General Project Area
East Smoky Panel Mine EIS

The USFS must determine whether and how to authorize these operations. Because the on-lease operations would occur on NFS lands, the USFS is a joint lead agency in the analysis of potential effects to those lands. The BLM would consult with the USFS in completing the effects analysis for on-lease operations and ensure that any mining and reclamation operations approved for NFS lands would comply with the RFP.

Because of these agency-specific responsibilities, the BLM is the lead agency for this EIS and the USFS is the joint lead agency.

Cooperating agencies are those federal, state, or local agencies that have jurisdiction by law and or special expertise with respect to any environmental impact related to a proposal (40 CFR Section 1508.5). The Idaho Department of Environmental Quality (IDEQ) is charged with implementing certain environmental laws and regulations within the State of Idaho including the Idaho Environmental Protection and Health Act (EPHA), the Idaho Water Quality Act, and rules and standards including the Idaho Ground Water Quality Rule. In addition, the IDEQ has authority to implement portions of the Federal Water Pollution Control Act through the Idaho Water Quality Standards and Wastewater Treatment Requirements. The Idaho Department of Lands (IDL) is the State of Idaho's agency charged with regulating mine reclamation on all lands in the state, regardless of ownership. The Office of Energy and Mineral Resources (OEMR) has special expertise in coordinating comments amongst the various Idaho state agencies. Therefore, by a Memorandum of Understanding (MOU) signed by the BLM, USFS, IDEQ, OEMR, and IDL, the IDEQ, OEMR, and IDL are cooperating agencies for this EIS (BLM et al. 2014 and BLM and OEMR 2017).

Hereafter in this document the lead and cooperating agencies are referred to collectively as the "Agencies."

1.3 PURPOSE AND NEED

The purpose of the proposed federal actions for the BLM and USFS is to decide whether to approve, approve with modifications, or deny Simplot's proposed M&RP for the Project. Simplot proposed the M&RP for the Project to exercise their right to develop the federal mineral leases they hold. The lease modification would enlarge existing Lease IDI-015259 to encompass a portion of the proposed East Smoky Panel pit and associated disturbance, without which Simplot would be unable to maximize ore recovery in the East Smoky Panel. In addition, Simplot has proposed to deposit overburden from the East Smoky Panel in the Panel B pit area, which would minimize the seleniferous footprint of the mine by avoiding the creation of additional external overburden disposal areas, while continuing to meet reclamation goals to return the Panel B area to more natural contours.

The need for the proposed federal actions for the BLM and the USFS is to evaluate Simplot's proposal pursuant to applicable laws and regulations. The BLM is required to evaluate mining proposals and issue decisions related to the phosphate leases, as directed by the Mineral Leasing Act of 1920. This includes ensuring economically viable development of the phosphate resources, in accordance with federal law and regulations governing federal leases, including the requirement for ultimate maximum recovery (43 CFR 3594.1), and allowing the lessee to exercise its right to develop the lease. Such is the case for consideration of whether to enlarge lease IDI-015259. USFS authorization is required for operations related to the Project located outside of the phosphate lease boundaries on NFS lands, such as portions of the haul roads, borrow areas, stormwater control features, power line, and topsoil storage areas. The USFS must determine whether and how to authorize these operations. Since the on-lease operations would occur on NFS lands, the USFS is a joint lead agency in the analysis of potential effects to those lands, and the BLM has consulted with the USFS in completing the effects analysis for on-lease operations.

1.4 AUTHORIZING ACTIONS

1.4.1 Federal Decisions to be Made

The BLM and the USFS will make separate but coordinated decisions related to the proposed Project. The BLM will approve, approve with modifications, or deny the M&RP; and determine whether to modify lease IDI-015259. In addition, the BLM will decide whether or not to approve a modification to the existing B-Panel Mine Plan. These decisions will be based on the EIS, public and agency input on the EIS, and any recommendations the USFS may have regarding surface management of leased NFS lands. The USFS will make recommendations to the BLM concerning surface management and mitigation on leased lands within the CTNF. SUAs from the USFS would be necessary for any off-lease disturbances/structures located within the CTNF and associated with the Project (e.g., topsoil storage, borrow areas, stormwater control features, transmission line relocation, and the dewatering pipeline). All proposed SUAs for the Project are described in **Chapter 2**. A forest plan amendment by the USFS would be necessary to change the route of an existing utility corridor designated by the RFP in order to relocate the existing 115 kV power line contained within the rerouted corridor around the southern portion of the proposed pit.

1.4.2 Permits, Approvals, and Consultations

The existing and proposed mining operations must comply with laws and regulations for mining on public land. In addition to the BLM and USFS, other federal, state and local agencies have jurisdiction over certain aspects of the Project and any potential action alternatives. **Table 1.4-1** lists these agencies and identifies their respective authorization or oversight responsibilities.

Table 1.4-1 Agency Involvement and Potential Affirmative Actions Required for the Project

ACTION	NATURE OF ACTION	APPLICABLE PROJECT COMPONENT	ANTICIPATED RESOLUTION
BLM			
ROD	Compliance with NEPA	Activities affecting federal lands and resources	Required for final approval
M&RP Approval	Authority under the Mineral Leasing Act and compliance with 43 CFR 3590.2a, 3592.1a and applicable federal land use plans	Activities affecting federally leased mineral resources (IDI-015259, IDI-026843, and IDI-012890)	Pending after ROD on the FEIS
Lease Modification	Authorize expansion of existing lease boundaries in compliance with 43 CFR 3510	Expansion of existing federal phosphate lease IDI-015259	Pending after the ROD

ACTION	NATURE OF ACTION	APPLICABLE PROJECT COMPONENT	ANTICIPATED RESOLUTION
Government to government consultation with the Shoshone-Bannock Tribes	Consultation with the Fort Hall Council of the Shoshone-Bannock Tribes is required on land management activities and land allocations that could affect treaty rights	All Project components	Consultation with the Fort Hall Council of the Shoshone-Bannock Tribes as required by law will continue throughout the EIS process
Mineral Material Sale (noncompetitive)	Authority under the Materials Act and compliance with 43 CFR 3602.30 to 3602.34 and applicable federal land use plans	Activities affecting federal resources	Pending after the ROD
USFS			
Special Use Authorization	Surface disturbance on NFS lands off-lease	Disturbance of NFS lands outside existing mineral leases	Pending after the ROD
Mineral Materials Permit (Use Permit)	Removal of mineral materials such as GM, alluvium, colluvium, or aggregate from USFS managed lands for use on federal or state lands; 36 CFR Part 228, subpart C – Disposal of Mineral Materials	Removal of mineral materials such as GM, alluvium, colluvium, or aggregate from borrow areas on USFS managed lands for use on federal or state lands	Approval must be obtained before commencement of borrow of material from USFS managed lands Pending issuance of the USFS ROD
Mineral Materials Permit (Negotiated Sale Contract)	Removal of mineral materials such as topsoil, alluvium, colluvium, or aggregate from USFS managed lands for use private lands; 36 CFR Part 228, subpart C – Disposal of Mineral Materials	Removal of mineral materials such as topsoil, alluvium, colluvium, or aggregate from borrow areas on USFS managed lands for use on private lands	Approval must be obtained before commencement of borrow of material from USFS managed lands Pending issuance of the USFS ROD
USFS Recommendation to the BLM	Under the Mineral Leasing Act, on NFS lands the USFS makes recommendations to the BLM regarding mineral leasing and development activities on federal mineral leases with respect to compliance with the RFP and other forest management concerns (these recommendations do not constitute or imply a permit or USFS decision)	Lease modification and M&RP approval	Recommendations issued after availability period for FEIS

ACTION	NATURE OF ACTION	APPLICABLE PROJECT COMPONENT	ANTICIPATED RESOLUTION
Government to government consultation with the Shoshone-Bannock Tribes	Consultation with the Fort Hall Council of the Shoshone-Bannock Tribes is required on land management activities and land allocations that could affect treaty rights	All Project components	Consultation with the Fort Hall Council of the Shoshone-Bannock Tribes as required by law will continue throughout the EIS process
U.S. Environmental Protection Agency (EPA)			
National Pollution Discharge Elimination System (NPDES) Multi-Sector General Permit	Protects quality of surface waters from stormwater discharge under Clean Water Act	Storm Water Pollution Prevention Plan (SWPPP)	Annually renewable SWPPP to be updated, as applicable and needed, pending ROD
Spill Prevention Control and Countermeasures (SPCC) Plan	Provides management direction for potential spills	Bulk petroleum products storage	In place. Updated as needed for changes in operations
U.S. Fish and Wildlife Service (USFWS)			
Endangered Species Act Compliance (Section 7)	Protects threatened or endangered species	Any activity, such as displacement or habitat disturbance, potentially affecting listed or proposed threatened or endangered species	Biological Assessment (BA) will be prepared for the agency preferred alternative prior to the issuance of the ROD; consultation will take place with the USFS
Migratory Bird Treaty Act	Protects migratory birds	All surface disturbing activities	Analysis to be completed
Bald and Golden Eagle Protection Act	Protects bald and golden eagles	All surface disturbing activities	Analysis to be completed
U.S. Army Corps of Engineers (Corps)/Joint Application			
Permit to Discharge Dredged or Fill Material (Section 404 Permit)	Authorized placement of fill or dredged materials in Waters of the U.S. or adjacent wetlands Clean Water Act Compliance	Disturbances of waters of the U.S., including wetlands	Analysis to be completed and permit obtained if needed
IDEQ			
Air Quality Permit	Release of air pollutants in compliance with the existing Smoky Canyon Mine permit	Elements that contribute to air quality issues, such as blasting, hauling, or crushing	Required air approvals for existing property already in hand; further permit updates, as needed, pending ROD

ACTION	NATURE OF ACTION	APPLICABLE PROJECT COMPONENT	ANTICIPATED RESOLUTION
401 Certification	Water quality certification for NPDES permit and authorized placement of fill or dredged material in waters of the U.S. and/or wetlands	SWPPP and disturbances of waters of the U.S., including wetlands	Analysis to be completed
Ground water quality Point(s) of Compliance Determination, as required by the Idaho Ground Water Quality Rule (at Idaho Administrative Procedures Act (IDAPA) 58.01.11.401)	Issuance of Point(s) of Compliance determination, which will ensure no adverse impacts to ground water and interconnected surface waters outside the mine area	Mine pits and overburden/interburden storage areas	In January 2020, IDEQ (2020) finalized a Point(s) of Compliance determination based on a May 10, 2019 application from Simplot. IDEQ evaluated hydrogeology, potential contaminants, and effects before determining a Point of Compliance well and four indicator wells to be monitored as required by Idaho's Ground Water Quality Rule (IDEQ 2015a).
Resource Conservation and Recovery Act program (adopted federal standards)	Management of hazardous waste	Storage and off-site disposal of hazardous wastes	Exempt Small Quantity Generator Notification already completed
Idaho Department of Water Resources (IDWR)			
Water Monitoring Well(s) Drilling Permit	Construction Permit for Development of Monitoring Well(s)	Monitoring Well(s)	Permits would be obtained prior to construction of wells
Idaho Department of Lands (IDL)			
State Mine Reclamation Plan Approval	Plan approval	M&RPs	Required for all surface mining activities in Idaho. Issued after reclamation plan is coordinated with IDL and approved by BLM and USFS.
Idaho State Historic Preservation Office (SHPO)			
Section 106 Compliance	Protects cultural and historical resources under the National Historic Preservation Act	All ground disturbing activities	ISHPO concurrence needed and required prior to issuance of USFS and BLM RODs
Caribou County			
Conditional Use Permit	Approval of construction of facilities within an approved land use	General facilities	None anticipated

The U.S. Army Corps of Engineers (Corps) exerts regulatory jurisdiction over waters of the U.S., including wetlands, pursuant to Section 404 of the Clean Water Act (33 United States Code (U.S.C.) 1344). Section 404 of the Clean Water Act requires a Corps permit be obtained prior to discharging dredged or fill material into waters of the U.S., which includes most perennial and intermittent rivers and streams, natural and man-made lakes and ponds, irrigation and drainage canals and ditches that are tributaries to other waters, and wetlands.

The enforcement of federal laws that protect migratory birds and endangered species lies with the USFWS and not primarily with the land management agencies (BLM and USFS). The USFWS will review the BA for listed plant and animal species prepared by the USFS for the agency-preferred alternative. The USFWS will conduct consultations with the land management agencies as they deem necessary and provide direction as required for protection of species within their regulatory authority.

Simplot's existing and current EPA NPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity would be maintained and updated as needed.

1.5 RELATIONSHIP TO AGENCY AND OTHER POLICIES AND PLANS

1.5.1 Federal Land Management Plans

The Project has been reviewed for compliance with agency policies, plans, and programs. The BLM Record of Decision and Approved Pocatello Resource Area Resource Management Plan (ARMP; BLM 2012) states leasable minerals on the CNF will be managed consistent with the applicable Forest Plan. In addition, since the Project involves split-estate lands where private land overlies BLM managed federal mineral estate, the Project would need to be in compliance with Goal ME-2 of the BLM's ARMP which includes the following:

- any operations plan will be coordinated with the surface owner to mitigate impacts as practical and as required by established requirements;
- On split-estate lands, stipulations, mitigation, and reclamation requirements for mineral development operations will be the same as on public lands and/or equivalent to State standards; Mitigation prescribed for federal mineral development on split estate lands (sub-surface) will apply only to the development of the federal minerals and will not dictate the surface owner's management of their private lands. Mitigations will be applied as restrictions to only those surface activities conducted for purposes of developing federal mineral that are permitted, licensed, or otherwise approved by the BLM;
- Exceptions to surface development restrictions could be granted if requested or agreed to by the surface landowner; and,
- Applicable Idaho Standards for Rangeland Health (BLM 1997) will be employed to determine the success of reclamation, rehabilitation, or restoration activities following major surface disturbances on public lands.

Further, **Chapter 4** (**Appendix 4A**) provides Project compliance information for various resources relevant to ARMP Goals, Objectives, and Actions for split-estate lands.

Conformance Language for the Greater Sage-grouse ARMPA

The Record of Decision for the Idaho and Southwestern Montana Approved Resource Management Plan Amendment (ARMPA) was signed on September 21, 2015 and the Revised ARMPA was signed March 14, 2019. The ARMPA amended all of the Land Use Plans within Idaho that have greater sage-grouse habitat and thus amends the ARMP. The ARMPA identifies and incorporates measures to conserve, enhance, and restore greater sage-grouse habitat by avoiding, minimizing, and compensating for unavoidable impacts of threats to greater sage-grouse habitat. The ARMPA addresses threats to greater sage-grouse and its habitat identified by the greater sage-grouse National Technical Team (NTT), by the USFWS in the March 2010 listing decision, as well as those threats described in the USFWS's 2013 COT report. The ARMPA establishes Objectives, Management Decisions, Buffers, and Required Design Features to protect and restore greater sage-grouse habitat. Idaho uses a conformance review form to document how each project proposal conforms to the ARMPA. However, for this Project, because there is no greater sage-grouse habitat within the Project Area, the conformance review form does not apply and the Project conforms to the ARMPA.

CNF Revised Forest Plan

The CNF RFP which guides land use developments and activities in the Project Area, recognizes phosphate mining as an appropriate use of NFS lands in this portion of the CNF.

As part of the RFP, management prescriptions have been developed and are applied to specific areas of the NFS lands to attain multiple-use and other goals and objectives. The Project Area includes the following management prescriptions: Prescription 2.8.3 – Aquatic Influence Zones, Prescription 5.2 (b) – Forest Vegetation Management, Prescription 8.1 (b) – Concentrated Development Areas, Prescription 8.2.1 – Inactive Phosphate Leases, and 8.2.2 (g) – Phosphate Mine Areas. (USFS 2003a). The majority of the Project Area is within the 8.2.1 Management Prescription. This management prescription area is shown on Map 11 of the RFP (USFS 2003b). It is basically a 0.5-mile buffer around Known Phosphate Lease Areas (KPLA) and inactive leases that existed at the time the RFP was prepared, and it was intended to include phosphate mining operations and ancillary facilities needed for development of mines within the 8.2.1 management prescription area. This same area is also covered by other management prescriptions discussed in the land use section of **Chapter 3**. Those are the prescriptions that guide USFS management until a site-specific, phosphate mine development plan is submitted to the USFS. Then the area of the specific mine plan is intended to only be managed under Prescription 8.2.2, Phosphate Mine Areas.

The management prescriptions are not designed to stand alone and are part of the management direction package presented in the RFP. Where a management prescription allows an activity, such as the development of existing phosphate leases, the standards and guidelines in the prescription in the Forest-wide direction (explained below) would provide specific parameters within which the activity must be managed. In land areas where prescriptions are applied, direction provided under each prescription would override Forest-wide direction if there were a conflict. Under Prescription 8.2.2 (USFS 2003a), site-specific mining and reclamation plans developed by the mining industry will be jointly reviewed and evaluated by the USFS, BLM, and other regulatory agencies with jurisdiction through the environmental analysis process. One of the goals of this prescription is to "[p]rovide for phosphate resource development with consideration given to biological, physical, social, and economic resources" (USFS 2003a).

The RFP also provides Forest-wide guidance for desired future conditions (DFCs) for each resource. From these DFCs, Forest-wide goals have been formulated, and, for some resources, objectives have been developed to help measure the progress in meeting these goals and achieving DFCs. Standards and guidelines, by resource, are presented in the RFP and are used to promote the achievement of the DFCs and to assure compliance with laws, regulations, executive orders, or policy direction established by the USFS. Disclosure of and compliance with these Forest-wide Standards and Guidelines and the applicable prescriptions listed above are discussed within this EIS in **Chapter 4** (**Appendix 4A**).

The approach for active phosphate leases in the RFP (USFS 2003a) is to incorporate best management practices (BMPs) into the conditions of approval for site-specific mining and reclamation plans, and to allow for developments in research and technology over time to be incorporated into the prescribed practices and monitoring systems. In addition, in order to relocate the existing 115 kV power line, which is currently within an existing utility corridor designated by the RFP, within a rerouted corridor around the southern portion of the proposed pit, an amendment to the RFP would be required.

1.5.2 Inventoried Roadless Areas Management on the CTNF

In August 2008, the Roadless Area Conservation, National Forest Lands in Idaho Final Environmental Impact Statement (FEIS; USFS 2008a) was issued, and the Final Rule and Record of Decision on Idaho Roadless Area Conservation were published in the Federal Register on October 16, 2008. The October 16, 2008 final Idaho Roadless Rule is currently the law of the land in Idaho. None of the proposed mining activities would be located within Inventoried Roadless Areas (IRAs); therefore, the Idaho Roadless Rule would not be a consideration for this Project.

1.5.3 Instruction Memorandum No. 2019-0018 Compensatory Mitigation

On December 6, 2018, Instruction Memorandum (IM) 2019-018 was issued and now supersedes IM 2018-093. This policy provides guidance to the BLM relating to the imposition of offsite mitigation. Under limited circumstances, the BLM will consider voluntary proposal for compensatory mitigation, and state-mandated compensatory mitigation, but the BLM will not accept any monetary payment to mitigate the impacts of a proposed action. In all instances, BLM must refrain from authorizing any activity that causes unnecessary or undue degradation pursuant to FLPMA Section 302 (b). Preventing unnecessary or undue degradation does not mean preventing all adverse impacts upon the land. When BLM is considering voluntary compensatory mitigation as a component of the project submission, BLM's NEPA analysis should evaluate the need for compensatory mitigation by both considering the effectiveness of the compensatory mitigation and comparing the proposal with and without off-site compensatory mitigation. The proponent did not voluntarily offer compensatory mitigation. Therefore, it was not a consideration in this EIS.

1.5.4 Instruction Memorandum No. ID-2013-040 Habitat Equivalency Analysis

Instruction Memorandum (IM) ID-2013-040 outlines the Idaho BLM guidance for appropriate use of Habitat Equivalency Analysis (HEA) as part of the impact analysis of phosphate mining project proposals within the context of NEPA documents. Using HEA as a tool will help the BLM achieve a better NEPA analysis.

The BLM will use HEA to inform its direct and indirect effects analysis and to compare alternatives within the area of impact. The use of the HEA will not be to exact mitigation.

1.6 PUBLIC SCOPING

The originally proposed East Smoky Panel M&RP was submitted to the BLM and CTNF in November 2013. The Notice of Intent (NOI) to prepare an EIS for the Project was published in the Federal Register on April 3, 2015. A copy of this NOI is included in the Public Scoping Summary Report, East Smoky Panel Project Environmental Impact Statement (Scoping Report; Stantec 2015a). Legal notices announcing the Agencies' request for public scoping comments for the Project were published in newspapers that serve communities near the Project location in Pocatello, Idaho and Afton, Wyoming on April 3 and April 8, 2015, respectively. A news release was submitted to approximately 40 television stations, radio stations, and newspapers on April 3, 2015 and Project information was posted on BLM and USFS planning websites (Stantec 2015a).

A public mailing list was compiled and 96 scoping letters were sent to federal, state, and local government agencies, groups, and members of the interested public. Three public scoping meetings were held: one at the Civic Center in Afton, Wyoming, on April 21, 2015; one at the Shoshone-Bannock Hotel Event Center in Fort Hall, Idaho, on April 22, 2015; and one at the BLM Pocatello Field Office in Pocatello, Idaho, on April 23, 2015. The open house style meetings provided a description of the Project, maps and photo displays of the Project Area, and a forum for exchange of information and ideas or concerns related to the Project. Comment forms were available at the meetings and agency, proponent, and consultant representatives were present to answer questions as needed.

Public comments regarding the Project were solicited and compiled in the Scoping Summary Report (Stantec 2015a) to help determine the issues and alternatives for evaluation in the environmental analysis. By the close of the scoping period on May 4, 2015, 9 comment letters had been received for the Project. Comments were submitted by agencies, entities, and interested citizens. A complete list and copies of all written comment letters, forms, and e-mails can be found in the Scoping Summary Report (Stantec 2015a). Preliminary concerns identified included potential effects of the Project to water resources and from selenium releases, but also included potential effects and or cumulative effects of the Project regarding air quality, climate change, human health and safety, socioeconomics, wildlife, reclamation and financial assurance, and mitigation and monitoring for mine operations. These are further discussed in **Section 1.8**.

1.7 TRIBAL TREATY RIGHTS AND NATIVE AMERICAN CONSULTATION

Federal agencies acknowledge the federal trust responsibility arising from Indian treaties, statutes, executive orders, and the historical relations between the United States and Indian tribes. The Shoshone-Bannock Tribes have ancestral Treaty Rights to uses of the CTNF. The relationship of the U.S. government with Native American tribes is based on legal agreements between sovereign nations. The Fort Bridger Treaty of July 3, 1868, granted hunting, fishing, and gathering rights to tribal members on "all unoccupied lands of the United States so long as game is present thereon." This right applies to all public domain lands reserved for National Forest purposes that are presently administered by the CTNF. USFS managers have a responsibility to ensure consideration of those resources essential for the Tribes to exercise their treaty rights. Treaty rights are governed by the law of the United States as set forth by the U.S. Supreme Court. Consultation with the Fort Hall Business Council of the Shoshone-Bannock Tribes is required on land management activities and land allocations that could affect these rights. Concerns and objections that the Shoshone-Bannock Tribes have with this Project are discussed in this EIS and revolve around impacts to their tribal treaty rights.

Applicable Forest-wide goals and standards of the USFS CNF RFP (USFS 2003a) regarding tribal coordination are listed below.

Forest-wide Goals:

- Tribal Treaty rights and other federal trust responsibilities are met and Tribal governments are involved in planning and implementation of programs of mutual interest.
- The Forest recognizes the tribes' right to self-determination and control of their resources and their relationship both among themselves and with non-Indian governments, organizations, and persons.
- Culturally significant items and sites are identified, protected, and treated within the context of the culture that identifies and values them.
- Relationships with American Indian populations are improved to better understand and integrate Tribal needs and desires with Forest management activities.

Forest-wide Standard: Forest consultation procedures and intergovernmental agreements with the tribes to guide future cooperative efforts shall comply with the protocols set forth in the National Resource Book on American Indian and Alaska Native Relations Working Draft 1995 or its successor (USFS 2003a, Caribou RFP 3-35).

Desired Future Conditions: Lands within the Forest serve to help sustain and provide opportunities for traditional American Indian land and resource uses. The opportunities help sustain the American Indians' way of life, cultural integrity, social cohesion, and economic wellbeing (USFS 2003a, Caribou RFP 3-35).

The ARMP (BLM 2012) and BLM policy acknowledge a relationship between the U.S. Government and American Indian tribes based on Indian trust responsibilities and other legal agreements such as treaties made between these sovereign nations. As a federal agency, the BLM shares in the federal trust responsibility to the Shoshone-Bannock Tribes on the management of federal lands. The federal trust responsibility is related to traditional/cultural uses, as well as the health of the land and water resources and therefore to the socio-economic needs of the Shoshone-Bannock Tribes. Consultation with the Shoshone-Bannock Tribal Council is required on land management activities and land allocations that could affect these rights. The goal of this coordination is to assure that tribal governments, Native American communities, and individuals whose interests might be affected have a sufficient opportunity for productive participation in BLM resource management decision making as set forth in the BLM Manual Section 8160.

The ARMP (BLM 2012) guides land management activities on public lands administered by the BLM. Land management decisions such as mineral leasing and mining need to recognize these rights and trust responsibilities. The BLM also administers the subsurface mineral estate, for phosphate and other leasable minerals, on the CTNF. The 1868 Fort Bridger Treaty reserves off reservation treaty rights to Tribal members. Provisions of the Fort Bridger Treaty reserve the Shoshone-Bannock people's rights to practice hunting, gathering, fishing, and traditional use on all unoccupied public lands. As these treaty rights are related to surface management, and not the mineral estate, the BLM relies on coordination with the USFS and compliance with the CNF RFP (USFS 2003a) to ensure sufficient protection of those resources to which the Shoshone-Bannock people have certain rights.

BLM and USFS staff met with Shoshone-Bannock Tribal staff on December 17, 2014 to provide descriptions of the Project and discuss items of concern. A certified letter was sent to the Tribe Business Council Chairman on March 31, 2015 to describe the Project and provide notice of the public meetings, one of which was held at the Shoshone-Bannock Hotel Event Center on April 22, 2015. Consultation with the Tribes will continue throughout the EIS process.

1.8 ISSUES AND INDICATORS

The issues to be evaluated in this EIS are derived from the Scoping Summary Report (Stantec 2015a). That document summarized the comments received during public scoping from agencies, groups, and the public, and organizes the comments into categories, which became the basis for defining issues.

Pursuant to CEQ NEPA regulations (40 CFR 1501.7), it is through the scoping process that the lead agency (a) determines the scope and significant issues to be analyzed in depth in the EIS and (b) identifies and eliminates from detailed study the issues that are not significant, narrowing the discussion of such issues to a brief presentation in the EIS as to why they will not have a significant effect on the human environment. In brief, the scoping comments must be reviewed to determine the significant issues in the context of NEPA and for preparing an EIS.

By the close of the scoping period on May 4, 2015, nine comment letters had been received. Copies of all written comment letters are included in Scoping Report (Stantec 2015a).

Within the nine comment letters, a total of 156 concerns were identified. Contained within those concerns, issues were identified and categorized into resource categories. The defined issues are presented under components of the human and natural environment that are customarily addressed in impact analysis. The indicators are typically the quantifiable criteria that are used to judge the significance of the impact, although some issues rely on a discussion of effects for comparison purposes or an evaluation of the impact instead of a quantifiable indicator. Indicators are based on regulatory requirements, baseline data, trends, and best management technology and typically only apply to impacted resources discussed and analyzed in **Chapter 4**.

In addition to the comments received from the external scoping process, internal (Agencies) scoping identified either similar issues or additional issues covered in this EIS.

Resource issues derived from concerns raised and identified during scoping and their associated indicators are summarized in **Table 1.8-1**. The table also identifies in which section of the EIS the issue is addressed. A complete summary of concerns identified during scoping, including those concerns that may not be specifically addressed in this EIS, is provided in the Scoping Summary Report (Stantec 2015a). The issues included in **Table 1.8-1** are issues that relate to environmental impacts to resources. Many of the concerns brought forward through scoping are not included in the table because they deal with disclosure, policies, procedures, or other processes that the Agencies are required to follow. Those scoping concerns are important and will be addressed in the EIS, the ROD, or supporting documentation.

Public comments on the Draft EIS did not reveal any new issues that needed to be added to the table or to the FEIS.

Table 1.8-1 Issues and Indicators Derived from Scoping

RESOURCE	ISSUES	INDICATORS	WHERE ADDRESSED IN EIS
Air Quality and Climate Change	The Project has the potential for emission of air pollutants including those associated with airborne particulate matter from mining activities and exhaust emissions from haul trucks and other mining equipment. The Project has the potential to increase emissions from construction and operation and release greenhouse gas (GHG) emissions including CO_2, N_2O, and CH_4 from proposed mining activities.	Increase in emissions of air pollutants including fugitive dust (airborne particulate matter) from proposed mining activities and exhaust emissions from haul trucks and other mining equipment. Increase in emissions of GHG including carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4) from proposed mining activities.	Chapter 4 – Air Resources
Cultural Resources	Cultural resources may be impacted by the Project.	Number of historic properties (cultural sites eligible for the National Register of Historic Places [NRHP]) impacted by the Project.	Chapters 3 and 4 – Cultural Resources
Fisheries and Aquatics	The Project may affect cutthroat trout, other native fish, amphibians, fisheries resources, or aquatic resources in the Project Area due to habitat alterations.	The length of intermittent and perennial stream channels directly affected by the Project, and comparison with the undisturbed lengths of these stream channels in the Project Area. Acres of aquatic influence zone (AIZ) habitat to be affected and comparison with undisturbed acreage of this habitat in the Project Area. Quantities of suspended sediment, selenium, and other heavy metals and other contaminants of concern resulting from the Project in fishery resources in the area, with emphasis on compliance with applicable aquatic life water quality standards.	Chapters 3 and 4 – Fisheries and Aquatics

RESOURCE	ISSUES	INDICATORS	WHERE ADDRESSED IN EIS
Geology and Geochemistry	Physical and chemical characterization of ore and solid wastes and wastewater should be determined to provide projections and potential impacts of wastewater and solid wastes from the Project.	Estimates of waste rock and ore volumes generated from the Project and the chemical characterization.	Chapters 2 and 4 – Geology, Minerals, and Paleontology
Grazing	The Project may result in impacts to grazing in the Study Area.	Acres of suitable livestock foraging areas to be disturbed and the length of time livestock would be excluded from the mining areas, and comparison with undisturbed acres of grazing allotments in the Project Area. Changes in vegetation or forage value as a result of the reclamation mix.	Chapter 4 – Land Use and Transportation
Hazardous Materials	Potential for spills due to transporting, containing and cleaning up fuels, solvents, lubricants, hazardous materials, explosives, and human waste.	Compliance with appropriate local, state, and federal standards for handling of fuels, hazardous materials, and solid wastes	Chapter 2 – Section 2.3 Existing Operations
Land Use and Transportation	There are potential adverse impacts to private property owners in the region. The Project may cause changes to the USFS road network in and around the Project Area, from Off-Highway Vehicle (OHV) and All-Terrain Vehicle (ATV) use and mining activities.	Changes in access to private property. Increase/decrease in traffic. Relative increase in traffic on public roads in the Project Area as a result of proposed mining activities, change in traffic types, and road design features to deal with this. Changes in existing primary access to and through the CTNF on county or open USFS roads caused by the Project-related activities, including access to private lands (number of private landowners impacted).	Chapter 4 – Land Use and Transportation Chapter 4 – Land Use and Transportation Chapter 4 – Land Use and Transportation
Noise	Noise impacts from mine operations, mine traffic on haul roads, and traffic on access roads may affect Project Area residents and wildlife.	Estimated noise levels (decibels) from mining operations, haul truck traffic related to mining, and access road traffic and proximity to sensitive receptors.	Chapters 3 and 4 – Noise

RESOURCE	ISSUES	INDICATORS	WHERE ADDRESSED IN EIS
Recreation	Recreational use and public access to the Project Area may be limited or prevented by mining activities.	Acres of and number of recreational access points temporarily closed and/or blocked to public use. Locations of primary access roads blocked or closed by the Project. Changes in the quality of recreational use of the area including fishing, hiking, riding, wildlife viewing, and hunting.	Chapter 4 – Land Use and Transportation
	Impacts may occur from OHV and ATV use on reclaimed and closed roads.	Predicted use of recreational vehicles on reclaimed area or roads with consideration of methods used to prevent OHV and ATV use.	Chapter 3 – Land Use, Transportation, and Special Designations
Water (Selenium)	Impacts may occur from further deposition of selenium into the environment and the effectiveness of mitigation measures needs to be disclosed, plus the cumulative effects of the proposed operation, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) related removal and remediation components, and with other phosphate mines in the region, needs to be evaluated.	Predicted changes in water quantity and quality based on water and contaminant transport modeling within the Project Area and within the Cumulative Effects Areas (CEAs).	Chapter 4 and 5 – Water Resources
	Impacts may occur from the potential for increased selenium rich runoff from all aspects of the site – roads, stockpile areas, and active and reclaimed surfaces.	Predicted changes in water quantity and quality based on water and contaminant transport modeling.	Chapter 4 – Water Resources

RESOURCE	ISSUES	INDICATORS	WHERE ADDRESSED IN EIS
Socioeconomics	Potential for closure of the mine and effects on the local economy of affected communities should be evaluated.	Numbers of employees, contractors, and their dependents that could be affected by potential mine and fertilizer plant closure and loss of personal/public income. Estimated economic and social impacts of the Proposed Action, Action Alternatives, and No Action Alternative.	Chapters 3 and 4 – Social and Economic Resources
	Efficient recovery of the phosphate resource should be discussed.	Phosphate resource (tons) that would not be recovered under the No Action Alternative.	Chapters 3 and 4 – Social and Economic Resources
Soils	Soil quantity may be insufficient for reclamation plans.	Estimated volumes of stockpiled and direct placed soil.	Chapters 3 and 4 – Soils
Threatened, Endangered, Candidate, and Sensitive Species	Short and long-term impacts to threatened and endangered (T&E) wildlife species and their habitat, candidate T&E species and their habitat, species of special concern and their habitat, and migratory birds and their nesting sites could occur.	Disruption of movement corridors between habitat areas. Disruption and displacement of threatened, endangered, or sensitive species at lek, nest, or roost sites. Disturbance to threatened, endangered, or sensitive species from noise and mining activity. Mortality of threatened, endangered, and sensitive species through vehicle and power line collisions. Presence/lack of presence of species in the Project Area.	Chapter 4 – Wildlife Resources Chapter 5 – Wildlife Resources

RESOURCE	ISSUES	INDICATORS	WHERE ADDRESSED IN EIS
Vegetation and Noxious Weeds	The mining operations and related transportation activities may affect vegetation patterns and productivity in the Project Area.	Acres of vegetation communities that would be disturbed by the Project and also potentially subjected to an increase in weed invasion. Acres of disturbed areas that are planned for reclamation and the types of vegetation that would be restored. Acres of permanent vegetation conversion from forest to non-forest cover and predicted re-growth rate back to forest conditions. Discount service acre years (DSAYs) lost through the Proposed Action and Action Alternative.	Chapter 3 – Vegetation and Wetlands Chapter 4 – Vegetation and Wetlands
Visual Resources	Visual impacts of the Project should be disclosed.	Estimated compliance with the Visual Quality Objectives in the USFS Visual Management System. Change in scenery, from baseline to projected, from various public and occupied points within the Study Area.	Chapter 4 – Visual Resources
Water	The mining operations and related transportation activities may cause changes to the quantity and quality of surface water or groundwater in the Project Area and within the affected watershed area.	Current status of groundwater and surface water quantity and quality in the Project Area. Acreage and percentage of hydrologic disturbance within the affected watershed. Predicted changes to quantity and quality of groundwater and surface water from the Project. Predicted performance of cover systems and resulting impacts to water quality and quantity.	Chapters 3 and 4 – Water Resources

RESOURCE	ISSUES	INDICATORS	WHERE ADDRESSED IN EIS
Water continued	The EIS should identify fault lines that influence the production of natural springs, the water resources of the area, and the supporting hydrology to fully assess the potential impacts of the Project on the adjacent springs and streams as well as groundwater recharge.	Identification of springs and streams that would be impacted by the Project. Predicted changes to the quantity and quality to springs and streams.	Chapter 4 – Water Resources
	The Project may result in water rights being obtained and impacted and potential water diversions.	Water rights are described and compliance of the Project with rights determined. Analysis of impacts from any water diversion. Estimated flows at key locations.	Chapter 3 – Water Resources Chapter 4 – Water Resources
	The Project may result in: (1) changes in the volume and timing in surface runoff water caused by the operations; (2) increases in suspended selenium, temperature, sediment, turbidity, and contaminants of concern in downgradient streams, ponds, and other surface waters, with regards to applicable surface water quality standards; (3) reduction in available groundwater to supply existing baseline flow of streams and springs in the Project Area from pumping water supply well (s).	Changes in the volume and timing in surface water runoff caused by the Project. Increases in suspended sediment, turbidity, and contaminants of concern in downgradient streams, ponds, and other surface waters, with regards to applicable surface water quality standards. Reduction in available groundwater to supply existing baseline flow of streams and springs in the Project Area from pumping of any water supply well(s). Project-related impacts affecting the 303(d) listing and Total Maximum Daily Loads (TMDLs).	Chapters 3 and 4 – Water Resources
Water and Wetlands	Construction of mine facilities and other surface disturbances may directly affect wetlands and Waters of the U.S. (WOUS) and could include increased metal and sediment loading in surface waters and/or changes in water quantity/quality in both surface waters and groundwater supporting WOUS.	Wetland acres and/or length of jurisdictional channels that would be disturbed by the Project. WOUS crossings caused by the Project and associated new transportation corridors. Change in function and value of all wetlands disturbed by the Project.	Chapter 3 – Vegetation and Wetlands

RESOURCE	ISSUES	INDICATORS	WHERE ADDRESSED IN EIS
Wildlife	The mining operations and related transportation facilities may physically affect terrestrial wildlife and significant wildlife corridors, through direct disturbance and fragmentation of their habitat, as well as reduction in amounts and quality of available water.	Acres of different wildlife habitats physically disturbed over the life of Project. Acres of disturbance to and the proximity of Project operations to high value habitats such as: crucial and or high value big game ranges, significant migration corridors, wetlands, and seep and spring areas. DSAYs lost through the Proposed Action and Action Alternative.	Chapter 3 – Wildlife Resources Chapter 4 – Wildlife Resources
	Exposure of wildlife to selenium or other harmful contaminants.	Acres of habitat disturbance in the Project Area. Reclamation efforts to prevent uptake of selenium in vegetation. BMPs or mitigation measures to prevent exposure and bioaccumulation.	Chapters 3 and 4 – Vegetation and Wildlife Resources
Wildlife, Vegetation, and Water	Cumulative impacts should consider, (1) large scale conversion of many miles of more or less contiguous bands of partial woodlands and sage scrub to pits, rock faces and meadows, and what effect that will have on the environment; and (2) the impacts to surface and groundwater within the larger spatial and temporal context of past, present, and likely future mines in this area; (3) potential impacts to natural resources due to potential foreseeable actions (e.g. expansion of mine on private land or other ground disturbing action that could natural resources) regardless of what agency (federal or non-federal) undertakes the action (40 CPR§ 1508.7); and (4) removing sources of contamination.	Cumulative impacts analysis evaluates the disturbance associated with the Project in conjunction with other disturbances in the CEA and anticipated future impacts in the CEA, by resource.	Chapter 5 – Wildlife Resources, Vegetation and Wetlands, and Water Resources

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CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter provides background information on Simplot's existing operations at the Smoky Canyon Mine, along with detailed descriptions of Simplot's Proposed Action, one action alternative, alternatives that were considered and/or eliminated from detailed analysis, the No Action Alternative, and the Agency Preferred Alternative. The Agency Preferred Alternative was identified by the Agencies after comparing predicted environmental impacts associated with the Proposed Action, Alternative 1, and the No Action Alternative.

2.2 MINE HISTORY

2.2.1 Background

Simplot has been involved in phosphate mining in Southeastern Idaho since 1945. As described in **Section 1.1.1**, Simplot began extracting phosphate ore from deposits located on federal land at its Smoky Canyon Mine in eastern Caribou County, Idaho in 1984. The operation has included mining with standard open pit techniques in mine panels (Panels A through G) and then concentrating the phosphate content of the ore in an onsite mill. The concentrate is pumped through a buried pipeline to Simplot's existing fertilizer manufacturing plant (Don Plant) in Pocatello, Idaho. Tailings from the Smoky Canyon milling operation are disposed in two on-site permitted tailings disposal ponds located on private land owned by Simplot.

2.2.2 Past Environmental Impact Reviews

There have been a number of environmental reviews conducted under NEPA for the Smoky Canyon Mine property and operations.

The first EIS for the Smoky Canyon Mine was prepared in 1981 by the U.S. Geological Survey (USGS), then in charge of administering phosphate mining on federal lands, in conjunction with the USFS. This initial EIS was followed by numerous NEPA documents examining the environmental impacts of various components and expansions of the mine. Ultimately, mining of Panels A through E was authorized.

Leasing, lease modifications, and exploration activities in Panels F and G (also known as the Manning Creek and Deer Creek lease areas) were analyzed between 1994 and 2007 through several Environmental Assessments and EIS documents, including an EIS for the Panels F and G Mine Plan in 2007. The mining of Panels F and G was authorized by the 2008 RODs issued by BLM and USFS upon the completion of the 2007 FEIS. Most recently, lease and mine plan modifications for Panels F and G proposed by Simplot were evaluated in an EIS issued in 2014. RODs for the lease and mine plan modifications were issued in 2015.

Relative to the Project, the Agencies prepared a Supplemental EIS for Panels B and C of the Smoky Canyon Mine, published in 2002, with the ROD also issued in 2002. The decisions in the ROD provided for development of the Panels B and C pits and disturbing approximately 274 acres. Upon completion of mining, the Panel B pit was to be backfilled with overburden to produce a topographic condition similar to natural conditions. A portion of the highwall approximately 2,800 feet long with a maximum height of 250 feet was to remain after reclamation at the northeast edge of the pit, facing southwest (BLM and USFS 2002a).

In 2007, documentation of Land Use Plan Conformance and a Determination of NEPA Adequacy was prepared and a modification was approved to address a request by Simplot to extend Panel B to allow additional ore recovery, increase reclamation slopes by approximately 7.5 acres at steeper than 3 horizontal to 1 vertical (3H:1V) to reduce the amount of surface water that may percolate into backfill that may affect groundwater quality, and reduce the chert cover thickness from 8 feet to 4 feet to better schedule use of available chert (BLM 2007a).

An additional Determination of NEPA Adequacy was also prepared in 2008 to address a minor modification to the existing Smoky Canyon Mine M&RP, which included relocation of the Panel B Runoff Recharge Area (RRA) to the northwest portion of the panel; modification of the design of the Panel B reclamation surface to deliver clean water to the proposed RRA; and an increase in disturbance from the Panel B in-pit road by seven acres (BLM 2008a).

In 2010, an Environmental Assessment was prepared (BLM 2010a) and a Finding of No Significant Impact (BLM 2010b) documented the decision of the BLM (BLM 2010b) authorizing expansion of the Panel B pit on the northeast end by 18 acres, an increase in the amount of seleniferous overburden backfilled into the pit, and a reduction in the seleniferous footprint of the approved Panel B external overburden fill by 20 acres. The modification area was to be completely backfilled and reclaimed according to the provisions of the Supplemental EIS as previously described.

In 2015, the BLM issued a Categorical Exclusion allowing for an additional 3.4 acres of disturbance within Lease IDI-012890 to stabilize the Panel B footwall to prevent footwall failure. The additional disturbance was estimated to generate an additional 1.7 million bank cubic yards (BCY) of non-seleniferous overburden; would not increase the seleniferous footprint of the mine; or result in measurable change to the final mine configuration (BLM 2015a).

2.2.3 CERCLA Studies and Remediation

CERCLA, enacted by Congress in 1980 and amended in 1986, was enacted to respond to pollution and the threats posed to human health and the environment resulting from the release, or imminent threat of a release, of hazardous substances. CERCLA provides that the parties responsible for the pollution pay the costs to investigate and remediate contaminated sites.

Beginning in 1996, livestock deaths associated with selenium poisoning were identified at a phosphate mine other than the Smoky Canyon Mine in Southeastern Idaho. The livestock deaths associated with selenium poisoning prompted response by the regulatory agencies, the phosphate mining members of the Idaho Mining Association, tribal agencies, and other stakeholders. In 2000, many of these parties entered into an Area-Wide Administrative Order on Consent (AOC) to further evaluate and address area-wide and site-specific human health and ecological risks related to past phosphate mining in Southeastern Idaho. Signatory agencies involved in the Area-Wide AOC include IDEQ, BLM, USFS, EPA, and Bureau of Indian Affairs (BIA). This agreement also included a process for separate AOCs at specific mining properties that would describe the approach to conducting site investigations (SIs) and Engineering Evaluations/Cost Analyses

(EE/CAs) that would lead to removal actions necessary for remediation of environmental contamination from existing mining disturbances.

Concentrations of selenium in water sources in the vicinity of the Smoky Canyon Mine began increasing in 1995, and this upward trend continued at some sites for more than a decade. In 2003, Simplot entered into AOCs for the Smoky Canyon Mine with federal and state agencies. The subsequent SI, completed under the 2003 AOC, determined that selenium and other hazardous substances are being released from the site into the environment. The SI found that rock mined as overburden provided the sources for releases. Most of the mine facilities were constructed prior to the discovery of selenium releases. Since discovery, mining companies and the regulatory oversight agencies have worked to understand release mechanisms and to develop best management practices to prevent releases.

The 2003 AOC divided the Smoky Canyon Mine area into two parcels, known as Area A and Area B. Area A included historically mined areas and related facilities located on NFS land under lease and special use permit, which includes Panels A, B, C, D, and E. Area B included the tailings ponds and surroundings and also overlaps the East Smoky Panel Mine disturbance area. The AOC required that Simplot conduct a SI and EE/CA in Area A; this was completed in May 2006. For Area B, it required Simplot to conduct environmental investigations and an ecological risk assessment.

The Agencies continue to work with Simplot to remediate selenium issues at the Smoky Canyon Mine. The SI and EE/CA findings resulted in the Pole Canyon overburden disposal area (ODA) Removal Action (RA), which was accomplished in 2008 and a follow-up RA in 2015/2016. The Pole Canyon ODA is located south of the East Smoky Panel Mine area. Moving from the RA phase to the CERCLA remedial response phase of the project, the Smoky Canyon Mine entered into an Administrative Settlement Agreement and Order on Consent/Consent Order for a Remedial Investigation/Feasibility Study (RI/FS) with the USFS, IDEQ, and EPA in 2009. The RI/FS was conducted for Area A, with sampling of various media occurring between 2010 and 2013. Pilot studies for selenium treatability were also begun at the Hoopes Springs area south of the East Smoky Panel Mine area and are ongoing. The final RI report was completed in 2014 (Formation Environmental 2014). The USFS is currently underway and will analyze potential response actions at the Smoky Canyon Mine. The selected remedial action, when selected, will be documented in a CERCLA Record of Decision.

The potential relationship between the Project and these future remediation projects will be determined through ongoing studies and analysis in conjunction with groundwater and geochemical predictions made as part of this EIS. In turn, baseline studies (e.g., ground water, surface water, etc.) conducted for this EIS may provide supporting information to the ongoing CERCLA process. For example, two wells (GW-29 and GW-30) that were drilled and developed within the East Smoky Panel Mine area for baseline sampling were constructed to meet CERCLA standards to facilitate this dual use.

2.3 EXISTING OPERATIONS

2.3.1 General Location

Figure 1.1-1 shows the Project location and land ownership in and around the Smoky Canyon Mine. The Smoky Canyon Mine is located in Caribou County, Idaho approximately 10 air miles west of Afton, Wyoming on the east slope of the Webster Range between Smoky Canyon to the north and South Fork Sage Creek to the south. Access to the mine is gained by traveling west on state Highway 238/Nield Avenue from Afton approximately 3 miles, then continuing north about 4 miles toward Auburn to the intersection with the Stump-Tygee Creek Road, then approximately 8 miles south and west to Smoky Canyon.

Overall, the existing operations extend along an axis approximately 10.5 miles north to south/southwest on the east flank of the Webster Range. Elevations in the Smoky Canyon Mine area range from about 6,600 feet above mean sea level (AMSL) at the tailing pond area to about 8,300 feet AMSL along the ridge of unnamed peaks immediately west of the mine.

2.3.2 Land Ownership and Currently Approved Disturbance

The existing mining and milling operations are contained within a combination of federal phosphate mineral leases administered by the Pocatello Field Office of the BLM and SUAs administered by the CTNF. Existing mining operations are located on Federal Phosphate Leases IDI-012890, IDI-026843, IDI-027801, IDI-015259, IDI-27512, IDI-01441, and IDI-30369. The federal land surface is administered by the CTNF, Soda Springs and Montpelier Ranger Districts. Total currently approved disturbance at the Smoky Canyon Mine totals approximately 4,000 acres.

2.3.3 Facilities Descriptions and Locations

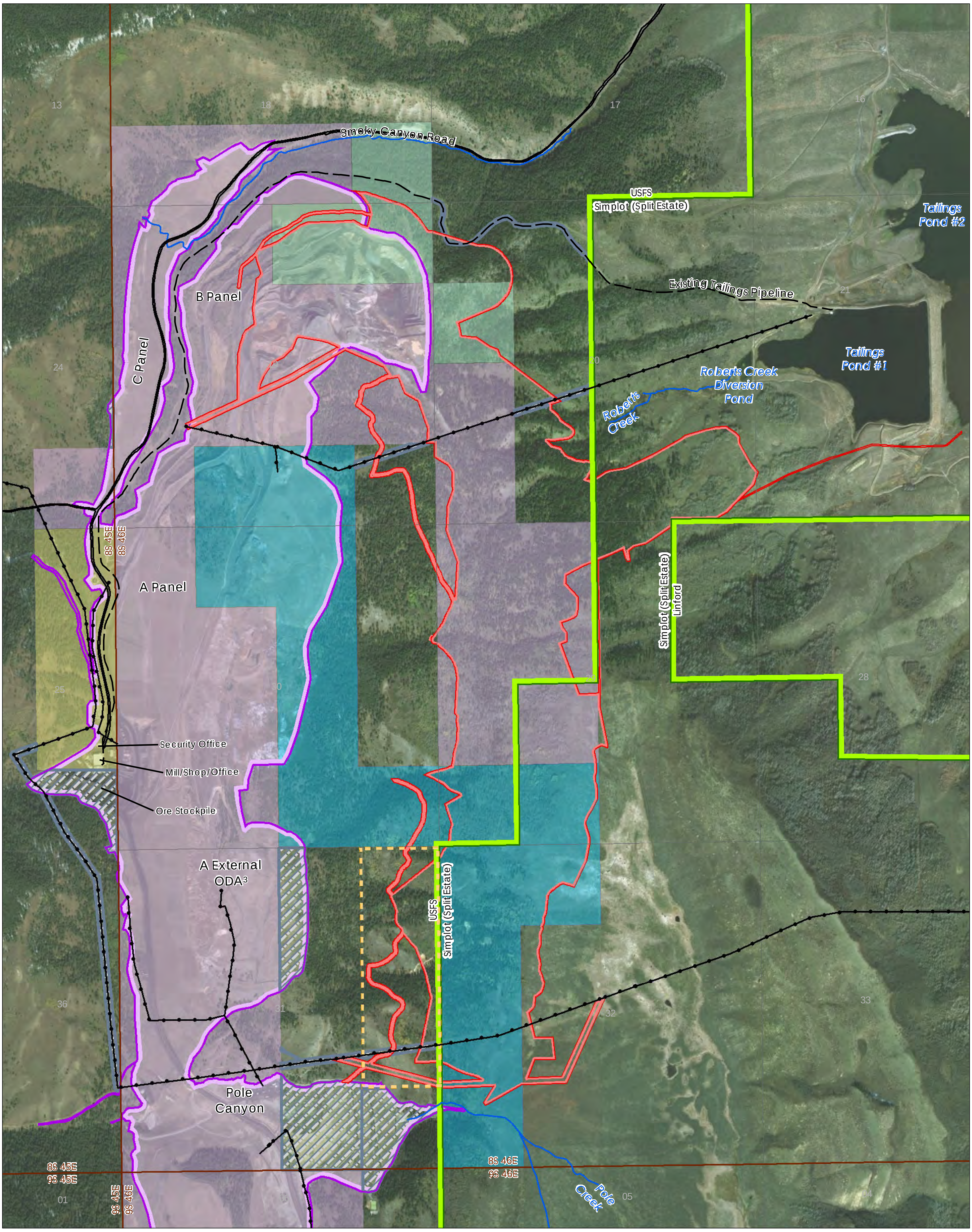
The existing mine and mill operations consist of mine Panels A through G plus the mill/shop facilities and tailings ponds. **Figure 2.3-1** shows the existing facilities and the tailings ponds in relationship to the Project Area.

The mill and administrative and maintenance facilities are located in Smoky Canyon near the northern end of the mining operations. Mine Panel A is immediately east of the mill. Panels B and C are located north of the mill, and Panels D, E, F, and G are toward the south.

Existing facilities at the Smoky Canyon Mine include an access road, office/shop complex, security office, mill, ore stockpiles, open pits, backfilled pits, external ODAs, industrial and culinary well, tailings ponds, power lines, tailings pipelines, concentrate slurry pipeline, and ancillary facilities such as runoff control ditches and ponds, storage yards, and "Hot Start" (mine equipment fueling, fuel storage, and parking) areas (**Figure 2.3-1**). In addition, a portable crusher is currently permitted for the Smoky Canyon Mine, and would continue to be used as necessary. A pug mill utilized for mixing Dinwoody Formation material and bentonite is also permitted for use at the site. These facilities would continue to be used during the mining activities described as part of the Proposed Action (**Section 2.4**). Detailed descriptions of the major facilities are as follows:

<u>Security Office</u>: Security staff provides around the clock (24 hours per day/7 days a week) coverage of the mine facility. Along with security personnel, this facility houses a conference room, offices, bathroom facilities, and employee lockers.

<u>Office, Warehouse, Maintenance Shop</u>: The office/shop complex consists of a combination shop and office building. This building contains the office, warehouse, and repair shop facilities. Employee parking, truck wash bay, tire shop, mill, and emergency generators are also located at the office/shop complex. The offices accommodate mine management personnel and warehouse/purchasing personnel, and are located upstairs above the shop and adjacent to the



Legend

- Existing Tailings Pipeline
- Existing Overhead Power Line
- Project Area Boundary
- Existing Disturbance Boundary
- Surface Ownership Boundary
- Township Boundary
- Section Boundary

Lease

- IDI-012890
- IDI-015259
- IDI-026843
- IDI-027801
- Proposed Lease Modification Area
- Existing Special Use Authorization (SUA)

Notes
1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3. ODA: Overburden Disposal Area
4. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
5. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

0 1,500 3,000
Feet
1:20,000 (at original document size of 11x17)
N

Figure 2.3-1
Project Area and Existing Phosphate Leases, SUAs, and Mining Development
East Smoky Panel Mine EIS

warehouse. The maintenance shop accommodates the maintenance staff that work on company mobile equipment.

Mill: The mill is housed in the same building where raw phosphate ore is fed from the outside via front-end loaders. The ore is milled into a fine powder/slurry with water through crushing and grinding operations. The phosphate-containing minerals are beneficiated (separated) from the rest of the rock and then are pumped through the concentrate slurry pipeline to the Don Plant in Pocatello for further processing. The tailings slurry (beneficiation waste) from the mill is gravity fed through the pipeline to the tailings ponds for disposal.

Wash-bay: This area is used for steam washing of company mobile equipment. An oil-water separator system for used-oil recovery is connected to the wash bay.

Fuel/Used Oil Containment Area: South of the wash bay building and east of the mill (in the yard), are aboveground storage tanks for anti-freeze, diesel fuel (low-sulfur), gasoline (lead-free), used oil, and used anti-freeze. These tanks are located within secondary containment bermed areas lined either with concrete (used oil and antifreeze), or polyethylene (diesel fuel and gasoline). An SPCC Plan is in place.

Tailings Thickener: Once the ore is beneficiated, the non-ore rock slurry is piped to a thickener, located 0.25-mile north of the mill, and sent in a pipeline to the tailings ponds. Water is then recirculated back to the mill via underground return pipelines.

Industrial Well: The industrial well provides fresh water for the mill operations and is located approximately 0.75-mile north of the shop, near Smoky Creek. It is also used as a water quality monitoring well (Site GW-IW).

Culinary Well: The Smoky Canyon Mine's potable water source is supplied by a culinary well completed in the Dinwoody Formation located in the southeast quarter of Section 18 on the north side of the USFS road. It is also used as a water quality monitoring well (Site GW-CW-2).

Monitoring Wells: More than 30 wells are currently monitored by Simplot under one or more required programs (including CERCLA). Some of these wells were also monitored for the Project's baseline groundwater data collection program that is described in **Section 3.5.1**. The Adaptive Management Plan (AMP) located in **Appendix 4B** describes the circumstances by which monitoring wells are added or removed from Simplot's overall monitoring plan only with agency approval.

Hot Starts: The "Hot Starts" is the name given to the staging area for the mobile equipment used in the mining operations. Service islands for maintenance and fueling of a number of vehicles simultaneously, lubing services, and fuel/lube oil tanks (all tanks are protected in a containment area lined with a polyethylene liner) are located here. The Hot Starts are located near the actual mining area for convenience and accessibility. The Hot Starts area is relocated, as needed, to adjust to the mine area location.

Tailings Ponds No. 1 and No. 2: Located approximately 3.2 air miles northeast of the mill area in the Tygee Creek drainage, this area consists of two tailings ponds with associated delivery lines, return lines, and pump houses.

Bone Yard: This is a temporary storage area for large reusable mining equipment, parts, and recyclable materials. Some material located here can be reused in the mining operation. This is not a fixed facility.

Ammonium Nitrate/Fuel Oil (ANFO) Storage: This is a staging area for blasting materials (kept separate from the explosives magazines for safety reasons). Ammonium nitrate and emulsion are stored separately, in above ground storage tanks in this area. Ammonium nitrate is not explosive until mixed with the fuel oil. The materials are only mixed when pumped directly into the blast holes. This area is a completely fenced, secured area under video surveillance and equipped with motion detectors. These surveillance videos are archived for a set amount of time as well. This area is capable of being monitored 24-hours a day through the onsite security office.

2.3.4 Existing Operations

Current mining operations are occurring at Panels B, F, and G; past mining has occurred at Panels A, C, D, and E. Each panel consists of one or more open pits and associated external overburden disposal sites. Mining at Smoky Canyon began with Panel A and proceeded southward through Panels D and E. As mining progressed southward along the strike of the deposit, the mined out pits have been backfilled with overburden. Panels A, C, D, and E have been fully reclaimed and portions of Panel B have also been reclaimed, with concurrent reclamation being implemented at the actively mined panels.

Mining at the Smoky Canyon Mine occurs along a southward trending phosphate deposit that dips to the west. Strip mining of this deposit continues down-dip until overburden stripping ratios hinder economic operations. As mining has progressed southward along the strike of the deposit, the mined out pits have largely been backfilled with overburden. Excess overburden has been disposed of in external ODAs. Inactive areas of the external ODAs and backfilled pits have been reclaimed with vegetation as approved by the regulatory agencies.

Current operations at the Smoky Canyon Mine include drilling, blasting, loading, and hauling of ore and overburden using a shovel and truck fleet and mining in the active panels is expected to continue up to potentially another ten to fifteen years.

The following description of mining operations applies to the existing operations. Thus, because the Project Area would be an extension of the existing mining operations, the following description of mining operations also applies to the Project.

The mine is operated 24-hours per day throughout the year with crews working overlapping shifts. Hard rock overburden is drilled with blast hole drills. Each blast hole is loaded with a mixture of ANFO. The loaded blast holes are typically detonated 3 to 4 days a week. On average, 400 blast holes are detonated per week. Softer overburden is ripped with dozers. A number of 15- to 27-cubic-yard diesel-powered hydraulic shovels are used to load ore and overburden into off-road type haul trucks.

Ore and overburden are loaded into 150-ton rear dump haul trucks. Depending on the concentration of phosphate mineral in the rock, the trucks deliver the material to one of the mill ore stockpiles, external overburden disposal areas, or previously mined pits as backfill. Water trucks are used to water haul roads, ancillary roads, and the active pit floors to control dust. Roads are also maintained with motor graders. Other equipment used in the operation includes: pickup trucks, vans, service trucks, maintenance trucks, explosives trucks, and other miscellaneous support equipment.

Erosion and sediment transport related to the mine disturbances are addressed with a SWPPP that includes design and construction of ditches, settling ponds, culverts, sediment traps and other methods included in normal BMPs. The mine also maintains a SPCC Plan to reduce the risk to inland waters from petroleum releases.

Ore is hauled in trucks to the on-site mill. At the mill, the ore is wet ground and the phosphate mineral is physically concentrated. The phosphate concentrate slurry is pumped in a buried pipeline west to the Simplot fertilizer plant in Pocatello (Don Plant).

The tailings slurry from the mill is piped to the tailings ponds located east of the mine property where the tailings solids settle out. Water from the tailings ponds is recycled back to the mill for reuse. Additional makeup water is provided by the industrial well near the mill.

The current Smoky Canyon Mine operations and facilities provide the infrastructure that would be needed for the Project. All necessary facilities, utilities, equipment, staff, and procedures are present and/or approved to recover the phosphate ore reserves in the Project Area. The ore in the proposed panel is readily accessible to the existing operations through the extension of the mining operation east from the trend of the previously and currently mined ore bodies in Panels A through E.

2.4 PROPOSED ACTION

2.4.1 Overview

As submitted by Simplot, the Proposed Action would consist of mining the East Smoky Panel, constructing topsoil stockpiles, reclamation material borrow areas, stormwater ponds and ditches, potentially a dewatering pipeline, haul roads, relocation of two existing power lines, and providing for complete backfill rather than the existing partial backfill in a portion of Panel B using overburden from the East Smoky Panel. As a part of the Project, lease IDI-015259 would be modified by adding 120 acres along the southwest side of the existing lease for mining-related disturbance (**Figure 2.4-1**). The Project would also include development, construction, and reclamation of portions of transmission lines, access roads, and other miscellaneous disturbances (e.g., sediment ponds, topsoil stockpiles) off-lease on federal land administered by the USFS, requiring several new SUAs. The Panel B aspect of the Proposed Action would be made consistent with any future CERCLA remedy selected at the site. All these Project features are discussed in more detail in the following sections. While the majority of Project disturbance would occur within a new proposed disturbance boundary, portions of the East Smoky Panel pit and haul road would occur within the previously authorized disturbance boundary for Panel B, along with Panel B backfill.

2.4.2 Land Ownership and Mineral Rights

The proposed Project would occur on federal and split estate lands in existing federal phosphate leases IDI-015259, IDI-026843, and IDI-012890 held by Simplot. Off-lease portions of the mining disturbance would occur on NFS land under existing SUAs, on NFS lands that would require new SUAs (**Section 2.4.9**), and on split estate lands. In addition, all mineral rights associated the Project are federally held except in portions of Sections 21, 29, and 32 which are held in half interest by Simplot with half interest retained by Raymond S. Petersen and Sons Inc., where future exercise of those mineral rights may be affected by topsoil stockpiles, borrow areas, proposed access roads, a potential dewatering pipeline, and storm water control features.

2.4.3 Pits and Overburden

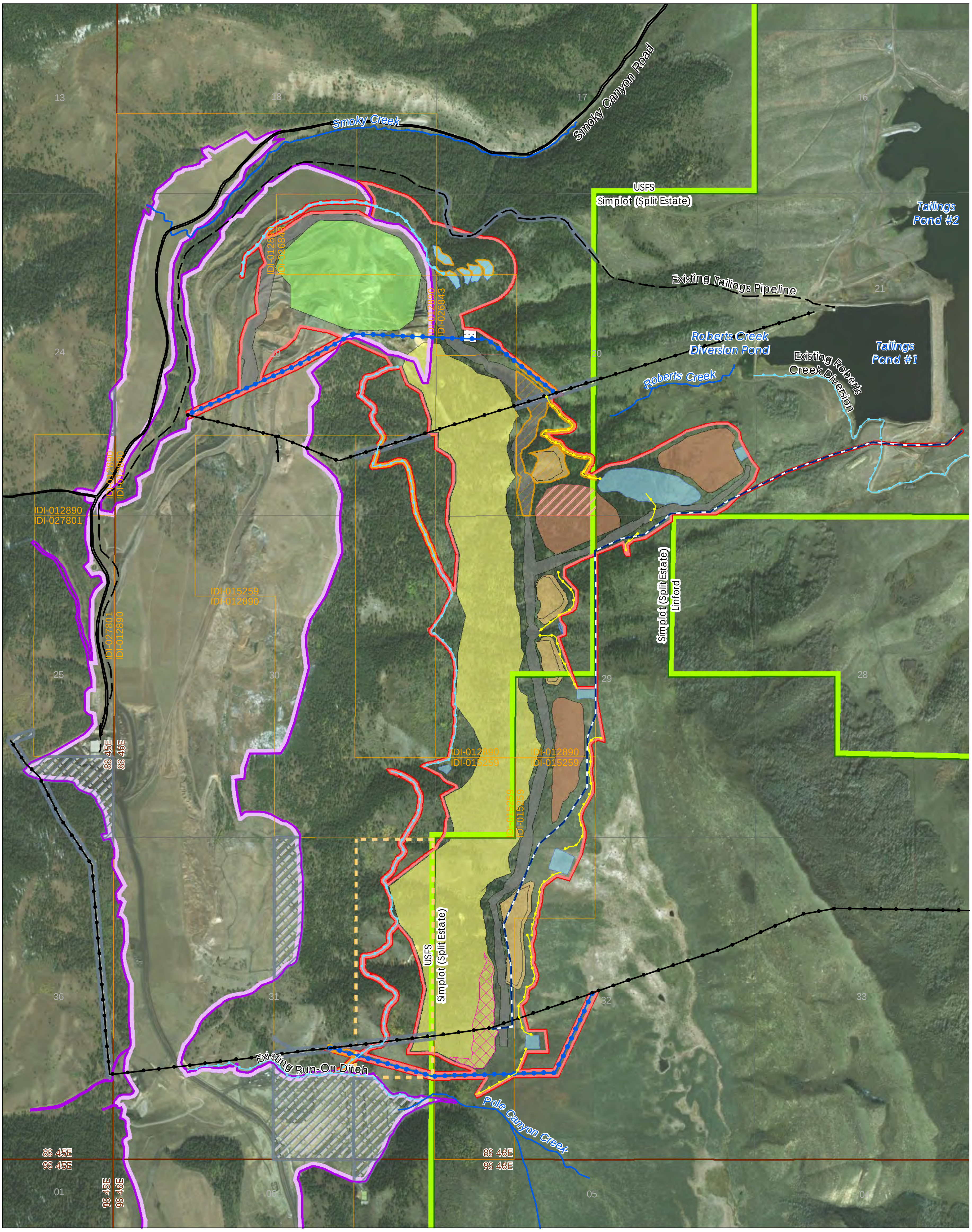
While mining in the northern portion of the East Smoky Panel pit, overburden would be placed directly into the previously mined Panel B pit. The additional material would elevate the reclaimed selected surface contours to be closer to the pre-mining topography. Placement of this additional material would not increase Simplot's planned disturbance acreage, the authorized / permitted disturbance acreage for Panel B, or the mine's seleniferous footprint; it would simply add volume for providing complete backfill. Overburden from the middle and southern portions of the pit would be backfilled into the East Smoky Panel pit for concurrent reclamation. The in-pit backfill would be maximized and there would be no external overburden placement, with the exception of some low-seleniferous overburden (low seleniferous overburden refers to any waste rock material not from the Meade Peak Member) to be used in haul road and ramp construction. An external haul road is proposed along the length of the ultimate pit. Chert and limestone from pit overburden would be used for coarse and durable armor in haul road, ditch, culvert, and pond design. All run-of-mine (ROM) overburden would receive a geologic store and release cover system consisting of chert, overlain by Dinwoody and/or Salt Lake Formation, and a topsoil layer. This type of cover system is designed to limit the percolation of meteoric water into the seleniferous overburden beneath, by increasing runoff and retaining moisture within some of the cover layers that would be available to plants and evapotranspiration. By reducing water movement into the seleniferous overburden, the intent of the store and release cover is to reduce the amount of selenium that can be transported by groundwater away from the overburden pile.

2.4.3.1 East Smoky Panel Pit

The development of the East Smoky Panel pit would require the removal, transportation, and placement of approximately 60.2 million BCY of overburden. Of this total, an estimated 50.8 million BCY or (85 percent) would be used to backfill the mined out East Smoky Panel pit. Approximately 1.4 million BCY of topsoil would be removed and stored in topsoil stockpiles (**Figure 2.4-1**), held in reserve for reclamation.

As mining progresses, the pit would be backfilled to reclamation contours concurrent with mining. All backfill would be placed in pits or on previously disturbed mining areas (i.e. Panel B). In addition, exposure of center waste shales (i.e., the shale that lies between the upper and lower ore beds and contains high concentrations of selenium and other COPCs) to meteoric weathering processes would be minimized by covering this material as soon as practicable during backfill operations. No segregation of waste materials is planned for backfilling operations under the Proposed Action, including any backfill into saturated zones. All overburden disposal areas have been designed to minimize surface impacts and to insure maximum overburden stabilization.

The development of the ore deposit would result in one ultimate pit representing approximately 302 acres of pit disturbance. The pit would be developed in seven distinguishable mining phases (**Figure 2.4-2**) executed sequentially from north to south. The ultimate pit is designed with a typical "V" cut configuration. Pit widths of the seven distinguishable mining phases, from highwall to footwall crests, would range from approximately 1,700 feet at the widest in the southern portion of the ultimate pit, to approximately 900 feet at the narrowest point. Pit elevations would range from 7,350 feet at the highest point on the ultimate pit wall to the 6,635-foot elevation of the ultimate pit floor for an overall elevation difference of 715 feet. The existing surface topography



Legend

- Proposed Dewatering Pipeline
- Existing Overhead Power Line
- Overhead Power Line Proposed Re-route
- Run-On Diversion Ditch
- Run-Off Diversion Ditch
- Existing Tailings Pipeline
- Township Boundary
- Section Boundary
- Project Area Boundary
- Surface Ownership Boundary
- Existing Disturbance Boundary
- Proposed Lease Modification Area
- Existing Lease Boundary
- Existing Special Use Authorization (SUA)
- Proposed Special Use Authorization (SUA)
- Proposed Mineral Materials Permit Area

Mine Components

- Haul Road
- Borrow Pit
- Panel B Additional Backfill Area
- Pit
- Stormwater Pond
- Topsoil Stockpile
- Unreclaimed High Wall
- Lube Car

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Feet
1:20,000 (at original document size of 11x17)
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Figure 2.4-1
Proposed Action Components
East Smoky Panel Mine EIS

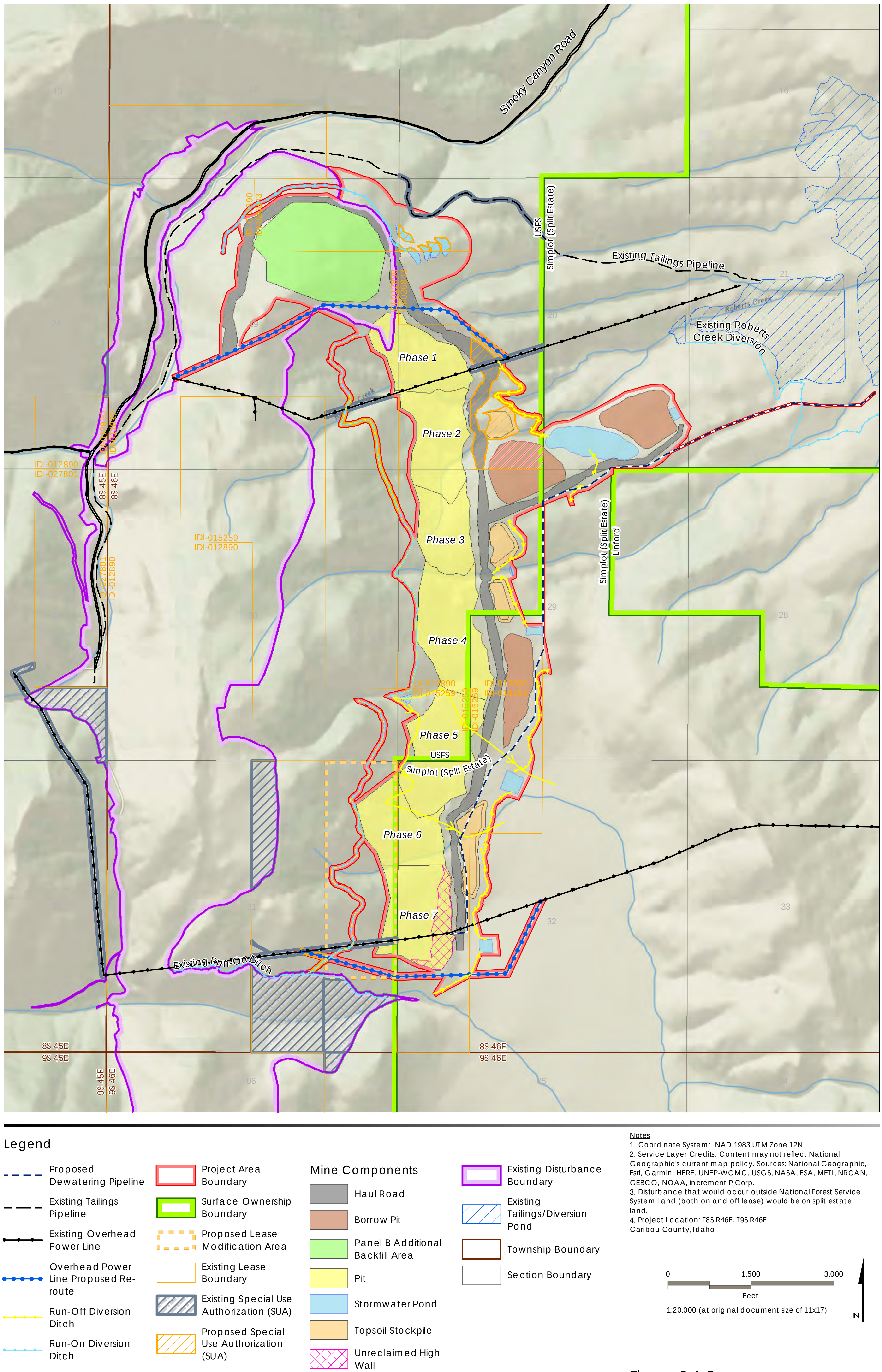


Figure 2.4-2
Mining Sequence and Ultimate Pit
East Smoky Panel Mine EIS

varies across the East Smoky Panel; however, the average pit depth for the seven mining phases would be 250 feet deep.

Pit walls are designed at an overall angle of 34 degrees on the west side of the pit and 40 degrees or less on the east side. Safety benches would be installed at least every 50 vertical feet to catch raveling material from the walls. These design slopes are currently utilized in the active and historic pits at the Smoky Canyon Mine and have been proven to be safe and effective in similar conditions. In addition to safety incorporated in design, Simplot would implement a comprehensive monitoring program (**Section 2.5.2**) to track wall and dump stability during mining.

The last cut (Phase 7) is proposed to be mined at the terminal south end of the ultimate pit. Overburden from this last cut would be temporarily placed elsewhere in the pit and rehandled back into the final pit. The majority of this final pit would be situated on private land owned by Simplot. Seleniferous overburden would be dozed or hauled back into the bottom of the pit; non-seleniferous overburden would then be hauled and placed over the seleniferous wastes, along with the proposed store and release cover (**Section 2.4.11.2**). Mining in Phases 6 and/or 7 may result in intercepting the groundwater which may require pit dewatering. In this event, this water would be piped to the tailings ponds (**Section 2.4.5.3**).

Ideally, the footwall is designed to follow the dip of the ore for stability and safety. However, due to faulting, overturned, and nearly vertical dipping beds, an intact, safe footwall is not anticipated. A layback of 34 to 45 degrees would mitigate footwall stability problems.

The ultimate pit design and disturbance are shown on **Figure 2.4-2**. Because of progressive pit backfilling and concurrent reclamation, unreclaimed pit disturbance at any point in time would be minimized to the extent feasible. The unreclaimed portion of pit disturbance, which would only be partially backfilled, would be situated entirely on private land owned by Simplot.

The mine life of the East Smoky Panel pit would be up to 12 years, depending on different blending scenarios with the ore from the remaining permitted Smoky Canyon Mine panels. Concurrent reclamation work is proposed and would continue on both federal and split estate lands for approximately two to three years following completion of mining. While the mining sequence is shown in **Figure 2.4-2**, the length of time any phase of the East Smoky Panel is open and being mined may vary from this estimate depending on ore blending scenarios. The East Smoky Panel would add approximately three years to the overall life of the Smoky Canyon Mine.

2.4.3.2 Panel B

Disturbance within the previously authorized disturbance boundary for Panel B under the Proposed Action would consist of the backfilling of overburden from the East Smoky Panel into the Panel B pit area. This would minimize the seleniferous footprint of the mine by avoiding creation of an external ODA for the East Smoky Panel overburden. In addition, placement of East Smoky Panel overburden in the Panel B pit area would elevate the final contours for the Panel B pit closer to the pre-mining topography (**Section 2.4.11.1**). As with all actions taken at the East Smoky Panel, backfilling (and covering) Panel B would be made consistent with any future CERCLA remedy selected at the site.

The Panel B portion of the Project Area would also contain disturbance associated with portions of the East Smoky Panel pit and associated haul road. Approximately 3.7 acres of the East Smoky

Panel pit would be developed within the previously authorized disturbance boundary for Panel B in Lease IDI-012890. Additionally, the haul road running the length of the East Smoky Panel pit would extend north into the previously authorized disturbance boundary for Panel B, wrapping around the northern boundary of the Panel B additional backfill area, redisturbing approximately 27.3 acres in leases IDI-026843 and IDI-012890.

2.4.4 Lease Modification

Under the Proposed Action, approximately 43 acres of disturbance (approximately 27 acres of the proposed East Smoky Panel pit and approximately 16 acres of miscellaneous disturbance associated with diversion ditches and portions of a relocated power line) would occur on NFS lands west of the boundary for Lease IDI-015259. Overburden would be backfilled into this portion of the pit; therefore, implementation of the Proposed Action would require modification of Lease IDI-015259 to encompass the East Smoky Panel pit.

The BLM's leasing regulations at 43 CFR 3503.36 state, "Generally a quarter-quarter section, a lot or a protraction block is the smallest subdivision for which you may apply [for a lease]. The lands must be in reasonably compact form." In following that direction, Simplot has proposed to enlarge Lease IDI-015259 by 120 acres (**Figure 2.4-1**), an area greater than a quarter-quarter section, which would encompass the proposed disturbance. The proposed modification to the lease would occur within Township 8 South, Range 46 East, Boise Meridian, Idaho, and specifically include the following lands:

East ½ of the Northeast ¼, Section 31; and

Northeast ¼ of the Southeast ¼, Section 31.

As described in **Section 1.5.1**, management prescriptions have been developed and are applied to specific areas of NFS lands to attain multiple-use and other goals and objectives. The land within this proposed lease modification area was previously managed under Management Prescription 5.2 (b) – Forest Vegetation Management. The area is currently managed under Management Prescription 8.2.1 – Inactive Phosphate Leases, and if the lease modification is approved, the prescription would become 8.2.2 (g) – Phosphate Mine Area.

2.4.5 Water Management

2.4.5.1 Water Usage

Currently water is recycled as much as possible with the milling and mining process at the Smoky Canyon Mine. Recycled water is supplemented with water pumped from an industrial well. Under the Proposed Action, the amount of water used annually at the Smoky Canyon Mine would not change. With the Project adding approximately three years of overall mine life to the Smoky Canyon Mine, this would result in a total of approximately 800 million gallons of additional water usage.

2.4.5.2 Surface Water Controls

Run-on and run-off ditches (**Figure 2.4-1**) would be constructed to collect stormwater and would follow the direction of mining (north to south). Run-on ditches would collect all water that has not come into contact with Project disturbance; run-off ditches would collect water that comes into contact with disturbance. Run-on control ditches along the west side of the pit would be designed to infiltrate clean water into limestone outcrops of the Wells Formation or divert water around the disturbed areas to prevent clean water from running into Project disturbance. All run-off stormwater collected in the ditches would be diverted into stormwater ponds (**Figure 2.4-1**). All stormwater conveyances would be designed with energy dissipation as needed to reduce erosion in transition areas, junctions, and discharge areas. Once mining has been completed, the last area to be mined would not be completely backfilled and would be used to collect runoff.

For the Project, run-on and run-off stormwater would be managed to correspond to aggregated phases of mine development. Ditches and ponds would be designed to accommodate peak flow from a 100-year 24-hour precipitation event.

The overburden fill areas would be constructed, where possible, with convex faces to eliminate the concentration and channeling of water run-off on the longer overburden faces and reduce run-off erosion.

Where drainage channels would be permanently routed over overburden fills, channels would be designed to be stable without damage for the peak flow from a 100-year, 24-hour storm on top of snowmelt. To prevent seepage into underlying seleniferous overburden, a clay liner would be installed under the channel. The overburden directly underlying the channel bottom and for a distance of 50 feet on either side of the channel would consist of chert or other low seleniferous overburden material. The channel surface would be protected from erosion with chert riprap. A high-density polyethylene (HDPE) plastic liner may also be used instead of the clay liner if sufficient clay or other suitable material is not available.

Sedimentation ponds designed to control runoff and sedimentation would be located off seleniferous overburden fills and primarily on Dinwoody or Salt Lake Formation areas. Surface soils would be removed from pond locations; however, little infiltration can occur vertically into the Dinwoody or Salt Lake Formation material, therefore the ponds would rely on evaporation to remove water rather than infiltration.

2.4.5.3 Groundwater Dewatering

During the last two phases (6 and 7) of mining in the southern portion of the East Smoky Panel pit, there is potential for groundwater to be encountered during mining of the lower benches of the pit. Should groundwater enter the active mining area, the water would be directed to a sump pump and pumped to the tailings pond via a dewatering pipe system located on split estate lands where Simplot holds the surface ownership (**Figures 2.4-1** and **2.4-2**). Pit dewatering, should it occur, would be estimated to last several weeks.

2.4.5.4 Tailings Ponds

The existing Smoky Canyon Mine tailings ponds (**Figure 2.3-1**) would be utilized for the Project without modification. The estimated remaining capacity of Tailings Pond 2 (TP2) is 20 million cubic yards (CY). On average, approximately 550,000 CY of capacity is used each year from tailings, thus the life of the pond is estimated to be about 36 years, with adequate capacity to support development of the Project.

2.4.6 Haul Roads

Due to the proximity of the Project to the existing mill and other Smoky Canyon Mine operations and the relatively small East Smoky Panel pit ore reserve volume, it was determined that truck haulage would be the most efficient method to transport ore to the existing mill location. Haul roads would be used to haul ore and overburden in 150-ton haul trucks. Access ramps built into the pit walls would be limited to approximately 8 to 10 percent grade for safety and to maximize haul truck efficiencies.

Several external pit roads would be required throughout the life of the mine for both overburden and ore transportation. All of these roads would be constructed of chert or limestone with cut side ditches, culverts as appropriate, and fill side berms where necessary for safety.

Approximately 4.5 miles of new haul roads would be required in the Project Area over the life of the mine. Total disturbance due to haul roads for the Proposed Action is approximately 96 acres (approximately 27 acres would be redisturbance). All haul road disturbance would be reclaimed. For the most part, all of these roads would be contained on lease. However, in a few small areas (approximately 12 acres) USFS SUAs (**Section 2.4.9**) would be required for haul roads.

Simplot is proposing an external haul road along the length of the ultimate East Smoky Panel pit to haul:

- Overburden to Panel B and back into the pit;
- Ore to the mill;
- Material from borrow areas to cover seleniferous overburden; and,
- Topsoil to reclaim disturbed areas.

The haul roads would also divert and control surface water and stormwater. All proposed haul roads external to the East Smoky Panel pit are designed to minimize surface impacts and to insure maximum efficiency in truck haulage.

2.4.7 Power Line Relocation

As proposed, the existing Smoky Canyon Mine, maintenance, administrative, and milling facilities would continue to be used. Electric power for the proposed mining operations would be provided with the existing power lines. However, two segments of existing power lines (**Figure 2.4-1**) are proposed for reroute around the proposed Project.

The 25 kV distribution power line providing power across the northern part of the Project to the tailings ponds would be relocated across the edge of Panel B disturbance. On USFS-administered lands, the 1.2-mile re-routed portion of the line would be contained within existing leases or areas authorized by SUAs. Approximately 0.75-mile of the existing northern power line route would be reclaimed; the remainder of the existing power line would be removed when the East Smoky Panel pit is developed.

The 115 kV Lower Valley Energy transmission line that transects the southern part of the Project would be rerouted approximately 1 mile around the south end of the pit. The rerouted transmission line would occur on a combination of private land, existing leases, and a proposed lease modification area. Since a portion of the rerouted line would occur on NFS lands not on leased lands, a new SUA would be required for that portion of the line (**Figure 2.4-1**). A portion of the existing southern transmission line route would be reclaimed; the remainder of the existing power line would be removed when the East Smoky Panel pit is developed.

New line segments would be constructed to match the existing infrastructure, and activated prior to decommissioning and removing existing line segments. Construction of the re-routed portions of the lines would result in both new disturbance and redisturbance of previously mined areas, assumed to be the entire width of the needed corridor. Line construction and removal disturbance would consist of overland travel as well as new spur roads, as needed; clearing or trampling of pole sites and pulling and tensioning locations; and augering of new foundation locations. Removal of existing infrastructure would consist of removing poles, spooling line, and trucking pieces off-site. USFS-administered lands containing the portions of the existing lines that would be removed, outside of the Project disturbance, would be reclaimed.

2.4.8 Forest Plan Amendment

The CNF RFP (USFS 2003a) uses management prescriptions to designate planned land uses on the Forest (see **Section 3.11**). The RFP requires that power lines over 66 kV be contained within utility corridors, which are designated by a specific management prescription. The existing Lower Valley Energy 115 kV transmission line crossing the southern part of the Project is contained within an SUA authorized by the CTNF and located within a larger 200-foot wide utility corridor designated in the CNF RFP. This transmission line would be rerouted around the south end of the pit under the Proposed Action where there is no CNF RFP designated utility corridor. An RFP amendment would be required to change the management prescription of the lands contained in the proposed reroute to allow designation of a 200-foot wide utility corridor for the new route and revised SUA for the 115 kV transmission line (**Figure 2.4-3**). 36 CFR 219.13(b)(5) requires the responsible official to determine and assess the specific substantive requirements within 36 CFR 219.8 – 219.11 that are directly related to the plan amendment. The analysis in this document discloses the effects to resources and includes the substantive requirements within 36 CFR 219.8 – 219.11.

2.4.9 SUAs

SUAs are, by definition, located on NFS lands, and this Project would use existing SUAs and require additional new SUAs. There are existing SUAs (**Figure 2.4-1**) in the Project Area that contain the existing northern power line. Under the Proposed Action, a number of Project components would require new SUAs (**Figure 2.4-4**), including run-on and run-off diversion ditches, relocated power lines, roads, and topsoil stockpiles. The relocated power lines would include a 50-foot buffer on either side of the centerline for a 100-foot wide SUA. The ditches would include a 25-foot buffer on either side of the centerline for a 50-foot wide SUA. The remaining components (i.e. haul roads, borrow pit, ponds, topsoil stockpile) would not be buffered but would only include the area of proposed disturbance, thus the proposed SUA areas would total approximately 30.0 acres as detailed in **Table 2.4-1** and shown on **Figure 2.4-4**.

The locations of these mine components may vary slightly due to on the ground conditions. However, all disturbance would occur within the Project Area boundary.

Table 2.4-1 Acreages of Proposed SUAs

PROPOSED SUA MAP ID*	PRIMARY FEATURE	AREA (ACRES)
A	Stormwater Ponds	3.2
B	Run-on Diversion Ditch	0.2
C	Rerouted Overhead Power Line	1.8
D	Runoff Diversion Ditch	3.0
E	Haul Road	11.7
F	Topsoil Stockpile	6.1
G	Run-on Diversion Ditch	3.0
H	Rerouted Overhead Power Line	0.6
I	Run-on Diversion Ditch	0.4
Total		30.0

*ID number from **Figure 2.4-4**.

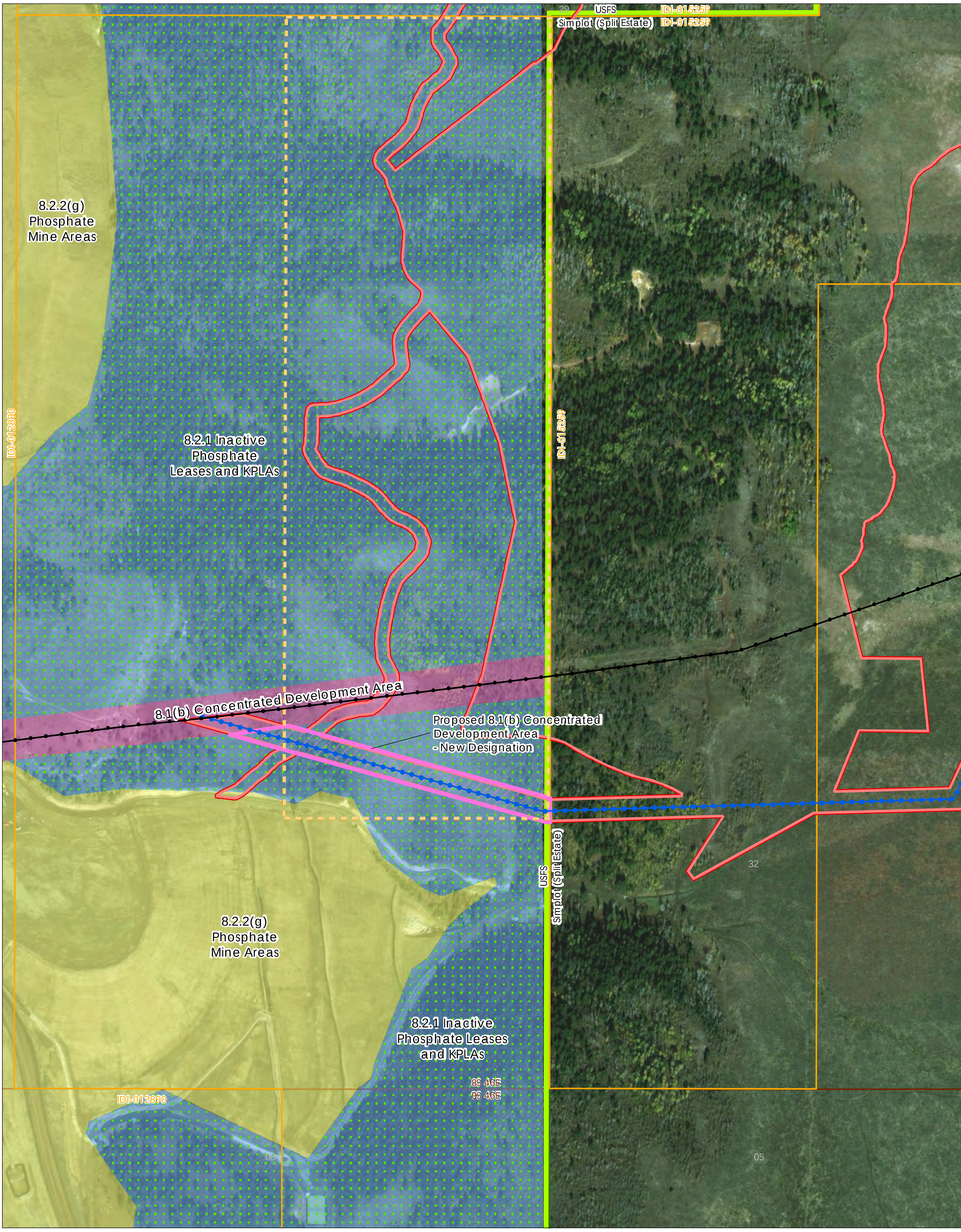
2.4.10 Operations and Equipment

If approved, mining is proposed to begin in the East Smoky Panel in 2018 or thereafter. The mine life of the Project would be up to 12 years, depending on different blending scenarios with the ore remaining in the currently permitted Smoky Canyon Mine panels. Concurrent reclamation work is proposed and would continue on both federal and split estate lands for approximately two to three years following completion of mining. While the mining sequence and estimated years that mining would occur in each phase are shown in **Figure 2.4-2** the length of time any phase of the East Smoky Panel is open and being mined may vary from this estimate depending on blending scenarios. The Project would add approximately three years to the overall life of the Smoky Canyon Mine.

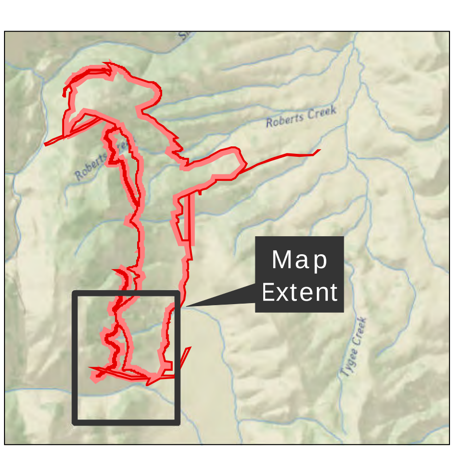
The Project would be operated 24-hours per day throughout the year with crews working overlapping shifts. No additional employment beyond that already in place for the Smoky Canyon Mine operations is anticipated for the Proposed Action.

2.4.11 Reclamation Activities

Almost all of the disturbance associated with the Project would be reclaimed at the end of the Project. The ultimate new surface disturbance resulting from the implementation of the Project would total approximately 725 acres, plus 124 acres of redisturbance, although the larger Project Area boundary totals approximately 920 acres (**Figure 2.4-1**) which includes approximately 70 acres that would not be disturbed. However, upon final abandonment, approximately 719 acres or approximately 98 percent of the total new disturbance, in addition to the areas of redisturbance, would be reclaimed. The unreclaimed portion would be all situated on private land owned by Simplot. Reclamation of disturbed areas that are no longer needed for active mining operations would be conducted concurrent with other mining operations, as soon as practicable. Reclamation to return the NFS land to productive and recreation uses following mining and backfilling would include placing a store and release cover over all seleniferous backfill in both the East Smoky Panel and Panel B pits and a topsoil cover over all non-seleniferous material; grading to return



Legend



- Existing Overhead Power Line
- Overhead Power Line Proposed Re-route
- Project Area Boundary
- Surface Ownership Boundary
- Existing Lease Boundary
- Proposed Lease Modification Area
- Township Boundary
- Section Boundary

USFS CNF RFP Management Prescription

- 8.1(b) Concentrated Development Area
- 8.2.1 Inactive Phosphate Leases and KPLAs
- 8.2.2(g) Phosphate Mine Areas
- Previously 5.2(b) Forest Vegetation Management
- Proposed 8.1(b) Concentrated Development Area - New Designation

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
5: Project Location: T8S R46E, T9S R46E

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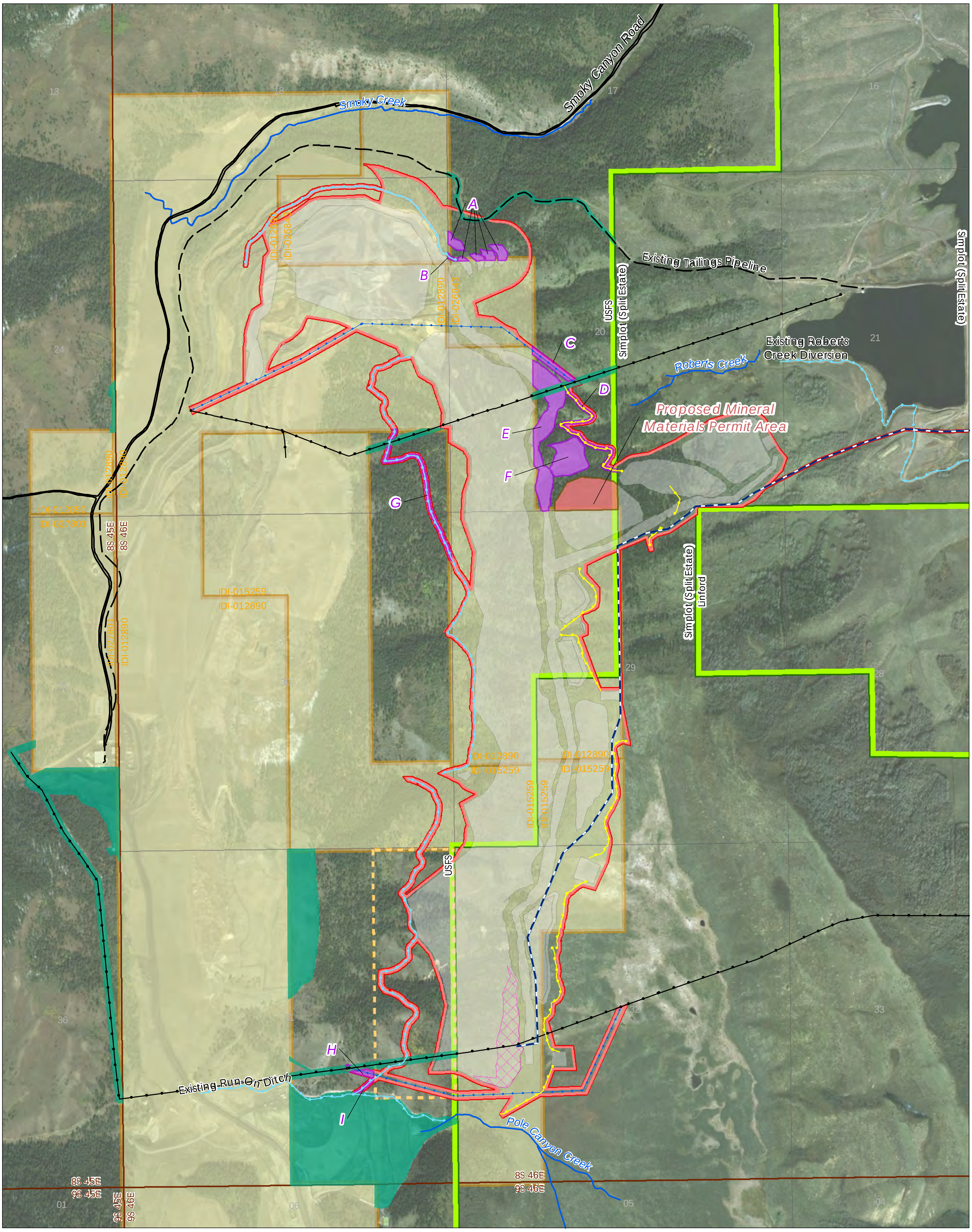
Figure 2.4-3
Proposed CNF Revised Forest Plan Amendment
East Smoky Panel Mine EIS



Legend

Proposed Dewatering Pipeline

Existing Overhead Power Line

Overhead Power Line Proposed Re-route

Run-On Diversion Ditch

Run-Off Diversion Ditch

Existing Tailings Pipeline

Project Area Boundary

Mine Components

Unreclaimed High Wall

Surface Ownership Boundary

BLM Lease

Proposed Lease Modification Area

Existing Special Use Authorization (SUA)

Proposed Special Use Authorization (SUA)

Proposed Mineral Materials Permit Area

Notes
1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E Caribou County, Idaho

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Figure 2.4-4
Proposed and Existing Special Use Authorizations (SUAs)
East Smoky Panel Mine EIS

disturbed areas to more natural contours; reestablishing drainage patterns; and revegetation. The following reclamation description would apply to the entire Project Area - both the East Smoky Panel and Panel B portion of the Project Area.

2.4.11.1 Backfilling

All overburden excavated during the course of mining would be backfilled into either the East Smoky Panel pit or the Panel B pit portions of the Project Area. Panel B is currently being mined, and while the reclamation process is initiated concurrent with mining, final reclamation would not be undertaken in the portions of Panel B proposed for revision as a part of this Project until a decision is issued for the Project. Material from the initial mining would be transported to provide additional backfill in the Panel B pit portion of the Project Area. Approximately 15 percent of the Project overburden would be placed in the Panel B pit as backfill to elevate contours closer to pre-mining topography. Approximately 124 acres in leases IDI-012890 and IDI-026843 would be re-disturbed (**Figures 2.4-1** and **2.4-2**). All other overburden excavated during the course of mining would be backfilled into the East Smoky Panel pit. This material would be reclaimed as final configuration contours are reached (**Figure 2.4-5**). It should be noted that the final Project configuration (**Figure 2.4-5**) has been developed based upon the current understanding of the ore body geometry, mining methods, mining rates, and overburden swell parameters. Modifications to the final configuration may also be necessary if strip ratios and other economic factors that drive the considerations used to develop the topography vary significantly from current assumptions. If needed, these would only occur with agency approval through mine plan modifications with applicable NEPA analysis (e.g., DNA, EA).

Additional armor would be added to channels on concave reclamation surface(s). All reclaimed areas would tie into existing contours recreating a similar function of pre-disturbed land. Roads would be reclaimed by rounding off road crests and revegetating the road disturbance. Any road culverts would be removed unless otherwise specified and the natural drainage patterns would be reestablished.

2.4.11.2 Cover System

Under the 2002 ROD, the Panel B pit was to receive a “cap” to prevent reclamation vegetation from accumulating toxic amounts of selenium; the cap would consist of an 8-foot layer of chert and limestone containing low or no amounts of extractable selenium that would be covered with 1 to 3 feet of topsoil growth medium having very low values of extractable selenium (BLM and USFS 2002b). The cap was designed to prevent reclamation vegetation from accumulating toxic amounts of selenium; however, the cap would have been permeable to infiltration of meteoric water from rain and snowmelt, which would facilitate mobilization of selenium in the underlying overburden (BLM and USFS 2002a). As described in **Section 2.2.2**, the permitted chert cap thickness has been reduced from 8 feet to 4 feet, based upon assessments of selenium bioaccumulation and groundwater quality prepared for BLM prior to its approval of the thickness reduction (BLM 2007a).

Under the Proposed Action, Simplot is proposing a store and release cover system over all locations in the Project Area receiving seleniferous overburden, which would include the Panel B contour improvement area and almost the entire East Smoky Panel (minus the unreclaimed high wall in the extreme southeastern portion of the pit), for a total of approximately 364 acres. The store and release cover system would consist of approximately two feet of chert, overlain by three feet of Dinwoody and/or Salt Lake Formation and, finally, a topsoil layer a minimum of 16 inches. Dinwoody and/or Salt Lake Formation material would be obtained from either pit overburden or borrow areas within the Project Area. Should suitable in-pit cover material be used, the material would be stockpiled within the same footprint as the proposed borrow areas (**Figure 2.4-1**).

The store and release cover system is expected to limit the amount of net percolation of meteoric water through the seleniferous overburden by increasing runoff as well as increasing moisture storage in the Dinwoody or Salt Lake Formation layer, making the water available for plant uptake and evapotranspiration. By limiting meteoric water percolation into the overburden, the chances for mobilization of selenium and transport to surrounding areas would be expected to be reduced when compared with the originally approved “cap”. Less percolation equates to less water in contact with the selenium-bearing overburden, which in turn equates to lower selenium mobilization and transport. The estimated percolation rates and their derivations are described in **Section 4.5.2.1**.

2.4.11.3 Topsoil Placement

After backfilling and preparing disturbed areas to final reclamation contours, direct-placed or stockpiled topsoil would be used in reclamation as plant growth media. Where practical and economically feasible, topsoil salvage for direct placement would be used on reclaimed areas. Topsoil stockpiles are proposed strategically throughout the mining area (**Figures 2.4-1** and **2.4-2**) for use in reclamation of all disturbed areas.

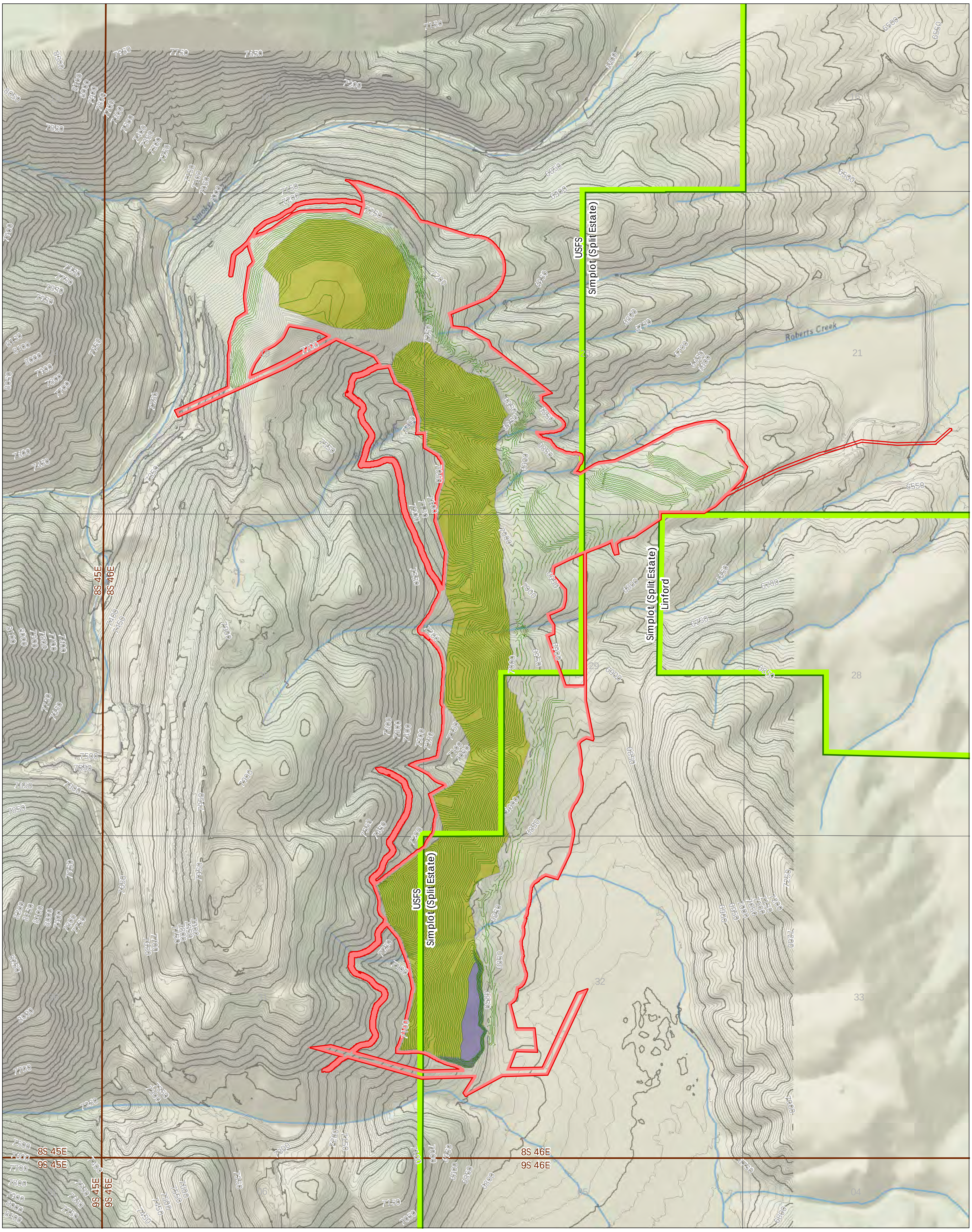
A minimum of 16 inches of topsoil would be distributed over disturbed areas to prepare for revegetation. The amount of topsoil used would be dependent upon the amount of topsoil salvaged during mining. Should more topsoil be available, the minimum thickness may be increased. Topsoil would be sampled prior to placement to determine the agronomic characteristics and to determine the optimum rate and analysis of fertilizer application; the ultimate goal would be to maximize the recovery and reutilization of topsoil. Topsoil would be graded into place with dozers, graders, or other equipment suitable to this purpose prior to re-vegetation.

2.4.11.4 Revegetation

Revegetation of disturbed areas would be handled in two distinct steps. The first step would be the temporary re-vegetation of areas disturbed by construction. The second step would be permanent re-vegetation of reclaimed areas.

Temporary re-vegetation would occur on cuts and fills around the mine facilities areas, on road fills, and on sediment pond embankments and other areas that would remain disturbed for the life of the Project. The objective would be to provide a self-regenerating cover that is easily established. This cover would be a mixture of grasses and forbs designed solely to stabilize the surface against erosion. USFS-approved seed mixes for species and application rates would be used for temporary re-vegetation on USFS land. Temporary re-vegetation would be completed during the first planting season following completion of construction of a specific area or phase of the Project. Planting would be conducted either in the spring or fall.

The objectives of the permanent re-vegetation of disturbed areas on USFS land are similar to those of the temporary program except that in addition to stabilizing the ground surface, the long-term objective would be a vegetative community suitable to support the post-mining land use of grazing



Legend

- Drainage
- Project Area Boundary
- Township Boundary
- Section Boundary
- Surface Ownership Boundary

Final Configuration Mine Components

- Seleniferous Waste, Geologic Store & Release Cover
- Unreclaimed High Wall Disturbance

- 10 ft Final Reclamation Contours
- 10 ft Existing Contours
- 50 ft Existing Contours

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 2.4-5
Proposed Action Final Configuration and Reclamation Pit Covers
East Smoky Panel Mine EIS

and wildlife habitat, as well as to enhance the evapotranspiration function of the proposed cover system. Long-term revegetation would include a mixture of native grasses and forbs, as well as reforestation of some areas. Seed mixes to be used and re-forestation goals would be determined by the USFS.

The geologic store and release cover would be revegetated with grasses and forbs surrounding “islands of diversity” (defined as native forbs, shrubs, and trees that would be seeded or planted in clusters where they are most likely to establish and where there are no concerns relative to the uptake of selenium). Modifications to the final configuration may also be necessary if strip ratios and other economic factors that drive the considerations used to develop the topography vary significantly from current assumptions. If needed, these would only occur with agency approval through mine plan modifications with applicable NEPA analysis (e.g., Determination of NEPA Adequacy, Environmental Assessment).

The areas to be revegetated would be properly prepared to receive seeds by ripping or scarifying the surface and drilling or broadcasting seed onto the area. All revegetation efforts would be conducted either in the spring or the fall to take advantage of high ground moisture conditions. Permanent revegetation would be conducted during the first planting season following the preparation of an area to reduce the period of time a disturbed area would be exposed to erosional forces. The existing noxious weed control program for Smoky Canyon Mine would be employed at the Project throughout the life of the Project.

Table 2.4-2 provides a list of temporary and permanent revegetation species of grasses and forbs that could potentially be used in the seed mix. The actual seed mix could vary from this conceptual list based on adaptive management strategies (e.g., monitoring finds that the species used do not meet establishment criteria or other species are found to be more adapted to site conditions), seed availability, and cost considerations. In addition, arrowleaf balsamroot could be added to the mix when used in non-seleniferous areas where its deep tap root would not be problematic. A goal of the revegetation would be to establish healthy native bunch grass communities that are structurally diverse and would allow for succession over time.

Table 2.4-2 Proposed Seed Mix

SPECIES	LBS/ACRE	LIFE SPAN	EXPECTED PERFORMANCE
Mountain Brome	6	Short-lived	Quick to establish first growth season
Slender Wheatgrass	4	Short-lived	Quick to establish first growth season
Western Wheatgrass	4	Long-lived	Establishes well
Big Bluegrass	0.5	Medium-lived	Small in size; provides benefits of diversity and high forage value, both early in the spring and throughout the summer
Thickspike Wheatgrass	2	Long-lived	Drought, grazing, fire, and cold tolerant
Pubescent Wheatgrass	3.3	Long-lived	Drought tolerant and winter hardy
Basin Wildrye	4	Long-lived	Slow to establish but adds stability
Blue Wildrye	3	Short-lived	Fast developing

SPECIES	LBS/ACRE	LIFE SPAN	EXPECTED PERFORMANCE
Rocky Mountain Fescue	1	Perennial bunchgrass	Resistant to drought and heavy frost; reproduces from seeds and tillers
Orchardgrass	1	Long-lived	Establishes quickly and is high-producing
Lewis Flax	0.5	Perennial forb	Slower to establish but does well and re-seeds itself
Small Burnet	3	Long-lived	Does well
Western Yarrow	0.2	Long-lived	Does well
Showy Goldeneye	0.1	Long-lived	Does well and is not in the Aster genus
White Clover	0.8	Medium-lived	Establishes well
Utah Sweetvetch	1	Medium-lived	Fixes nitrogen
Rocky Mountain Penstemon	0.5	Long-lived	Does well
Sterile Triticale	8	One season	Provides erosion control and organic matter the following spring
Mycorrhizal	10	Enhances water and nutrient uptake	NA

2.4.11.5 Facility Demobilization and Demolition

The Project operations would utilize existing Smoky Canyon Mine facilities (**Section 2.3.3**). Facilities would eventually be demolished according to previously established and approved permit obligations.

2.4.11.6 Unreclaimed Areas

Approximately 12 acres of the East Smoky Panel pit on split estate lands on Lease IDI-015259, mined as a part of Phase 7 of the Project, would not be fully reclaimed (**Figures 2.4-1**, **2.4-2**, and **2.4-5**). Unreclaimed areas would include pit highwalls and stormwater features that would continue to function.

2.4.12 Miscellaneous Disturbance Areas

As shown in detail on **Figure 2.4-1** and described throughout **Section 2.4**, a variety of miscellaneous mine components that include topsoil stockpiles, cover material borrow pit areas, stormwater and sediment ponds, stormwater ditches, power lines, and a dewatering pipeline would be needed as part of the Proposed Action. Some of these miscellaneous components would be in new SUAs as described in **Section 2.4.9** and shown on **Figure 2.4-4**. Others would be on Simplot-owned land. A portion (10.1 acres) of one of the cover material borrow pits would be located on off-lease NFS land adjacent to Lease IDI-012890. This disturbance feature would be permitted under a Mineral Materials Permit and would be addressed through an amendment with IDL, if needed. A free use permit would be issued for material to be used on federal lands and a negotiated sale contract for material used on private lands. The USFS must determine whether and how to authorize the mineral materials permits both on and off lease. To allow for the needed flexibility for these various miscellaneous mine components during development and for ease in impact analysis in **Chapter 4**, the miscellaneous disturbance areas have been combined and as shown on **Figure 2.4-6** grouped together into a single category of disturbance. However, it is unlikely that the entire area covered by the miscellaneous disturbance category would actually be disturbed.

2.4.13 Financial Assurance

Under its regulatory authority and prior to allowing Simplot to start Project ground disturbing activities, the BLM would require Simplot to post an actual cost reclamation performance bond that considers the cost of complying with all permit and lease terms including royalty and reclamation requirements (43 CFR 3504.50). The bond would ensure that adequate funds are available to the federal government to close and reclaim the Project in the event that Simplot is unable or unwilling to fulfill its reclamation responsibilities. This bond amount would be in addition to that already posted for the existing and currently permitted operations at Smoky Canyon Mine. Reclamation performance bonds are calculated according to BLM policy regarding bond requirement and calculation guidance for phosphate mining operations (BLM 2013a). The ROD would describe the methodology to be used to calculate the performance bond amount for the Project. The calculation would cover the maximum reclamation liability during the life of the Project or the period of the bond. The bond for the mine is managed adaptively and can be increased or decreased if or as unforeseen issues arise when it is determined that a change in coverage is appropriate. Periodic review and recalculation of the bond would occur, and any changes incorporated into the reclamation bond instrument, to account for factors such as inflation/deflation of fuel costs, equipment rental rates, wages, and materials. A similar actual-cost bond would also be required by the USFS for areas of Project disturbance permitted by SUAs (36 CFR 251.56(e)). Similarly, IDL holds a surety bond for the private lands portion of the Smoky Canyon Mine. This would also be updated as needed for the East Smoky Panel disturbances.

2.4.14 Disturbance Summary

Summaries of the disturbance acreage for the Proposed Action are contained in **Tables 2.4-3** and **2.4-4**.

Table 2.4-3 East Smoky Panel (Proposed Action) and Panel B Disturbance Breakout

<table>
<tr><th colspan="2">PANEL</th><th>NEW DISTURBANCE</th><th>REDISTURBANCE</th><th>TOTAL</th></tr>
<tr><td colspan="2">Proposed Disturbance within the 920-Acre East Smoky Panel Proposed Project Area Boundary</td><td>724.7</td><td>124.1</td><td>848.8</td></tr>
<tr><td rowspan="4">Panel B – Either within Authorized Disturbance Boundary or Associated Panel B Stormwater Features[1]</td><td>Additional Backfill & Miscellaneous</td><td>6.8</td><td>86.7</td><td>93.5</td></tr>
<tr><td>East Smoky Pit</td><td>0</td><td>3.7</td><td>3.7</td></tr>
<tr><td>Roads</td><td>0</td><td>27.3</td><td>27.3</td></tr>
<tr><td>Panel B Subtotal</td><td>6.8</td><td>117.7</td><td>124.5</td></tr>
</table>

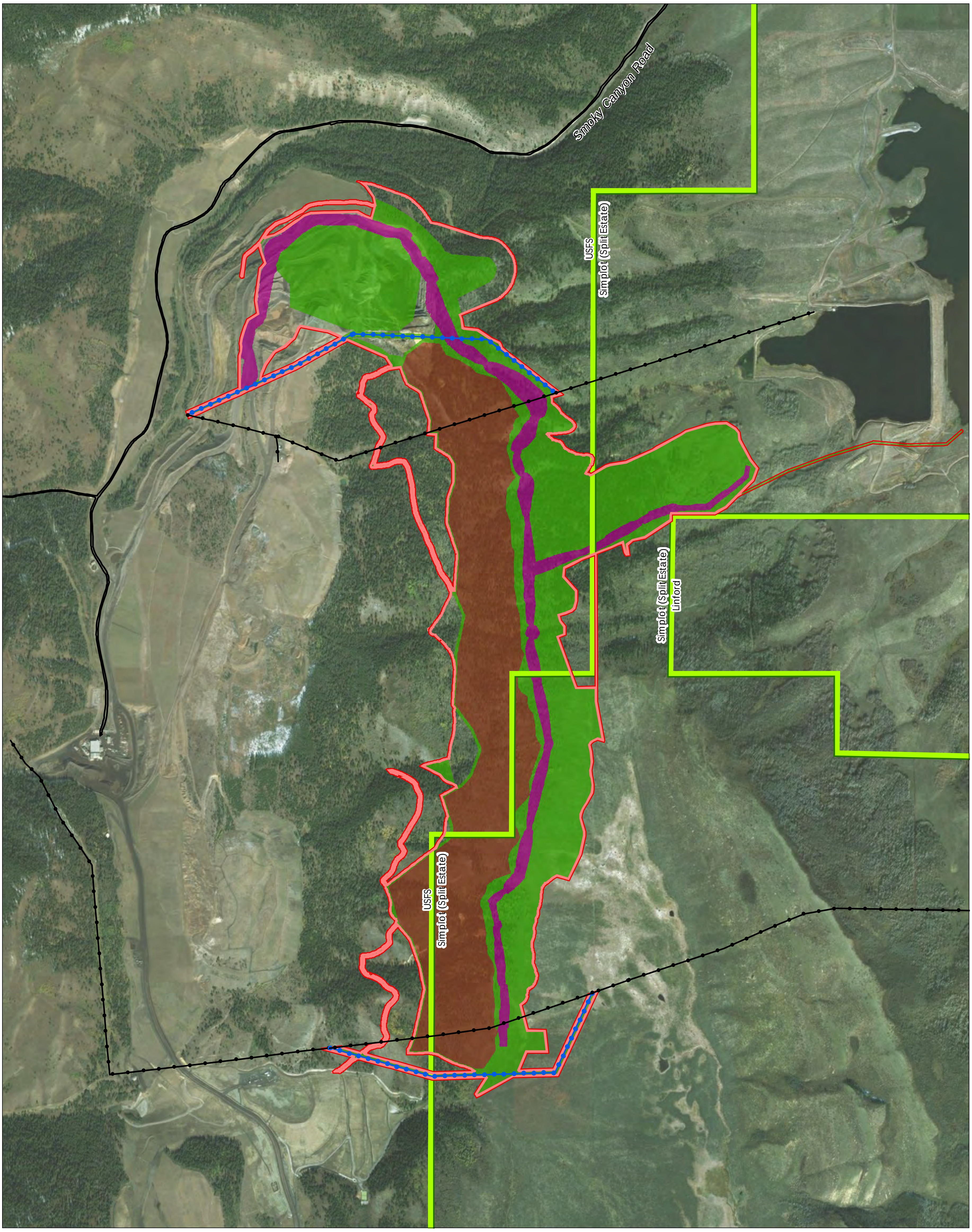
[1] Includes all proposed disturbance within the existing disturbance boundary, plus the proposed run-on ditch and storm water ponds associated with Panel B.

Table 2.4-4 Proposed Action Disturbance Acreages

AREA		PITS (ACRES)		ROADS (ACRES)		MISC.* (ACRES)		TOTAL (ACRES)	
		FEDERAL	SPLIT ESTATE	FEDERAL	SPLIT ESTATE	FEDERAL	SPLIT ESTATE	FEDERAL	SPLIT ESTATE
Lease IDI-012890	New Disturbance	148.8	7.8	19.8	4.7	69.0	25.5	237.6	38.0
	Re-disturbance	3.7	0	13.2	0	51.1	0	68.0	0
Lease IDI-026843	New Disturbance	0.5	0	6.0	0	22.5	0	29.0	0
	Re-disturbance	0	0	14.1	0	42.0	0	56.1	0
Lease IDI-015259	New Disturbance	28.0	86.5	0	17.6	7	73.7	35.0	177.8
	Re-disturbance	0	0	0	0	0	0	0	0
Disturbance on Lease IDI-015259	New Disturbance	27.1	0	0	0	15.8	0	42.9	0
Modification Area	Re-disturbance	0	0	0	0	0	0	0	0
Proposed USFS SUA Areas	New Disturbance	0	0	11.7	0	36.8 (18.3**)	0	48.5 (30.0**)	0
	Re-disturbance	0	0	0	0	0	0	0	0
Proposed Minerals	New Disturbance	0	0	0	0	10.1	0	10.1	0
Material Area	Re-disturbance	0	0	0	0	0	0	0	0
Split Estate Lands	New Disturbance	0	0	0	8.4	0	97.4	0	105.8
– Off Lease	Re-disturbance	0	0	0	0	0	0	0	0
Disturbance Totals**	Total New Disturbance	204.4	94.3	37.5	30.7	161.2	196.6	403.1	321.6
	Total Re-disturbance	3.7	0	27.3	0	93.1	0	124.1	0
	Sub-Totals – Federal and Split Estate Disturbance	208.1	94.3	64.8	30.7	254.3	196.6	527.2	321.6
Total by Disturbance Type		302.4		95.5		450.9		848.8	

* All areas outside pits and roads; includes Panel B additional backfill, settling ponds and ditches, topsoil stockpiles, borrow areas, dewatering pipeline, and disturbance associated with the power line relocation. Although it is unlikely that the entire area classified as Miscellaneous would ultimately be disturbed, including the entire area as potentially being disturbed would provide the needed flexibility during development of the miscellaneous components and potential future laybacks.

** Actual proposed SUAs based upon disturbance footprint only; see also **Table 2.4-1** for a break-out by feature.



Legend

Existing Overhead Power Line

Overhead Power Line Proposed Re-route

Road

Project Area Boundary

Surface Ownership Boundary

Disturbance Category

Haul Road

Miscellaneous Disturbance (see Figure 2.4-1)

Pit

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 2.4-6
Proposed Action Components - Combined

2.5 ENVIRONMENTAL PROTECTION MEASURES COMMON TO ALL ACTION ALTERNATIVES

Simplot would update their existing Comprehensive Environmental Monitoring Program Plan (CEMPP) to include the Project as necessary, to continue providing a level of environmental protection that would meet or exceed applicable regulations. Further, Simplot's M&RP (Simplot 2015) includes the following applicable environmental protection measures (EPMs) (including monitoring), described by resource below. Other EPMs and their sources are also described and are already, or would be, adopted by Simplot.

2.5.1 Cultural Resources (including Paleontological Resources)

Monitoring the protection of any potential cultural and paleontological resources on NFS lands identified through baseline surveys and concurrence with the appropriate agencies would be continued for the Project. If intact vertebrate fossils are exposed during mining activities, the locations would be recorded and, if possible, the fossil may be tentatively identified. Notification would be provided to the BLM and USFS. (M&RP 2015)

2.5.2 Air Quality

On-site emissions (composed principally of dust emissions from the mining operations) associated with mining the East Smoky Panel pit would be covered by the current air permit held by the Smoky Canyon Mine. Simplot would comply with the permit as required by IDEQ and would apply for any permit amendments, as determined necessary by IDEQ. (M&RP 2015)

Simplot would continue appropriate BMP's to address dust concerns, primarily by watering and/or applying magnesium chloride as appropriate to the haul and access roads as necessary. (M&RP 2015)

2.5.3 Soil

Salvaging topsoil and vegetation growth medium from disturbed areas prior to mining would occur to support long-term reclamation success. Topsoil would be removed and either direct-hauled to re-graded surfaces ready to receive topsoil or placed in topsoil stockpiles for temporary storage. (M&RP 2015)

Reuse of topsoil would follow the selenium guidelines published by the USFS. Environmental staff would inspect areas shortly after they are topsoiled to ensure coverage with topsoil thickness of at least 16 inches. (USFS Interdisciplinary Team [IDT])

Stable reclaimed areas would be promoted through the use of stabilization techniques such as: placement of soil on slopes that are 3h:1v or less; scarifying soil surfaces to reduce runoff; seedbed preparation to enhance the germination rate of seeds; incorporation of fertilizer and other methods to enhance successful growth of vegetation; and/or redirection of run-on/run-off. (M&RP 2015)

Low permeability layers of soil or shale in foundations of overburden disposal area slopes would be modified or removed to avoid the perching of water to prevent seeps at the face of these sites. Low permeability horizons in topsoil and subsoil under specific areas of overburden fills would be removed during topsoil stripping. (M&RP 2015)

Soil stockpiles would be protected from erosion by seeding and establishment of short-term vegetation cover. (BLM 2010c)

2.5.4 Vegetation

Reclamation activities (**Section 2.4.11**) are designed to: limit any potential impacts to the environment; re-establish the natural drainage patterns; and return the land to its original pre-mining multiple uses on public land such as recreation, livestock grazing and wildlife habitat. Success would be demonstrated as required on NFS land. (M&RP 2015)

Reclamation of disturbed areas that are no longer needed for active mining operations would be conducted concurrent with other mining operations. Revegetation of disturbed slopes reduces run-off quantity and velocity that would otherwise contribute to runoff volumes. As soon as practicable, disturbed areas would be graded, topsoiled, and reseeded with techniques and with a seed mix that are acceptable to the USFS. (M&RP 2015)

Pit backfilling in East Smoky Panel would allow these areas to be revegetated and support the post-mining land use. (M&RP 2015)

Livestock grazing in reclaimed areas would be controlled until the reclaimed areas have become stabilized and are deemed ready for grazing by Simplot and the USFS. (M&RP 2015)

Timber would be cruised by the USFS and then harvested from proposed disturbance areas as directed by the USFS. Simplot would purchase the timber at the market value appraised at the time of harvest. (IDT)

Small brush and slash would be incorporated in the topsoil when it is salvaged. (BLM 2010c)

Seeding would proceed no later than the first fall after earthwork is complete. (BLM 2010c)

In order to control and prevent the spread of noxious weeds, Simplot would comply with its existing noxious weed program (M&RP 2015). Body and undercarriage of all off-road vehicles would be examined and cleaned prior to leaving weed invested areas (BLM 2010c). Only certified weed-free seed, mulch, straw bales would be used (BLM 2010c).

2.5.5 Surface and Groundwater

Simplot would continue to follow BMPs (M&RP 2015) in the CEMPP to minimize and/or prevent impact to water resources for the Project that include:

- Final grading should be completed as soon as possible following overburden disposal to a maximum 3h:1v slope to reduce surface water run-off velocity.
- Haul roads would be graded away from fill slopes, or crowned, so that concentrated flow is not allowed to run along or across and erode the roads. Berms would be maintained to prevent run-off. Appropriately located rolling dips, water bars, and water deflectors may also be used to reduce erosion of the road surface or road base.
- Construction of Fills for Roads and Facilities - Fills, road, or parking areas should be constructed of chert or other low seleniferous material and designed with stable slopes. Slopes with topsoil should have temporary vegetation.

- Man-made accumulations of additional snow on active external overburden areas would be avoided, to the extent practicable, by disposing of snow that is picked up for any purpose in designated areas where the snow and snow melt would not be incorporated into an active overburden disposal facility. Snow disposal areas should be located where snow-melt would flow to sediment control ponds or open pits to prevent sediment being released outside run-off control areas.
- To minimize selenium in runoff, reclamation would include covering seleniferous overburden with a low seleniferous material prior to topsoiling.
- Chert riprap may be placed in areas subject to erosion, such as below culverts, drainage outlets and ditches thereby reducing erosion and sedimentation. Gabion walls made of chert may also be selectively used to protect road fills from erosion by flowing water.
- Drainage and diversion channels would be constructed as necessary to divert run-on water around disturbance areas and collect runoff from disturbed area to route it to settling ponds and other sediment control features. Ditches would be excavated with a berm placed on the downhill side of the ditch and would pass the 100-year, 24-hour storm event without damage or erosion.
- Where a drainage channel must be permanently routed over overburden fills, if it erodes into underlying overburden, any seepage could enter the underlying overburden and potentially leach COPCs. These channels would be designed to be stable without damage for the peak flow from the 100-year, 24-hour storm on top of snowmelt. A clay liner would be installed under the channel or the overburden directly underlying the channel bottom, and chert or other low seleniferous overburden would be placed for a distance of 50 feet on either side of the channel. The channel would be protected from erosion with chert riprap. An HDPE plastic liner could also be used.
- Sediment traps, silt fences, catch basins, and sediment settling ponds would be used to reduce runoff velocity of flowing water sediments settle out in a controlled manner. To the extent possible, these features would not be located on seleniferous overburden.
- Stormwater ponds would primarily be located on the Dinwoody or Salt Lake Formation. They would be designed to contain the runoff and sediment from the 100-year, 24-hour storm event.
- A preventive maintenance program would be implemented to ensure that stormwater control facilities are clean and operating effectively and that the design capacity is maintained. As identified during bi-monthly inspections, ponds may be scheduled for removal of sediments and/or water, earthwork to repair berms, ditches, or outflow structures, etc. Further, should these inspections note that unintended types of maintenance wastes, vehicle fluids, or any other non-storm waters have entered ponds, removal would be scheduled immediately.
- Permanent placement of seleniferous overburden material in perennial channels would be avoided when possible, but crossing drainages with temporary road fills is required to access the mining areas. These crossings would be built from chert and designed so they can be reshaped during reclamation to resemble the surrounding area.

- Ephemeral channels that cross proposed mine disturbance would be collected and diverted in ditches around the active mining area. Permanent placement of seleniferous overburden material in ephemeral drainages would also be avoided to the extent practicable. Road crossings would be built from low seleniferous material and designed so they can be reshaped to resemble the surrounding area.
- Seleniferous overburden would be placed in approved pit backfills and then capped with low seleniferous materials. (For the purpose of proper application of these BMPs, Simplot considers all shale overburden from the stratigraphic interval extending from the Hanging Wall Mudstone to the Fish scale Shale to be seleniferous overburden.)

Simplot would continue the comprehensive ground and surface water monitoring program, expanding the program as needed to adequately cover the Project Area. (M&RP 2015)

Simplot would continue to use baseline surface and groundwater monitoring data as a basis of comparison to document the effectiveness of site specific mitigation measures and BMPs employed during active mining as well as long-term protections of water resources in the Project Area. (M&RP 2015)

Preliminary designs for retention ponds and run-on control ditches have been developed and a comprehensive management plan would be developed contingent upon the final approval of the operations plan. These would also be incorporated into the SWPPP. The stormwater monitoring required by the stormwater permit would occur and Simplot would meet all additional requirements for storm-event-related surface water monitoring. (M&RP 2015)

Simplot would evaluate and update its current SPCC Plan as needed. It would be implemented prior to placement of the petroleum products on-site and would be reviewed every three years, amended as needed, and certified that it has been developed in accordance with good engineering practices and meets applicable standards. (M&RP 2015)

2.5.6 Wildlife and Aquatics

Monitoring and evaluation of the potential effect of the mining operation on wildlife and their habitat on NFS lands would continue. (M&RP 2015)

Any incident involving big game and mining equipment would be reported to Idaho Department of Fish and Game (IDFG). (M&RP 2015)

Long-term monitoring of fisheries and aquatic resources would be done as needed contingent upon mining approval. (M&RP 2015)

Biological surveys for migratory birds, raptors, or other special status bird species would be conducted between March 1 through August 31 in areas planned for disturbance to identify any active nests for bird species. If active nests are discovered during surveys, avoidance plans would be developed as necessary before these areas are disturbed. (USFS IDT; compliance with the Migratory Bird Treaty Act)

Power lines and poles shall be configured to minimize raptor electrocutions and discourage raptor and raven nesting and perching. (BLM 2010c)

2.6 ALTERNATIVES TO THE PROPOSED ACTION

2.6.1 Alternative 1 - Reduced Pit Shell with Soil-only Cover

2.6.1.1 Mining and Overburden

Under Alternative 1, the overall mining operations, mining sequences (Phases 1-7), associated stormwater controls, and other associated miscellaneous disturbances would remain the same as described for the Proposed Action. The general Project Area would also remain the same. Further, as with the Proposed Action, the Panel B portion of Alternative 1 would be made consistent with any future CERCLA remedy selected at the site. However, the ultimate pit shell footprint would be reduced by approximately 78 acres compared to the Proposed Action (**Figure 2.6-1** and **Figure 2.6-2**).

The reduction in area results from the steeper pit wall slopes that would be used under Alternative 1 to reduce mining the cherty shale that contains a high concentration of seleniferous material (**Figure 2.6-3**). A geotechnical study (CNI 2017) determined that these steeper pit wall slope angles would maintain appropriate factors of safety. The specific slope would vary in different geologic formations and structures.

The steeper pit wall slopes would generate less overburden (approximately 8 million BCY less compared to the Proposed Action). Further, no cherty shale material would be encountered with this alternative mining plan, due to the reduced pit footprint, as depicted in **Figure 2.6.3**. Any additional disturbances resulting from unanticipated slope instability requiring potential laybacks are accounted for by the conservatively-sized miscellaneous disturbance areas shown on **Figure 2.6-2**. In order to maximize the tonnage of ore that can be economically and safely recovered with Alternative 1, much of the pit would be mined to a lower elevation (i.e., deeper) than with the Proposed Action. This means that groundwater would likely be intercepted during mining of the lower benches associated with Phases 6 and 7, which is similar to the Proposed Action projections. If groundwater enters the mine pit, it would be directed to a sump within the pit and pumped to the tailings pond. As under the Proposed Action, the potential dewatering pipe and pump system would be located on Simplot-owned property.

The overburden mined initially would be placed in Panel B, eliminating the need for an external overburden disposal area, which is the same as under the Proposed Action. As with the Proposed Action, not all of the miscellaneous disturbance areas depicted would be likely to be disturbed (**Figure 2.6-2**).

2.6.1.2 Lease Modification and RFP Amendment

The proposed lease modification and RFP amendment described for the Proposed Action would be the same under Alternative 1.

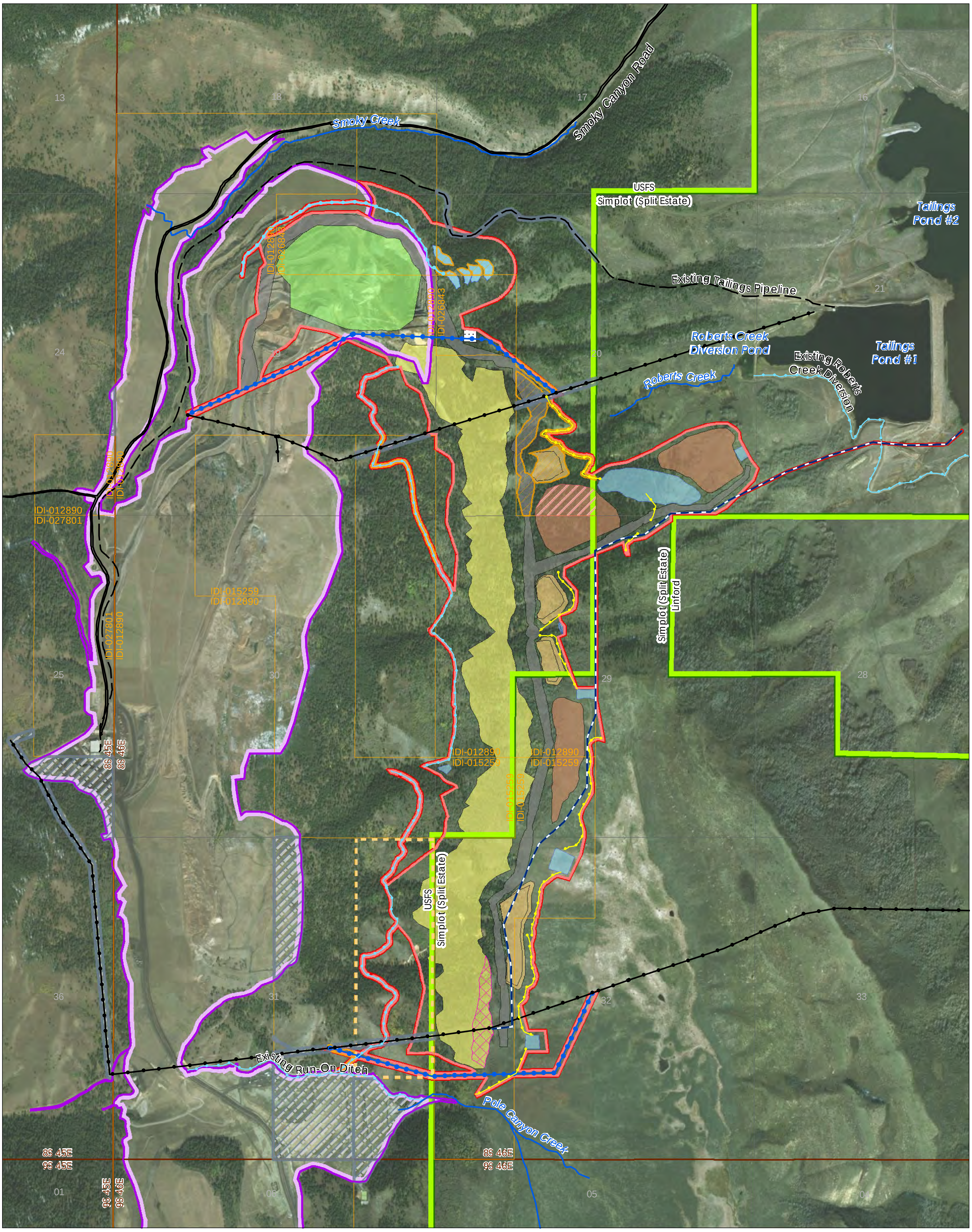
2.6.1.3 SUAs

Under Alternative 1, the proposed SUAs would be the same as described under the Proposed Action (**Figure 2.6-1**).

2.6.1.4 Backfilling and Reclamation

All 224 acres of the reduced East Smoky Panel pit under this alternative would receive a topsoil cover (**Figure 2.6-4**). Not encountering the cherty shale under Alternative 1 would reduce the seleniferous nature of the combined overburden materials, so the Proposed Action's geologic store and release cover would not be needed. However, final reclamation contours for the reduced East Smoky Panel pit would differ only minimally from the Proposed Action (**Figure 2.6-4** and **Figure 2.6-5**). The approximately 9-acre unreclaimed pit highwall area associated with this alternative would generally be situated in the same location as the Proposed Action, though it would be somewhat smaller. The reclamation seed mix for the Proposed Action would be used, in addition to potentially adding some shrub and tree species since the potential for selenium uptake by plant species under Alternative 1 would be greatly reduced.

As described earlier, overburden mined initially would be placed in Panel B, however, unlike for the Proposed Action, the currently approved cover for Panel B would be used under this alternative (**Figure 2.6-4**). That cover is a four-foot chert cap, which was modeled along with the source term from the Project for Alternative 1, was much lower than anticipated. Thus, the more restrictive Proposed Action cover was deemed unnecessary for Alternative 1 at Panel B. Further, since Panel B is currently under CERCLA action and ongoing studies and monitoring are continuing, a decision on whether a more restrictive cover will be required would be made under that program (see **Section 2.4.11.2**).



Legend

- Proposed Dewatering Pipeline
- Existing Overhead Power Line
- Overhead Power Line Proposed Re-route
- Run-On Diversion Ditch
- Run-Off Diversion Ditch
- Existing Tailings Pipeline
- Township Boundary
- Section Boundary
- Project Area Boundary
- Surface Ownership Boundary
- Existing Disturbance Boundary
- Proposed Lease Modification Area
- Existing Lease Boundary
- Existing Special Use Authorization (SUA)
- Proposed Special Use Authorization (SUA)
- Proposed Mineral Materials Permit Area

Mine Components

- Haul Road
- Borrow Pit
- Panel B Additional Backfill Area
- Pit
- Stormwater Pond
- Topsoil Stockpile
- Unreclaimed High Wall
- Lube Car

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Feet
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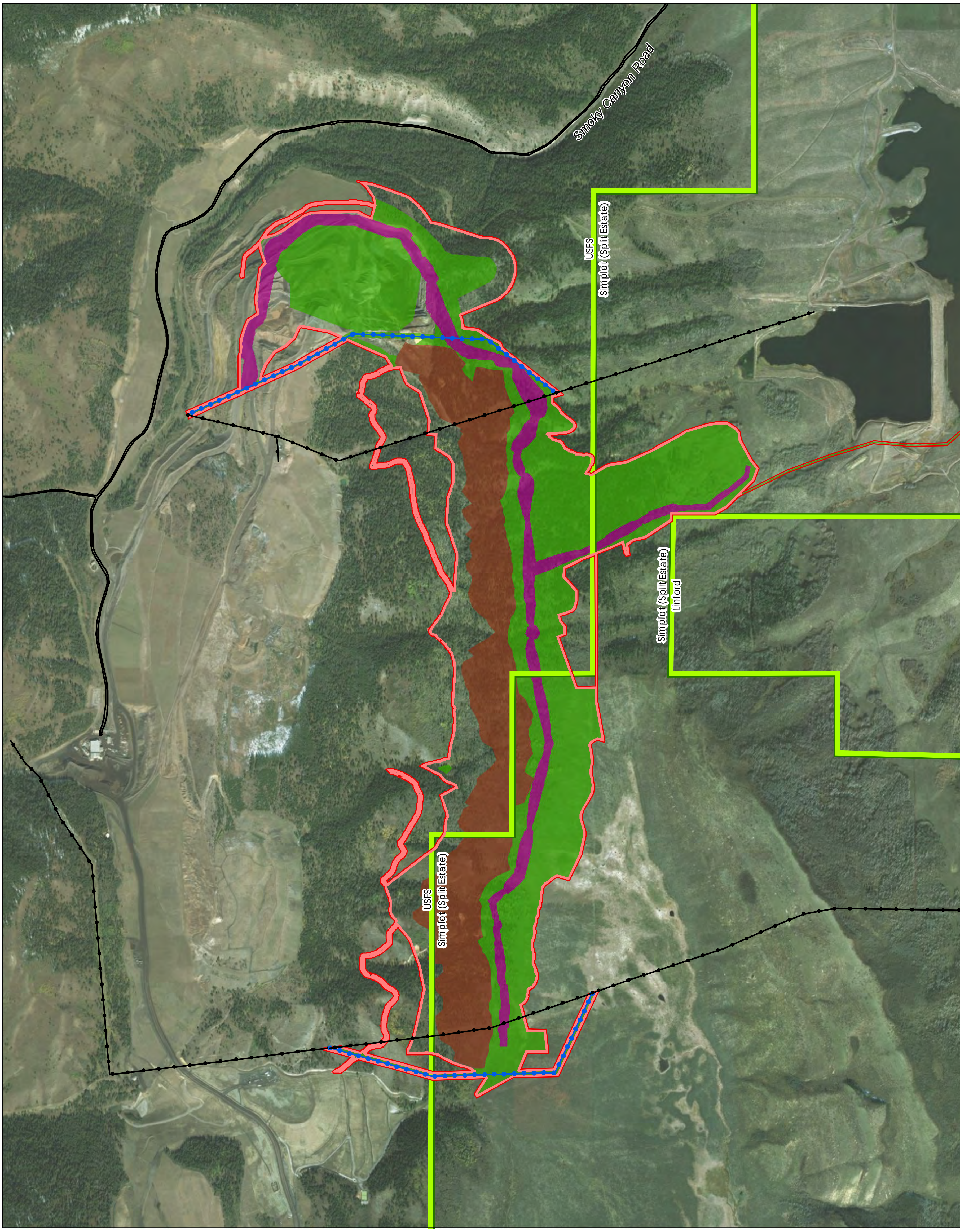
Figure 2.6-1
Alternative 1 Components
East Smoky Panel Mine EIS



Legend

Existing Overhead Power Line

Overhead Power Line Proposed Re-route

Road

Project Area Boundary

Surface Ownership Boundary

Disturbance Category

Haul Road

Miscellaneous Disturbance (see Figure 2.6-1)

Pit

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 2.6-2
Alternative 1 Components - Combined
East Smoky Panel Mine EIS

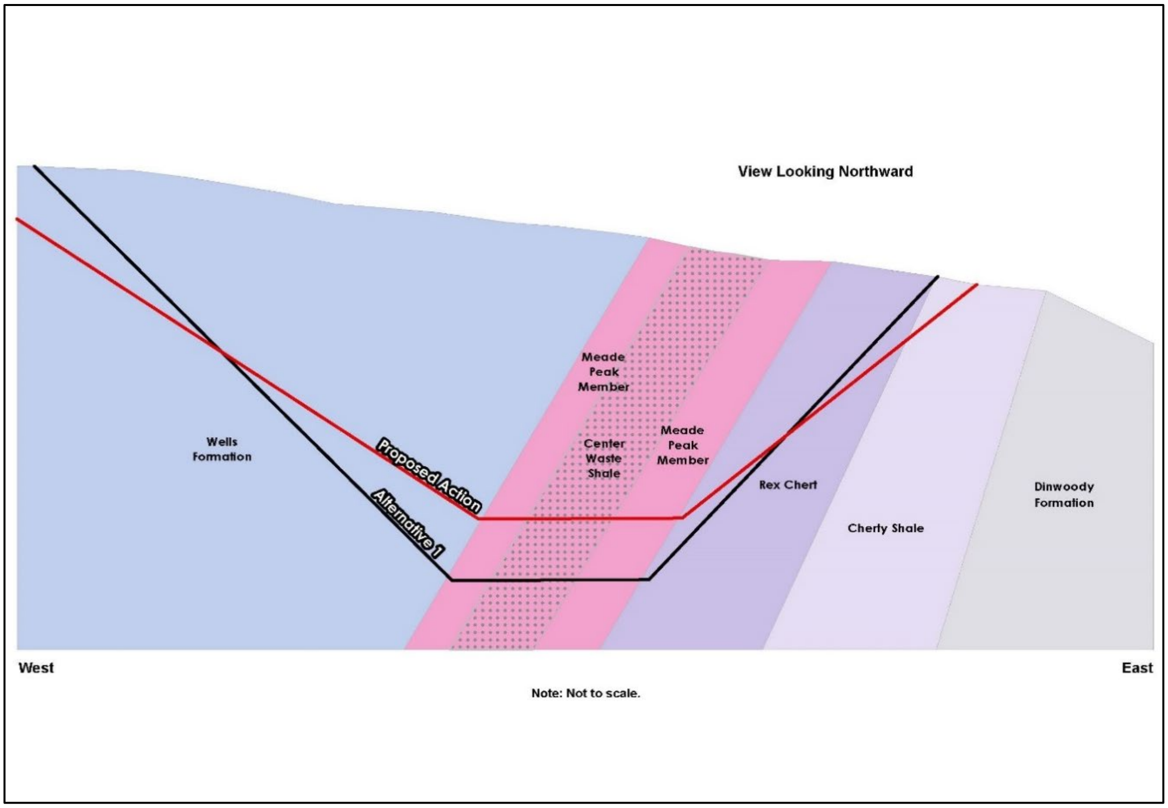
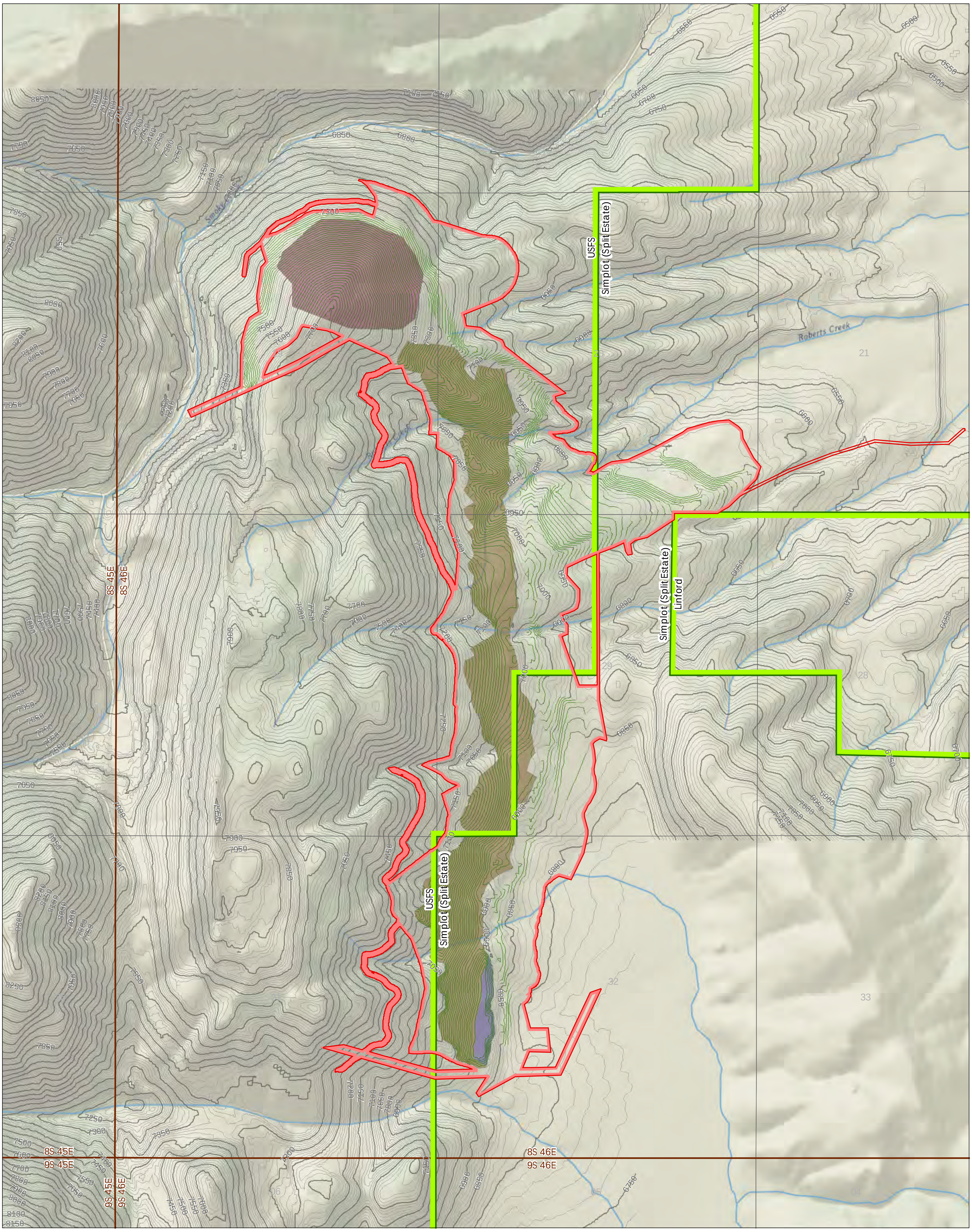


Figure 2.6-3 Idealized Cross Section of Alternative 1 vs. Proposed Action



Legend

- Drainage
- Project Area Boundary
- Township Boundary
- Section Boundary
- Surface Ownership Boundary

Final Configuration Mine Components

- Currently Approved Chert Cap
- Non-Seleniferous Waste, Topsoil-only Cover
- Unreclaimed High Wall Disturbance

- 10 ft Existing Contour
- 50 ft Existing Contour
- 10 ft Final Reclamation Contour

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Feet
1:20,000 (at original document size of 11x17)
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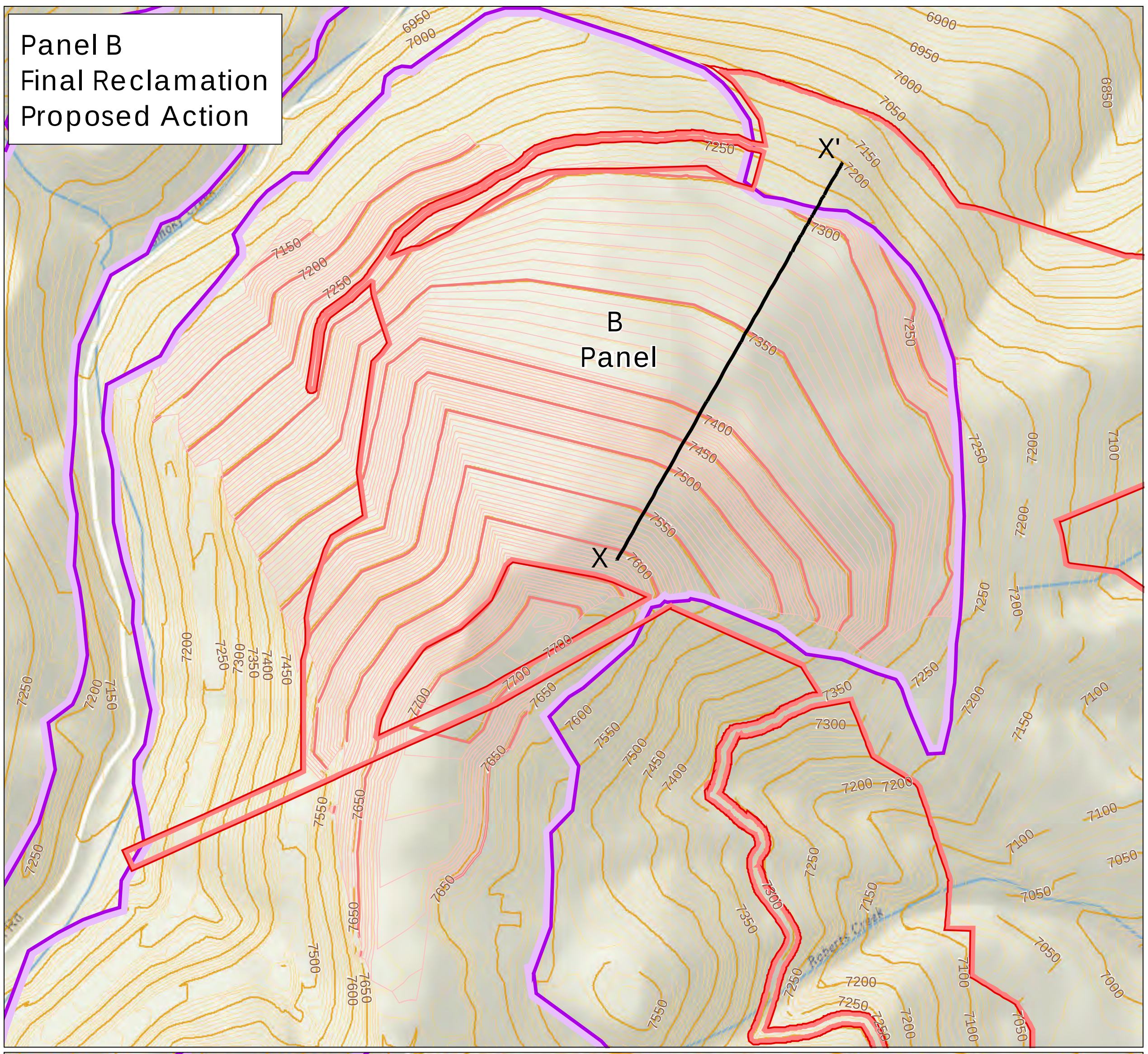
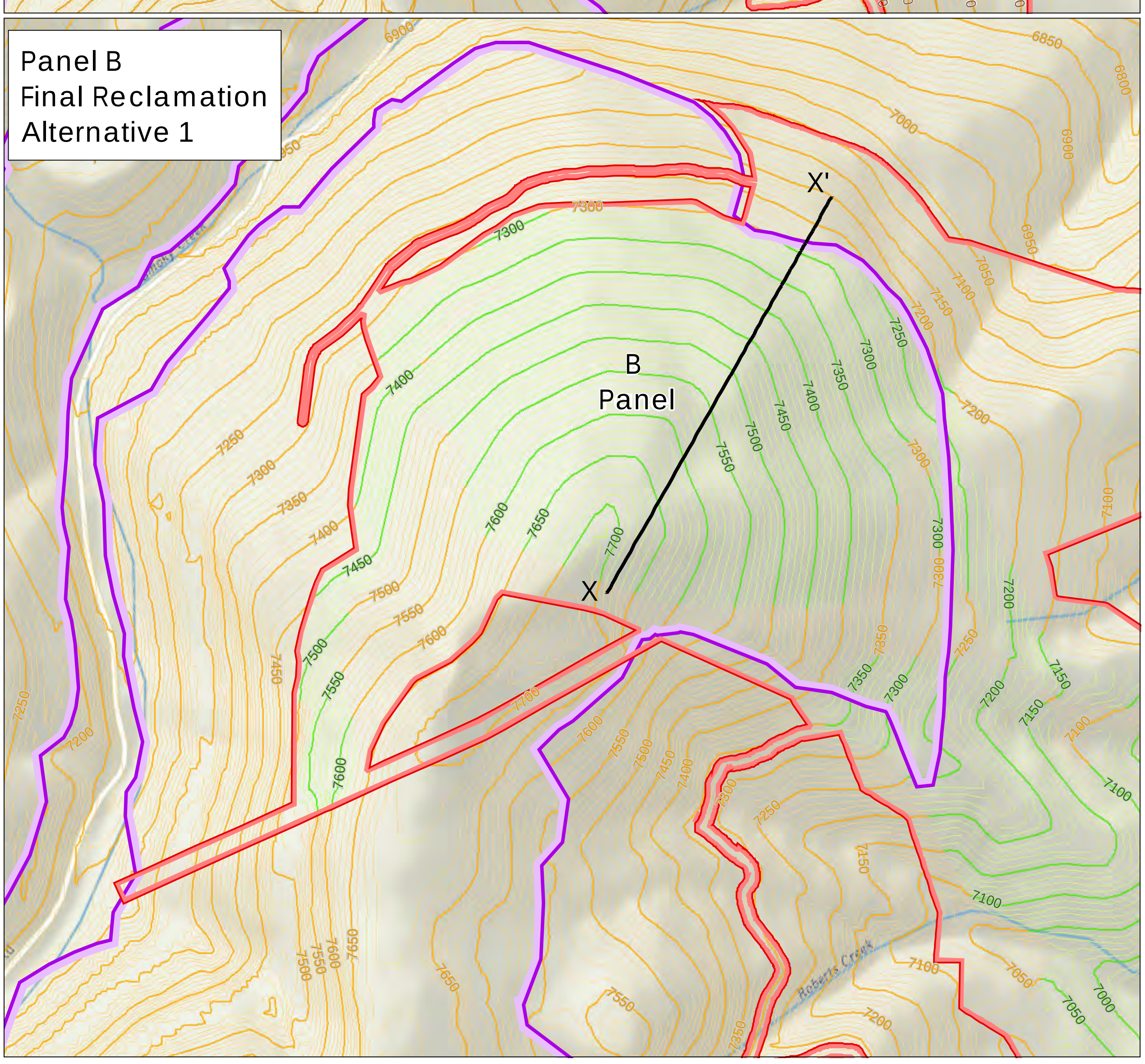
Figure 2.6-4
Alternative 1 Final Configuration and Reclamation Pit Covers
East Smoky Panel Mine EIS



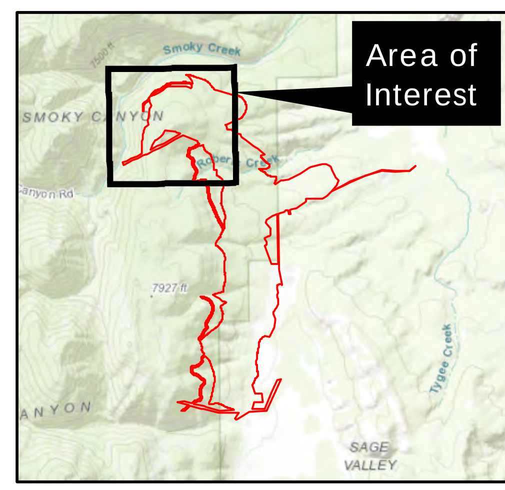


Legend

- Cross Section (X - X')
- Project Area Boundary
- Existing Disturbance Boundary

Final Reclamation Contours

- 10 ft Proposed Action Contours
- 50 ft Proposed Action Contours
- 10 ft Alternative 1 Contours
- 50 ft Alternative 1 Contours
- 10 ft Existing Contours
- 50 ft Existing Contours



Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community
3. PMT: Post Mining Topography

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Feet
1:10,000 (at original document size of 11x17)

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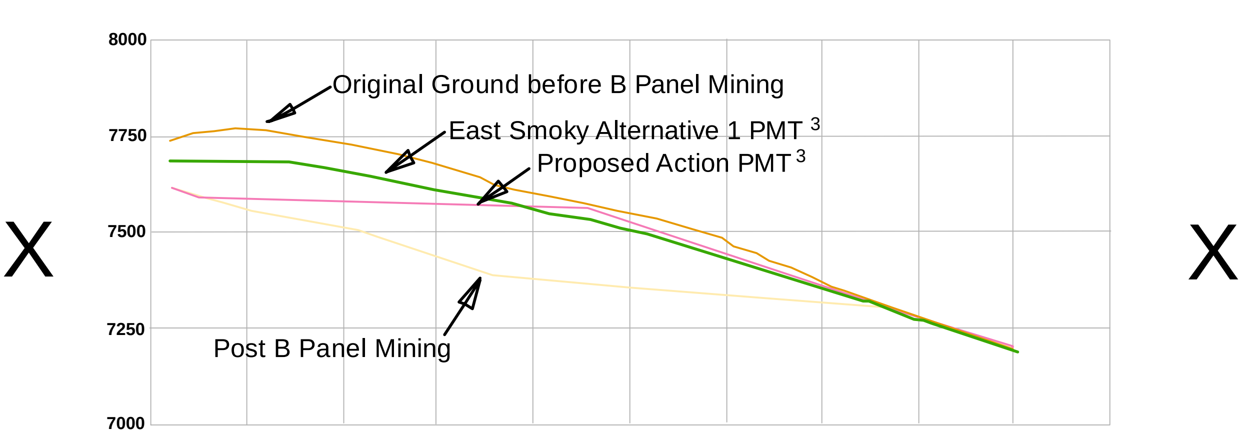

Figure 2.6-5
Panel B Final Reclamation Contours
Proposed Action and Alternative 1
East Smoky Panel Mine EIS

2.6.2 No Action Alternative

Under the No Action Alternative, the proposed M&RP for development of the East Smoky Panel Mine area and proposed SUAs would not be approved, existing Federal mineral leases would not be modified, the CNF RFP would not be amended, and mining at other panels of the Smoky Canyon Mine would continue as currently authorized. Mining in Panel B would proceed as currently planned by Simplot and authorized by the BLM. Simplot would retain and be eligible to invoke the mining rights granted in their existing federal leases at another time, with a revised M&RP that meets all regulatory and other established requirements.

2.6.3 Alternatives Eliminated from Detailed Analysis

This section describes alternatives to the Proposed Action for the Project that will not be analyzed in detail in this EIS because they: 1) do not meet the purpose and need so are ineffective; 2) are not technically practical and feasible to implement; 3) are not economically practical and reasonable; 4) would be similar in design to an alternative already analyzed; or 5) would have substantially similar effects to an alternative already analyzed.

2.6.3.1 No Issuance of a Lease Modification

This alternative addresses the public scoping comment to evaluate alternatives that reduce the disturbance footprint of the Project. This alternative would use the same basic mine plan as the Proposed Action, but would limit ore extraction to only those areas within existing lease boundaries; a lease modification would not be issued. This alternative would reduce total disturbance by approximately 9 percent compared to the Proposed Action; however, total ore recovered would be reduced by 14.5 percent compared to the Proposed Action.

Not issuing a lease modification would not be consistent with Simplot's objective for the Project nor BLM's regulations for full recovery of the resource because it would not allow for maximum development of the phosphate resource on leases held by the company. Pit layback would be limited to the existing lease boundary, precluding extraction of phosphate within the current lease boundary.

Not issuing a lease modification would not be technically practical and feasible because the on-lease ore left behind upon conclusion of mining of the East Smoky Panel would be isolated and would not be technically practical or feasible to mine as reclamation may preclude future recovery. Further, not issuing a lease modification would not be economically practical and feasible because the isolated remaining deposit of on-lease ore left behind upon conclusion of mining of the East Smoky Panel would be a quantity that would not be economically recoverable without being mined in conjunction with other off-lease ore. In addition, it is not economically practical to forego recovery of 14.5 percent of the phosphate ore to avoid a 9 percent increase in disturbance. The amount of ore that could be recovered is proportionally higher than the additional disturbance.

Not issuing a lease modification would not be environmentally reasonable because reducing the amount of ore recovered from the East Smoky Panel would only result in the need to mine other leases in the region at an earlier date. Further, there are not any special environmental values, concerns, or potential impacts known in the proposed lease modification area; therefore, recovering ore from this parcel would be less environmentally impactful than future proposals where such environmental values of concern may be more likely to occur.

Because the alternative to not issue a lease modification would not be consistent with Simplot's objectives for the Project, the BLM's regulations for full recovery of the resource, would not be technically or economically practical and feasible, and would not be environmentally reasonable, it was eliminated from further analysis.

2.6.3.2 External Overburden Disposal Area on Private Property

This alternative would involve the development of an off-lease and off-NFS lands seleniferous ODA on adjacent Simplot private property, instead of placing seleniferous overburden in Panel B and the East Smoky Panel, as proposed as a part of the Proposed Action. Development of an external ODA would be consistent with Simplot's objective for the Project; would be technically practical and feasible; and there are no known economic factors associated with the East Smoky Panel that would render this alternative infeasible. However, development of an external ODA would not be environmentally reasonable because additional capacity exists in the Panel B pit (a pit in active development and currently receiving overburden) under Alternative 1 for disposal of additional overburden. Development of external ODA(s) to receive Project overburden would increase the disturbance and seleniferous footprint of the mine unnecessarily. Further, the application of additional overburden to the Panel B disturbed site would be environmentally advantageous by bringing the final topographic configuration of that area closer to the original topography.

In addition, the underlying geology of the areas potentially suitable for an ODA on private property is alluvium and Salt Lake Formation, which could result in seleniferous seeps developing at the boundary of the ODA, causing a potentially long-term surface expression of drainage water that could have high concentrations of COPCs. Topographically it would not be possible to situate this ODA so any drainage would drain back into the mined out panel because the intent behind this alternative would be to place seleniferous overburden on top of areas underlain by relatively impervious Salt Lake Formation clay. In reviewing other adjacent areas that are underlain by the Salt Lake Formation, the topography is too steep to accommodate significant quantities of waste. The slopes of these areas trend down gradient toward Sage Valley alluvial gravels, where any seeps would run into the alluvial gravel rather than into the pit backfill. Because an external ODA on private property would not be environmentally reasonable, this alternative was eliminated from further analysis.

2.6.3.3 Mine Sequencing – South to North

This alternative would involve sequencing mining of the East Smoky Panel from south to north (as opposed to the Proposed Action, which sequences mining from north to south). Upon completion of mining of the East Smoky Panel, a portion of the pit and mine highwall would remain unreclaimed on NFS land since mining would end in the northern portion of the pit all situated on NFS land. This alternative assumes the total unreclaimed acreage would be the same regardless of mining sequence (north to south or south to north). Sequencing mining from south to north would be consistent with Simplot's objective for the Project; and would be equally technically practical and feasible as mining north to south under the Proposed Action by allowing for development of the phosphate resource on leases held by the company. Mining from south to north would require hauling overburden from the very southern end of the proposed East Smoky Panel to Panel B in the early phases of the mine. This would require the full length of the haul road to be constructed in Phase I of the Project, which would result in extremely high costs in the early phases of mining East Smoky Panel. In addition, fully reclaiming Simplot's private property, in the south portion of the pit, would improve the long-term economic value of the property, while the long-term economic value of the NFS lands containing the un-reclaimed portion of the mine would be reduced. There would be no known difference in overall environmental impacts between this alternative and the Proposed Action; the only difference would be the location of the un-reclaimed portion of the mine. Because there would be no overarching technical, economical, or environmental advantage to sequencing mining from south to north as opposed to north to south, and because NFS lands would bear greater long-term adverse impacts of a south or north sequence, this alternative was eliminated from further analysis.

2.6.3.4 Low (No Meade Peak Member Material) Seleniferous Overburden Backfill in the East Smoky Panel

Under this alternative, the lease modification, SUAs, and RFP amendment described for the Proposed Action would apply. The proposed stripping of overburden and mining of phosphate ore in the East Smoky Panel would also be the same as described for the Proposed Action. However, the Project Area would be expanded to include the existing and approved Panel B ODA and the existing access road to the ODA because all overburden from the Meade Peak Member from the East Smoky Panel pit would be placed in the Panel B pit. In order to make room for the East Smoky Panel seleniferous overburden in the Panel B pit, approximately 70 percent of the remaining overburden that is left to be mined from Panel B would be placed in the currently permitted Panel B external ODA, resulting in a bigger footprint for this ODA beyond its current configuration, but not beyond the currently permitted disturbance boundary. The currently approved Panel B RRAs would remain, and in addition a geologic store and release cover would be used atop the seleniferous materials placed in Panel B.

All other overburden (low seleniferous material), not from the Meade Peak Member, would be placed in the East Smoky Panel pit as described under the Proposed Action. The acreage of disturbance in the Project would be the same as the Proposed Action under this alternative, but the seleniferous footprint would be smaller because the seleniferous material removed from the East Smoky Panel would instead be all placed in the Panel B pit.

Based upon preliminary infiltration, geochemical, and groundwater modeling and evaluations, it was determined that this alternative would not have an overall measurable positive effect on resultant groundwater chemistry compared to the Proposed Action due to the low chemical concentrations and associated source terms, thus, this alternative was eliminated from further consideration.

2.6.3.5 No East Smoky Panel Overburden Used to Backfill Panel B

Under this alternative, all overburden from the East Smoky Panel would be used to backfill the East Smoky Panel pit; unlike the Proposed Action or Alternative 1, no overburden would be used to backfill Panel B. This alternative would require that initial overburden removed from the East Smoky Panel be temporarily stored elsewhere and returned to East Smoky Panel for backfill at a later date. Using all East Smoky Panel overburden for the East Smoky Panel pit backfill would be consistent with Simplot's objective for the Project by allowing for development of the phosphate resource on leases held by the company and environmentally it would be indistinguishable from the Proposed Action, with the exception that the contours of the Panel B pit backfill area under the Proposed Action would not be elevated closer to pre-mining topography. It would be technically feasible, although it would not be technically practical as it would require the greatest amount of re-handle of overburden of all alternatives, which would not be practical if other alternatives require less re-handle.

In order to use all East Smoky Panel overburden to backfill the East Smoky Panel pit, the initial overburden stripped from the East Smoky Panel would need to be stored then eventually returned to backfill the East Smoky Panel pit, which would increase the cost of the operation. While this operation would be economically feasible, it would not be economically practical because there is sufficient space to dispose of the overburden in the Panel B pit and avoid incurring the additional cost of rehandling. Since this alternative would not be technically or economically practical, it was not carried forward for detailed analysis in the EIS.

2.6.3.6 Reduced Pit Design to Eliminate Relocation of Utility Corridor/Forest Plan Amendment

This alternative would reduce the southern pit footprint of the East Smoky Panel, eliminating the need to move the existing power line and associated designated utility corridor, which would eliminate the need for a RFP amendment. Reduction of the size of the pit (by approximately 13 acres), and thus the seleniferous footprint and the disturbance area associated with the Project would be environmentally reasonable. However, reducing the size of the East Smoky Panel pit to avoid the power line relocation and RFP amendment would result in the loss of approximately 100,000 tons of ore (a 1.4 percent reduction). This alternative would not be consistent with the purpose and need for the Project because under this alternative Simplot would be prohibited from recovering ore in the southern portion of the Project Area where they hold the lease for the phosphate resource. Reducing the size of the pit footprint to avoid relocating the existing transmission line, utility corridor, and an RFP amendment would be technically practical and feasible. From a safety standpoint if the power line was left in place, by the Mine Safety and Health Administration (MSHA) rules, clearances of at least 18 feet with haulage and excavation equipment is a concern. Generally, a clearance of 40 feet away from an active mining operation is maintained due to moisture in the air (i.e. rain, fog or mist), which pose safety risks to personnel with increased conductivity of the air and reduced visibility conditions. Although there are mitigating methods which add cost, flyrock from blasting also poses risks to transmission line conductors/wires and support structures. The ore under the transmission line and within the clearance areas would not be recovered. Reducing the amount of ore taken from the East Smoky Panel could impact the economic viability of the Project. Because this alternative would not be consistent with the purpose and need for the Project and may not be economically practical and feasible, this alternative was eliminated from further analysis.

2.6.3.7 Not Mining below the Water Table

Currently, the Proposed Action anticipates that mining in the south end of the East Smoky Panel pit would potentially need to occur below the existing water level for a short duration (1 to 2 weeks) of time, thus requiring dewatering of the pit in this area. If actually required, dewatering would consist of a dewatering pipeline that would carry the pit water through a pipeline north to the tailings pond. This alternative would require shallower mining in the south end of the pit, so that the groundwater would not be intercepted and mining would not occur below the existing water level, thus no pit dewatering would be required. This alternative would not be consistent with the purpose and need for the Project because under this alternative Simplot would be prohibited from recovering ore in the southern portion of the Project Area where they hold the lease for the phosphate resource. Under this alternative, they would have to mine shallower in this area, so they would not need to dewater.

Not mining below the existing water table would be technically practical and feasible as dewatering has never occurred or been needed at the Smoky Canyon Mine in the past. Besides not requiring a pipeline to take the pit water to the tailings pond, in which there would be sufficient capacity, there would be no difference environmentally under this alternative compared to the Proposed Action. Water levels in GW-16 and GW-29 are actually 5 to 10 feet below the proposed bottom of the Proposed Action and Alternative 1 pits but seasonal fluctuations in water levels could result in seasonal groundwater flows to the bottom of the pit. It is unlikely that the pit bottom would be perennially submerged in groundwater. Thus, the relative percentage of pit backfill that would be exposed to direct contact with groundwater is also very small compared to the entire volume of pit backfill such that the effect on predicted flushing of COPCs from the backfill material would be negligible.

Although not mining below the water table would eliminate the need and costs associated with dewatering, it would reduce the amount of ore mined and recovered. Reducing the amount of ore taken from the East Smoky Panel could impact the economic viability of the Project. The magnitude of the economic impact would depend on the amount of ore that would not be recovered; however, the amount of ore estimated to be below the water table is estimated to be low.

In summary, not mining below the water table is estimated to result in a small amount of ore being unrecovered. However, that would also mean that, despite the fact that dewatering would be required for the life of the project once groundwater is encountered, because the amount of ore would be minor, the "life" of the project would be short-lived and the amount of water disposed of would be minimal. The alternative appears to be technically not consistent with the purpose and need and not economically practical. But if the estimated water table level is correct, effects would be minimal, likely rendering this alternative essentially the same as the Proposed Action. For these reasons, this alternative was eliminated from detailed analysis in the EIS.

2.6.3.8 Underground Mining

This alternative of using underground mining methods offers the potential benefit of eliminating the development of open pits and the associated overburden disposal issues. However, underground mining of phosphate ore has not been practiced in Southeastern Idaho or northeast Utah since 1976, and there are no underground phosphate mines currently operating in the United States, although one is now being proposed (the Paris Hills Phosphate Project in Bear Lake County, Idaho). Additionally, Simplot's entire operation is set up to conduct surface mining. Underground mining would require outlays of capital for all new machinery. Extensive retraining would be required or new hiring of professional, technical, and labor personnel; the number of personnel would need to increase; and the hazards to mining personnel would be greater in an underground mining situation. The economics of modern open pit mining practices, by using more cost-efficient mining methods and equipment, allows for increased recovery of the phosphate resource compared to underground methods.

In summary, underground mining has its own set of potential impacts that are not shared with open pit methods including:

- Potential long-term subsidence (caving) of ground over the mined out areas,
- Interception of groundwater in underground openings,
- Increased electrical power needs for mine ventilation and other equipment,
- Increased mining costs per ton of ore extracted, and
- Different safety considerations.

Therefore, this alternative was eliminated from further consideration because it is not considered to be economically feasible or practical and did not meet the Purpose and Need for continued economically viable development of federal phosphate resources.

2.6.3.9 Alternative Cover Systems

Preliminary groundwater modeling was used to determine whether alternative mitigative cover systems such as synthetic liners, or compacted clay barrier-type liners would be needed to reduce water quality impacts that are expected to occur from seleniferous overburden. Although synthetic or barrier-type cover systems would have lower infiltration than the covers in the Proposed Action or Alternative 1, such cover systems present challenges including technical construction difficulties, high costs to construct and maintain, and limitations on post-mining multiple uses. Based upon modeling results, the need for alternative cover systems was eliminated from further consideration once it was determined that the relatively simple cover systems of the Proposed Action and Alternative 1 are expected to sufficiently protect groundwater and surface water resources.

2.7 AGENCY PREFERRED ALTERNATIVE

Following their review of the environmental impacts as discussed in the DEIS, the BLM and USFS have identified Alternative 1: Reduced Pit Shell with Soil-only Cover as their Preferred Alternative for this Project because this alternative:

- Reduces the size of the proposed pit and new surface disturbance by approximately 78 acres.
- Increases the amount of overburden proposed to be placed in Panel B, returning the topography in this area back closer to original contours.
- Reduces the amount of unreclaimed highwall by approximately three acres.
- Eliminates mining the cherty shale material which would reduce the seleniferous nature of the combined overburden materials, resulting in a soil-only cover needing to be used.
- Reduces the amount of DSAYs under HEA by approximately 5,500.

The Agency Preferred Alternative would reasonably accomplish the purpose and need for the federal action, while giving consideration to environmental, economic, and technical factors.

2.8 SUMMARY COMPARISON OF ALTERNATIVES

Table 2.8-1 provides a tabular summary and comparison of impacts from the components of the Proposed Action, Alternative 1, and No Action Alternative.

Table 2.8-1 Alternative Comparison and Impact Summary

PROJECT COMPONENT OR RESOURCE	PROPOSED ACTION	ALTERNATIVE 1: REDUCED PIT SHELL WITH SOIL-ONLY COVER	NO ACTION ALTERNATIVE
Project Component Acreages			
New SUA Acreage	30	30	0
Acreage within Lease Modification	43	9	0
Split Estate Lands – Off lease Acreage New Disturbance	322	314	0
NFS Land Acreage New Disturbance	403	332	0
Total Redisturbance Acreage	124	124	0
Total New Disturbance Acreage	725	647	0
Total Overall Project Disturbance	849	771	0
Geology, Minerals, Topography, and Paleontology			
Geology, Minerals, Topography, and Paleontology	Long term, major, local impact on geology and minerals from removal and rearrangement of geologic materials. Minor, long term, local impact to topography. Negligible impact to paleontological resources.	Similar and/or somewhat improved as Proposed Action.	The East Smoky Panel would not be mined, thus no potential effects to geology, minerals, and paleontology resources would occur. The Panel B pit topography would not be backfilled with overburden from the East Smoky Panel and brought back closer to original topography.

PROJECT COMPONENT OR RESOURCE	PROPOSED ACTION	ALTERNATIVE 1: REDUCED PIT SHELL WITH SOIL-ONLY COVER	NO ACTION ALTERNATIVE
Air Resources			
Air Resources	The intensity of air emission impacts would be minor at the site-specific perspective and negligible at the local and regional perspective from the Proposed Action.	Same as Proposed Action.	The East Smoky Panel would not be mined, thus no air emissions from the Project would occur. Air emissions from ongoing mining activities would continue.
Climate Change			
Climate Change	The overall contribution to climate change would be long term and negligible.	Same as Proposed Action.	The East Smoky Panel would not be mined, thus no impacts to climate change from the Project would occur. Impacts to climate change from ongoing mining activities would continue.
Noise			
Noise	The noise effects would be short-term and negligible or minor at the closest sensitive receptor due to the distance from the mine.	Same as Proposed Action.	The East Smoky Panel would not be mined, thus no noise effects from the Project would occur. Current noise impacts to receptors from ongoing mining activities would continue.

PROJECT COMPONENT OR RESOURCE	PROPOSED ACTION	ALTERNATIVE 1: REDUCED PIT SHELL WITH SOIL-ONLY COVER	NO ACTION ALTERNATIVE
Water Resources			
Water Resources	Groundwater: Negligible impacts to quantity or elevation in the Wells Formation aquifer. Changes in groundwater flow in alluvium and/or Salt Lake Formation across the fault could affect small springs east of the Project Area. Concentrations of manganese, sulfate, TDS, and selenium would be added to groundwater. Of these, only manganese would exceed a groundwater standard (secondary) at any of the four groundwater observation points. Surface Water: There would be some runoff reduction to small streams downgradient of the mine due to stormwater management during operations. There could be long term reduction in Roberts Creek and Tygee Creek flows due to spring disruption, which could affect some water rights. Concentrations of manganese, sulfate, TDS, and selenium that would be added to groundwater would appear at Hoopes Springs, but not at Lower South Fork Sage Creek Springs. Selenium added from the Proposed Action would not exceed the applicable aquatic life criterion for selenium in the water column in Hoopes Spring and downstream waters, but when combined with the RI/FS-predicted Year 2050 selenium concentration it would.	Groundwater: Same as Proposed Action except that manganese would exceed the groundwater standard (secondary) by a much lesser amount. Surface Water: Same as the Proposed Action except selenium added from the Proposed Action would not exceed the applicable aquatic life criterion for selenium in the water column in Hoopes Spring and downstream waters, but when combined with the RI/FS-predicted Year 2050 selenium concentration it would. The manganese and sulfate contribution to surface waters would be markedly less than under the Proposed Action.	The East Smoky Panel would not be mined, thus no additional effects to water resources from the Project beyond existing conditions would occur. Existing conditions would include continued exceedances of the applicable aquatic life criterion for selenium in the water column at Hoopes Spring, Lower Sage Creek, and Crow Creek. The Water Treatment Pilot Plant (if approved and effective as a CERCLA remedy) at Hoopes Spring and South Fork Sage Creek Springs would significantly reduce selenium levels in downstream waters.

PROJECT COMPONENT OR RESOURCE	PROPOSED ACTION	ALTERNATIVE 1: REDUCED PIT SHELL WITH SOIL-ONLY COVER	NO ACTION ALTERNATIVE
Soils			
Soils	Approximately 725 acres of newly impacted soils; 12 acres left unreclaimed. Direct impacts to soils from mining and construction include physical and chemical changes; soil compaction; and decreased soil productivity Impacts would be minor and long-term.	Approximately 652 acres of newly impacted soils; 9 acres left unreclaimed. Besides an approximately 78-acre reduction in direct soil impacts, impacts would be the same as the Proposed Action.	The East Smoky Panel would not be mined, thus no impacts to soil resources from the Project beyond existing conditions would occur.
Vegetation			
Vegetation	Long-term direct impacts on approximately 725 acres due to changing species composition and community structure after reclamation; 12 acres left unreclaimed. Permanent loss of 521.4 acres of aspen or aspen mix and 61.6 acres of conifer habitat. There are no special status plant species in the Study Area. BMPs would be implemented to minimize the potential spread of noxious weed and effects would be short-term and minor.	Long-term direct impacts on approximately 652 acres due to changing species composition and community structure after reclamation; 9 acres left unreclaimed. Permanent loss of 441.7 acres of aspen or aspen mix and 46.9 acres of conifer habitat. There are no special status plant species in the Study Area. Impacts from noxious weeds would be similar to the Proposed Action with approximately 78 acres less of new disturbance, thus slightly minimizing the opportunity for noxious weed establishment.	The East Smoky Panel would not be mined, thus no impacts to vegetation resources from the Project beyond existing conditions would occur.
Wetlands			
Wetlands	No impact.	Same as Proposed Action.	Same as Proposed Action.

PROJECT COMPONENT OR RESOURCE	PROPOSED ACTION	ALTERNATIVE 1: REDUCED PIT SHELL WITH SOIL-ONLY COVER	NO ACTION ALTERNATIVE
Wildlife			
Wildlife	Mortality of individuals due to vehicles, equipment, or continuing use of powerlines: short-term and localized. Disturbance and/or displacement due to human presence, noise, and activity, causing stress, behavior modifications, and/or competition for resources: short- to long-term and generally negligible to moderate impacts. Habitat alteration and forest fragmentation causing species composition changes: long-term. Net debit of 33,551 DSAYS under HEA. Unlikely impact to populations and negligible to minor impacts to individuals or habitat: bald eagle, boreal owl, brewer sparrow, Columbian sharp-tailed grouse, greater sage grouse, flammulated owl, great gray owl, northern goshawk, olive-sided flycatcher, peregrine falcon, prairie falcon, sagebrush sparrow, American three-toed woodpecker, trumpeter swan, willow flycatcher, Uinta chipmunk, gray wolf, Canada lynx; amphibians/reptiles including the Northern leopard frog, common garter snake, and boreal toad; migratory birds in general, and raptors in general. Negligible impacts to wolverine. Minor impacts to bats and upland game birds. Minor to moderate impacts to big game.	Generally, the same intensity and types of impacts as for the Proposed Action although 78 fewer acres impacted so slight reduction in habitat impacts over the Proposed Action. Net debit of 28,063 DSAYS under HEA.	The East Smoky Panel would not be mined, thus no impacts to wildlife resources from the Project beyond existing conditions would occur.

PROJECT COMPONENT OR RESOURCE	PROPOSED ACTION	ALTERNATIVE 1: REDUCED PIT SHELL WITH SOIL-ONLY COVER	NO ACTION ALTERNATIVE
Fisheries & Aquatics			
Fisheries and Aquatics	Impacts to approximately 20.9 acres of AIZs. Indirect impacts to aquatic habitat by streamflow alterations and predicted increases of selenium, manganese, sulfate, and TDS concentrations by a small amount in Hoopes Spring, Sage Creek, and Crow Creek. Impacts to macroinvertebrates and fisheries from selenium increases expected to be negligible to minor.	Same as Proposed Action.	The East Smoky Panel would not be mined, thus no additional effects to fisheries and aquatic resources from the Project beyond existing conditions would occur.
Grazing Management			
Grazing Management	Removal of 594 acres from the Pole Draney Allotment in the short term, (a loss of 5 percent of the acres and Animal Unit Months (AUMs) in the allotment as a whole (minor effect) until reclamation restores the land. This would occur for 19 days per year. Trailing of sheep through the southeastern portion of the allotment would be extremely difficult, if not impossible, resulting in a moderate effect.	Same as the Proposed Action.	The East Smoky Panel would not be mined, thus no impacts to the Pole Draney Allotment would occur. Trailing of sheep through the allotment would occur under existing conditions.
Recreation and Land Use			
Recreation and Land Use	Disturbance and access restrictions on approximately 725 acres of NFS lands and additional access restrictions on nearby 570 acres; negligible to minor and short term.	Disturbance and access restrictions on approximately 650 acres of NFS lands and additional access restrictions on nearby acres; negligible to minor and short term.	The East Smoky Panel would not be mined, thus no impacts to recreation and land use access from the Project beyond existing conditions would occur.

PROJECT COMPONENT OR RESOURCE	PROPOSED ACTION	ALTERNATIVE 1: REDUCED PIT SHELL WITH SOIL-ONLY COVER	NO ACTION ALTERNATIVE
Visual and Aesthetic Resources			
Visual Resources	Negligible to minor and long-term impacts on visual quality depending upon the location and angle of viewers; visual impacts would include contrast, color, and texture changes due to disturbance, disruption, dust, and lighting.	Same as the Proposed Action.	The East Smoky Panel would not be mined, thus no impacts to visual resources from the Project beyond existing conditions would occur. The Panel B pit topography would not be backfilled with overburden from the East Smoky Panel and brought back closer to original topography, thus creating more of a visual impact than under the Proposed Action and Alternative 1.
Cultural Resources			
Cultural Resources	No effect.	No effect.	No effect.
Native American Concerns			
Native American Concerns	No change in land ownership; however, the Project Area would not be available to support Treaty Rights. Temporary and negligible impact to access. No Tribal historical or prehistoric archeological sites, no occurrences of rock art, and no sacred sites have been identified in the Project Area.	Same as the Proposed Action.	The East Smoky Panel would not be mined, thus any existing impacts to Native American Concerns would continue to occur under current conditions.

PROJECT COMPONENT OR RESOURCE	PROPOSED ACTION	ALTERNATIVE 1: REDUCED PIT SHELL WITH SOIL-ONLY COVER	NO ACTION ALTERNATIVE
Transportation			
Transportation	Negligible to minor effects to existing transportation routes.	Same as the Proposed Action.	The East Smoky Panel would not be mined, thus existing transportation routes would continue to exist under current conditions.
Socioeconomics			
Socioeconomics	Extension of employment, earnings, both direct and indirect, for an additional three years, which would be considered beneficial, short-term, and major impacts to socioeconomics.	Same as the Proposed Action.	The East Smoky Panel would not be mined and the Smoky Canyon Mine period of operation, relative to the Project, would be shortened by approximately three years. Closing the Smoky Canyon Mine three years earlier would have short-term, but adverse major impacts to socioeconomics.

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CHAPTER 3 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the existing environment, including the physical environment, natural environment, and human-made resources and uses, which would be affected by the Proposed Action. Much of the information comes from a series of resource baseline technical reports (TR) that were prepared to support the EIS.

3.1.1 Resource Values and Uses Brought Forward for Analysis

The following resources and uses are brought forward for analysis and are presented in this chapter.

- Geology Minerals, and Paleontology, presented in **Section 3.2**
- Air Resources, presented in **Section 3.3**
- Noise, presented in **Section 3.4**
- Water Resources, presented in **Section 3.5**
- Soils, presented in **Section 3.6**
- Vegetation and Wetlands, presented in **Section 3.7**
- Wildlife Resources, presented in **Section 3.8**
- Fisheries and Aquatics, presented in **Section 3.9**
- Land Use (Grazing and Recreation), Transportation, and Special Designations, presented in **Section 3.10**
- Visual Resources, presented in **Section 3.11**
- Cultural Resources, presented in **Section 3.12**
- Native American Concerns and Treaty Rights Resources, presented in **Section 3.13**
- Social and Economic Resources, presented in **Section 3.14**, and
- Environmental Justice, presented in **Section 3.15**.

3.1.2 General Setting of the Project Area

The Project Area (the area that would be directly impacted by the Project) is located within the large-scale ecological unit called the Webster Ridges & Valleys subsection discussed in the EIS for the CNF RFP (USFS 2003b). The Webster Ridges & Valleys subsection occurs at low-to-high elevations with slopes ranging from 10 to 65 percent. This landscape includes mountainsides, canyons, ridges, and valleys eroded from sedimentary rocks that are folded in generally north-south trending patterns. The elevations in the Project Area range from 6,900 to 8,200 feet AMSL. Generally mountainous terrain with a major north-south axis borders the Project Area. The region is composed of a mix of alpine forest and high sagebrush vegetation.

In general, the climate of the Project Area is typical of Rocky Mountain areas influenced by major topographic features. Nearby mountain ranges (e.g. Snowdrift Mountain and Freeman Ridge) trend primarily north-south and have an impact on local winds, as well as temperature and precipitation patterns in the immediate area. Climate and meteorology are discussed in more detail in **Section 3.3.3**.

3.1.3 Study Area

The Study Area refers to an analysis area, which varies by resource value or use, depending on the geographic extent of the resource or use and the extent of the effects of the Project on a resource or use. In some cases, the Study Area is the Project Area (**Figure 2.3-1**) because that is the extent of the effects of the Project on the resource. The Project Area encompasses some small areas (approximately 70 acres) where disturbances would not occur, but where disturbance surrounds these small areas (**Figures 2.4-1** and **2.4-6**). In other cases, the Study Area is much larger than the Project Area, encompassing larger administrative or natural boundaries, because the effects on the resource extend beyond the Project Area boundary itself. The Study Area for each resource is described in the subsection addressing that resource.

3.2 GEOLOGY, MINERALS, AND PALEONTOLOGY

The Study Area for geology, minerals, and paleontology is the Project Area (**Figure 2.3-1**). The Study Area boundary was developed with the IDT experts and professional judgement. A Geology, Minerals, and Paleontology TR (Stantec 2016a) was prepared for these resources and provides much of the information summarized in the following subsections. One component of geology and minerals that is particularly important for impact analysis is geochemistry, including the potential for acid rock drainage (ARD). This component was addressed in a separate TR (Whetstone 2017), which is summarized in **Section 3.2.3**.

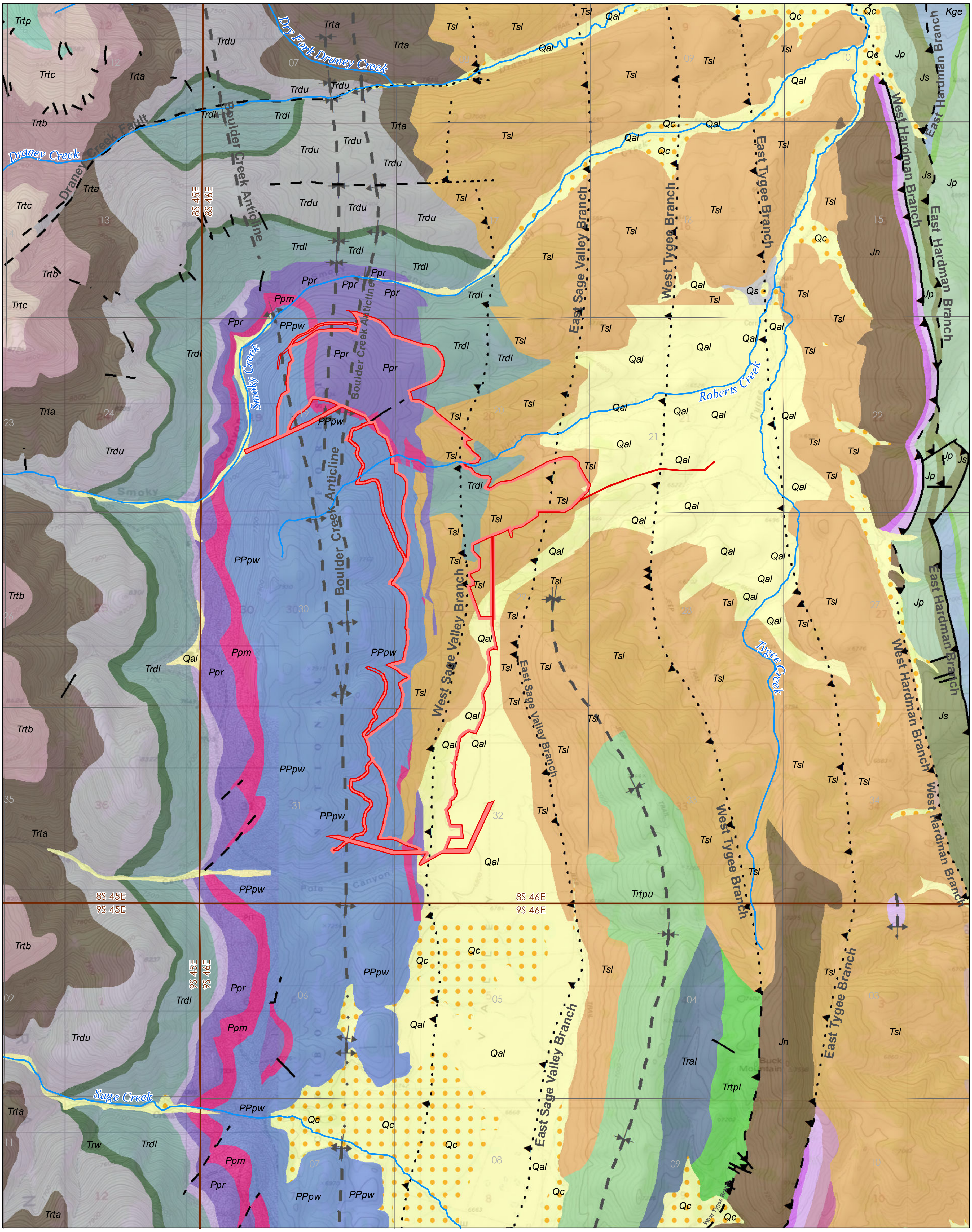
3.2.1 Geology

3.2.1.1 Regional Geologic Setting

The Geology Study Area and surroundings are within the middle Rocky Mountain and Basin and Range physiographic provinces in the central part of the Overthrust Belt. The Overthrust Belt is a major orogenic (mountain-building) zone trending generally north-south through the North American continent. Within the Belt, thrust faults developed parallel to typical anticlinal/synclinal folding, resulting in crustal deformation in a west to east direction. This in turn formed northwest trending ranges and valleys, such as are found near the Study Area.

Marine sedimentary rocks outcrop in the region, dating from the Paleozoic Era to Middle Mesozoic Era. This includes the Permian-age Phosphoria Formation, which forms the western phosphate field and comprises one of the world's largest known reserves of phosphate. Older rock, notably the Pennsylvanian-age Wells Formation, also outcrops in the region, as does younger sedimentary rock (of the Middle Mesozoic to Cenozoic Age) deposited primarily in lacustrine and fluvial environments. Block faulting began as part of the Basin and Range Province about 17 million years ago and continues to affect the region today (BLM and USFS 2000).

The geologic units, the stratigraphy, and the structure described previously, are all represented in the Study Area. Units found in the Study Area are described briefly in **Section 3.2.1.2**; detailed stratigraphic descriptions are provided in Cressman (1964), Montgomery and Cheney (1967), McKelvey et al. (1959), Lowell (1952), and Deiss (1949). **Figure 3.2-1a** shows surface geology and **Figure 3.2-1b** provides the stratigraphic legend.



Legend

Project Area Boundary

Stream/River

Township Boundary

Section Boundary

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N

2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.

4: Project Location: T8S R46E, T9S R46E Caribou County, Idaho

0 1,600 3,200

Feet

1:33,000 (at original document size of 11x17)

N

Figure 3.2-1a

Surface Geology and Faults

East Smoky Panel Mine EIS

Legend

Quaternary

Qal/Qf - Alluvium

Qc/Qls - Colluvium

Qs - Salt

Tertiary

Tsl - Salt Lake Formation

Jurasic

Jtcr - Twin Creek Limestone - Rich Member

Jtcs - Twin Creek Limestone - Sliderock Member

Jtcgs - Twin Creek Limestone - Gypsum Spring Member

Jn - Nugget sandstone

Triassic

Trtc - Thaynes Formation - C Member

Trdu - Dinwoody Upper Formation

Trtb - Thaynes Formation - B Member

Trta - Thaynes Formation - A Member

Trtp - Thaynes Formation - Portneuf Limestone Member

Trtpl - Thaynes Formation - Portneuf Limestone - Lower

Tral - Thaynes Formation - Lanes tongue of Ankareh Formation

Trtpu - Thaynes Formation - Portneuf Limestone - Upper

Trw - Woodside Formation

Trdl - Dinwoody Lower Formation

Permian

Ppc - Phosphoria Formation - Cherty Shale Member

Ppr - Phosphoria Formation - Rex Chert Member

Ppm - Phosphoria Formation - Meade Peak Member

Pennsylvanian

PPpw - Wells Formation - Upper; PPwu

Geologic Feature

Thrust Fault, Inferred

Thrust Fault, Buried

Fault, Confirmed

Fault, Inferred

Fault, Buried

Anticline, Buried

Anticline, Inferred

Syncline, Inferred

Syncline, Buried

Strike/Dip

Strike/Dip Overturned

Figure 3.2-1b
Local Geology Legend
East Smoky Panel Mine EIS

3.2.1.2 Geologic Units and Stratigraphy

Geologic formations relevant to the Study Area have an approximately 350 million-year age range. The youngest deposits are Quaternary alluvium with an age of 0 - 1.8 million years and the oldest are Pennsylvanian limestones and sandstones associated with the Wells Formation (300 – 320 million years old). Relevant geologic units are described as follows in order of oldest to newest.

Stratigraphy within the Study Area includes a thick sequence of carbonate and clastic sedimentary rocks overlain by younger unconsolidated deposits. Geologic cross sections that cover the Study Area are provided in Appendix A of the Geology, Minerals, and Paleontology TR (Stantec 2016a). The sections reflect an updated interpretation accounting for observations made at the 44 mineral exploration boreholes and nine geotechnical investigation boreholes that were drilled during the summer and fall of 2014 and additional holes later in 2015.

Wells Formation

The Wells Formation is the oldest formation encountered during exploration drilling within the Study Area. This formation contains two members, with the lower member consisting of interbedded limestone and sandy limestone and the upper member consisting of calcareous quartz sandstone with subordinate limestone and chert. The Wells Formation outcrops along the western edge of the Study Area (**Figure 3.2-1a**). This thick (greater than 1,500 feet) formation of sandstone and limestone contains the primary regional aquifer in the Study Area with recharge occurring on the mountain slopes and discharge occurring at lower elevations on the east margin of the Webster Range. Its aquifer characteristics are discussed further in the water resources section (**Section 3.5.1**).

Phosphoria Formation

The Phosphoria Formation conformably overlies the Wells Formation (**Figure 3.2-1b**). The Phosphoria Formation is approximately 400 feet thick and consists of several members, including two of importance within the Study Area (Meade Peak and Rex Chert).

The Meade Peak Member is phosphatic shale and contains the phosphate-bearing ore beds targeted for mining at the existing Smoky Canyon Mine and the proposed East Smoky Panel Mine. It is a thin-bedded, dark brown, carbonaceous unit of phosphatic mudstones and phosphorites. The Meade Peak Member is seldom exposed naturally because it is relatively soft and erodes into swales and topographic lows. Within the Project Area, it outcrops in discontinuous areas (**Figure 3.2-1a**) east and north of the Wells Formation outcrop. The Meade Peak Member can be divided from top to bottom into the Hanging Wall Mudstone, the Hanging Wall Phosphatic Shale, the Hanging Wall Ore Zone, the Middle Shale Wastes or Low Grades, the Footwall Ore Zone and the Footwall Mudstone. A typical description of these units follows from Simplot (2000):

- Hanging Wall Mudstone - consists of 0.5 to 1 foot of cherty nodular greyish black phosphatic rock and 10 to 20 feet of dark brown to black thick bedded carbonaceous mudstone.
- Hanging Wall Phosphatic Shale - consists of 1 to 2 feet of dark brown thin bedded phosphatic mudstone known as the “marker bed” and 3 to 5 feet of dark brown medium bedded carbonaceous mudstone which weathers to light brown.
- Hanging Wall Ore Zone - contains the Upper Rich Bed ore which consists of 1 to 4 feet of greyish brown thin bedded coarsely oolitic phosphate rock, a parting of 1 to 2 feet of light

grey dolomitic limestone which weathers to light brown, the Lower Rich Bed ore which consists of 1 to 4 feet of greyish brown thin bedded coarsely oolitic phosphate rock, a parting of 1 to 2 feet of light grey dolomitic limestone which weathers to light brown, the Buck Shot ore which consists of 2 to 4 feet of greyish brown medium bedded coarsely oolitic to pisolitic phosphate rock and the Hanging Wall Shale which consists of 2 to 8 feet of dark brown to black thin bedded phosphatic shale with concretions.

- Middle Waste Shale - consists of 5 to 15 feet of dark brown to black thin bedded phosphatic mudstone with concretions, 25 to 35 feet of light brown to dark brown medium to thick bedded phosphatic mudstone that contains dolomitic beds, 4 to 8 feet of dark brown thin bedded phosphatic mudstone known as the "E-marker", 40 to 60 feet of light to dark brown medium to thick bedded phosphatic mudstone that contains dolomitic beds, and 5 to 9 feet of dark brown to black thin bedded phosphatic mudstone.
- Footwall Ore Zone - contains the Hot Bed ore which consists of 1 to 5 feet of dark brown to black thin bedded phosphatic shale, a "False Cap" parting of 4 to 12 feet of greyish brown dolomitic limestone with a thin bedded dark brown phosphatic mudstone center weathering to a light brown mudstone, the Upper Footwall Shale ore which consists of 2 to 4 feet of medium to dark brown thin bedded phosphatic shale, a parting of 1 foot of greyish brown weathering to a light brown dolomitic limestone, the Lower Footwall Shale ore which consists of 5 to 8 feet of medium to dark brown thin bedded phosphatic shale, a "Cap Rock" parting of 5 to 8 feet of light grey dolomitic limestone with a thin bedded phosphatic mudstone center weathering to a light brown mudstone and the Main Bed ore which consists of 4 to 5 feet of greyish brown thin to medium bedded coarsely oolitic phosphatic rock.
- Footwall Mudstone - consists of 3 to 5 feet of light to dark brown medium bedded mudstone and 0.5 to 1 foot of greyish black cherty and nodular "Fishscale" phosphate rock.

Studies by Derkey et al. (1984) and Grauch et al. (2004) suggest that alteration within the Meade Peak Member is highly variable and locally gradational. Some locations in the existing Smoky Canyon Mine suggest this type of variation, such as within the Panel F deposit where rocks have been offset along transverse fault structures. For these reasons, alteration characteristics within the Study Area may or may not be similar to those in the adjacent Panel B.

<u>The Rex Chert Member of the Phosphoria Formation overlies the Meade Peak Member. The Rex Chert Member consists of about 150 feet of massive grey and black chert and cherty limestone. Composed of more resistant rock, it tends to readily form outcrops and dip slopes. However, within the Study Area, it is exposed in isolated narrow bands trending north south, as well as in a larger block in the northern portion where mining has not yet occurred (**Figure 3.2-1a**). In the vicinity of the Smoky Canyon Mine, the Rex Chert is variably saturated. It may be limited in its area of saturation, have limited ability to transmit large fluxes of groundwater, and/or be generally separated from the saturated geologic units that would be disturbed during mining. The Rex Chert's aquifer characteristics are discussed further in the water resources section (**Section 3.5.1**).</u>

In other parts of the region, another member of the Phosphoria Formation is found atop the Rex Chert. It is known as the Cherty Shale Member. This member has not been previously logged as a separate unit from the Rex Chert at the Smoky Canyon Mine; however, geochemical classification for the East Smoky Panel indicated variation of the constituents within the Chert and therefore, the

Rex Chert and Cherty Shale were segregated for the geochemical testing for this EIS as two distinct units.

Dinwoody Formation

The Triassic Dinwoody Formation is divided into upper and lower members that together are as much as 1,600 feet thick. It is composed of interbedded, calcareous siltstone, limestone, shale, and clay. The lower member contains more clay and shale beds than the upper member where limestone is more common. It is found on the surface in only a small portion of the Study Area (**Figure 3.2-1a**).

Salt Lake Formation

The Salt Lake Formation is Tertiary in age and crops out at the top of the bedrock section generally in the central and eastern side of the Project Area (**Figure 3.2-1a**). Locally, it is described as about 1,000 feet thick (Derkey et al. 1984). The Salt Lake Formation is composed of clay-rich gray to olive green to brown rhyolite tuff, tuffaceous siltstone, sandstone, and conglomerate with interbedded lacustrine limestone, shale, and marl (Danzl 1982 as cited in Stantec 2016a).

Alluvium

Quaternary-aged alluvium is found in the eastern part of the Study Area along stream channels and lower portions of mountain slopes (**Figure 3.2-1a**). These deposits consist of gravel, sand, silt, and clay. Total thickness is typically less than 10 to 20 feet but can be quite variable.

3.2.1.3 Structural Characteristics

The Study Area's structure is affected by the Boulder Creek Anticline (**Figure 3.2-1a**). This major north-south trending fold was probably formed contemporaneously with thrusting (Connor 1980). The majority of the Study Area is within the east limb of the Boulder Creek Anticline. On the east side of this Anticline, the Phosphoria Formation is steeply eastward dipping (greater than 75 degrees) to overturned (Derkey et al. 1984), which is much steeper than on the west limb where the existing Smoky Canyon Mine ore deposit is located (Derkey et al. 1984).

The West Sage Valley Branch is a major imbricate thrust fault that trends north-south through the Study Area. The cross sections shown in Appendix A of the Geology, Minerals, and Paleontology TR (Stantec 2016a) indicate the complexity of geology within the Study Area resulting from structural characteristics.

3.2.1.4 Seismicity and Geologic Hazards

Seismic design procedures in the U.S. no longer use seismic zones (USGS 2015a), but records of previous seismic events provide historical information for context. Within a 100-kilometer (km) radius of the Study Area, there have been 40 seismic events that exceed 4 on the Richter scale from 1962 (the date of the earliest record in the database) through 2015 (USGS 2015b); four of these had a magnitude of 5 or greater. The highest magnitude event was a 1962 quake reported as 5.9 on the Richter scale, located about 86 km (53 miles) away from the Study Area. The closest >5 magnitude earthquake was 10.4 km (6.5 miles) from the Study Area. It was reported as 5.8 in magnitude and occurred in February 1994 (USGS 2015b). More recently, on September 2, 2017, there was a magnitude 5.3 earthquake about 11 miles east of Soda Springs, Idaho along with numerous other smaller aftershocks in the area during the month.

Factors related to geotechnical stability of highwalls and overburden disposal site slopes have been identified through past operations at the Smoky Canyon Mine. Factors related to stability of highwalls include the type and strength of rock, degree of rock alteration, steepness of the final highwall slope, presence of any groundwater, spacing and orientation of fractures and faults, and blasting practices. Stronger rock which is less fractured and altered would produce more stable highwalls than weaker or more altered or fractured rock. Groundwater discharges from a highwall can also destabilize it. In general, highwalls at Smoky Canyon have proven to be stable over the duration of the mining operations. Simplot has conducted site-specific pit slope stability evaluations for the East Smoky Panel pit, which has resulted in the flexibility to have steeper overall pit slopes than originally proposed. However, these pit slopes would not be steeper than slopes typically constructed at other pits at the Smoky Canyon Mine.

Factors related to the stability of overburden fill slopes include the topography of the surface underlying the overburden pile, stress such as shock loading or overloading, slope heights, reduction of material strength by introduction of water, and the scheduling of reclamation contouring. Flat areas or topographic rises, whether natural or man-made, provide a more stable base for overburden fills and backfills. Shock loading occurs when loaded trucks roll to the crest or edge of the overburden pile or pit backfill. Overloading occurs when too much material is placed on a given area of the overburden pile or pit backfill. This potential for overloading increases as fill heights increase. Introduction of water, snow, mud or ice weakens the overburden material strength, increasing the potential for instability. Slopes left at angle of repose for long periods of time are more likely to experience instability than those that are regraded shortly after construction. Instability of overburden fill slopes at the Smoky Canyon Mine has been related to high fill heights and excess water content due to excess incorporation of snow or snow melt into the material. Mine practices have been modified based on experience to reduce potential for future overburden slope instability.

3.2.2 Mineral Resources

Phosphate ore resources occur primarily as sedimentary marine phosphorites. These phosphate rock minerals are the only significant global sources of phosphorous. In the Phosphoria Formation of southeastern Idaho, these deposits are confined to well-defined, specific stratigraphic horizons. The Western Phosphate Field, primarily in southeast Idaho, contains large phosphate reserves within the CTNF.

3.2.2.1 Phosphate Leasing Program and Description of Existing Rights

Domestic phosphate ore mining rights are granted under a leasing program, in accordance with the Mineral Leasing Act of 1920 (as amended) and applicable regulations. Mineral leases are administered by the BLM. These leases, purchased by mining companies, convey the right to mine and develop phosphate resources within the lease, in accordance with applicable federal, state, and local requirements.

The East Smoky Panel ore reserves occur in federal leases IDI–012890, IDI-026843, and IDI-015259. Simplot therefore has purchased rights to develop the phosphate reserves within these three leases from the federal government, in concurrence with applicable conditions set by the BLM, USFS, and other federal and state agencies and laws.

3.2.2.2 Mineral Economics

Costs associated with mining include permitting and planning, removal of overburden, mining the ore, transporting ore, and beneficiating and processing the ore into salable products. Because open pit mining of deeper ores requires excavation of a larger pit, the ratio of overburden to ore, or strip ratio, increases with pit depth. As ore depths increase, economic return decreases, and at a certain depth, mining of the phosphate ore becomes uneconomic. The depth at which ore recovery becomes uneconomic is also affected by ore grade, weathering, capital costs, and operational costs specific to the operation. Overall economics of the entire operation are also affected by domestic and global supply and demand of the salable products.

Most phosphate ore, including that produced at the Smoky Canyon Mine, is used in the production of fertilizer, primarily diammonium phosphate (DAP). Fertilizers continue to be important to feed the growing world population because, although demand for food will increase, the area of cultivated land is not expected to increase significantly. For this reason, commercial fertilizers will become increasingly important to meet the nutritional requirements of the world's population (USGS 1999a). World consumption of phosphate in fertilizer is projected to increase from 45.5 million tons in 2016 to 48.9 million tons in 2020 (USGS 2017).

Proximity of proposed operations to existing mining and processing facilities affects mine economics due to capital expenditures and uncertainty of reserves. A large capital expense is necessary to build and staff mining and processing facilities, so the use of existing facilities allows new deposits to be more economically mined. The ability to use existing facilities to mine new deposits is highest when the new deposit is close to these existing facilities. Because the extent of ore within a new deposit is never precisely known until it is mined, there is inherent risk in opening a new deposit. This risk is reduced when the new deposit is close enough to take advantage of existing mining and production facilities so that the capital expenditure of new processing facilities is not necessary.

3.2.3 Geochemistry

The chemical and mineralogical characteristics of geologic materials that would be produced or stored by the planned mining operation were evaluated in a study prepared by Whetstone Associates (Whetstone 2017). The study used 2,630 samples from 22 boreholes to characterize the distribution and environmental mobility of COPCs in the proposed overburden and cover construction materials. An overview of the baseline geochemical testing program is presented in **Figure 3.2-2**.

The proposed East Smoky Panel expansion would produce about 59.9 million BCY of overburden that would be placed as backfill (Simplot 2014). The majority of overburden would be derived from the Wells Formation and Grandeur Member of the Park City Formation (52.69 percent) followed by the Meade Peak Member of the Phosphoria Formation (25.55 percent), the Rex Chert and Cherty Shale Members of the Phosphoria Formation (9.80 percent), Salt Lake Formation (8.08 percent) and Dinwoody Formation (3.88 percent). Alluvium may also be present within the footprint of the open pit but would be a minor component of the overburden material balance.

Based on review of the geology of the site and the planned material balance, the baseline geochemistry study evaluated 10 types of overburden listed in **Figure 3.2-2**. The materials were evaluated for their mineral and elemental content using electron microscopy, x-ray diffraction (XRD), x-ray fluorescence (XRF) and inductively coupled plasma (ICP) analysis of whole rock geochemistry. The leaching characteristics of the materials and their potential to produce ARD were evaluated using acid-base accounting (ABA), synthetic precipitation leaching procedure (SPLP) tests, and column leaching tests.

The results of the mineralogic and elemental analyses indicate that selenium and other metals including arsenic, cadmium, iron, manganese, uranium, vanadium, and zinc are widely distributed in overburden from the Phosphoria Formation with the highest concentrations of most metals occurring in the shales and siltstones of the Meade Peak Member. As a general rule, the environmental mobility of metals is controlled by the oxidation state of the metals and stability of the host minerals rather than by the total concentration of the metals in overburden. For example, reduced forms of selenium such as selenide, selenite, and elemental selenium have relatively low solubility in water compared to the more oxidized form, selenate (Stewart and Howell, 2003; Mebane et al. 2015). Metal mobility in overburden seepage is also affected by pH with most metals being more soluble under acidic conditions. Metals in water can be affected by a number of other processes including precipitation, sorption, complexation with organic matter and other compounds, and biologically mediated reduction or oxidation reactions. Pyrite and to a lesser extent sphalerite are the primary sulfide minerals observed in rocks from the East Smoky Panel. Selenium is associated with pyrite and oxide minerals and also occurs in elemental form (Whetstone 2017). It may also be associated with organic matter (Perkins and Foster 2004), but this association was not observed in the geochemical characterization work completed for the East Smoky Panel.

The results of ABA testing for the East Smoky Panel indicate that the proposed overburden has low potential to generate ARD which is formed by the weathering of sulfide minerals, mostly pyrite, that react with oxygen to release sulfuric acid and other ions in water. The pyritic sulfur content of the proposed overburden is low ranging from 0.01 to 1.75 percent by weight with overburden from the Dinwoody Formation having the highest concentration (**Table 3.2-1**). Acidity produced by sulfide minerals can be neutralized by reactions with carbonate minerals including calcite and dolomite that are abundant in the overburden rocks. The capacity of carbonate minerals to consume acidity and maintain neutral pH drainage is typically evaluated by calculating the ratio of acid neutralizing potential (ANP) to acid generating potential (AGP) (ANP:AGP) or by subtracting AGP from ANP to calculate the net neutralizing potential (NNP). Materials with ANP:AGP ratios greater than three are classified as having low potential to generate ARD according to BLM guidelines (BLM 1996). EPA guidelines indicate that materials with NNP values greater than 20 tonnes calcium carbonate per kilotonne (t $CaCO_3$/kt) have low potential to generate ARD (EPA 1994). The average ANP:AGP ratios and NNPs for all tested materials exceed the recommended BLM and EPA thresholds for overburden that has low potential to generate ARD. This conclusion is consistent with observations of historic phosphate mine overburden piles and backfills in the district that have been in place for up to 100 years and have not generated acidic drainage (Formation Environmental 2016a; MWH 2014; Maxim 2006).

Figure 3.2-2 Baseline Geochemical Testing Program

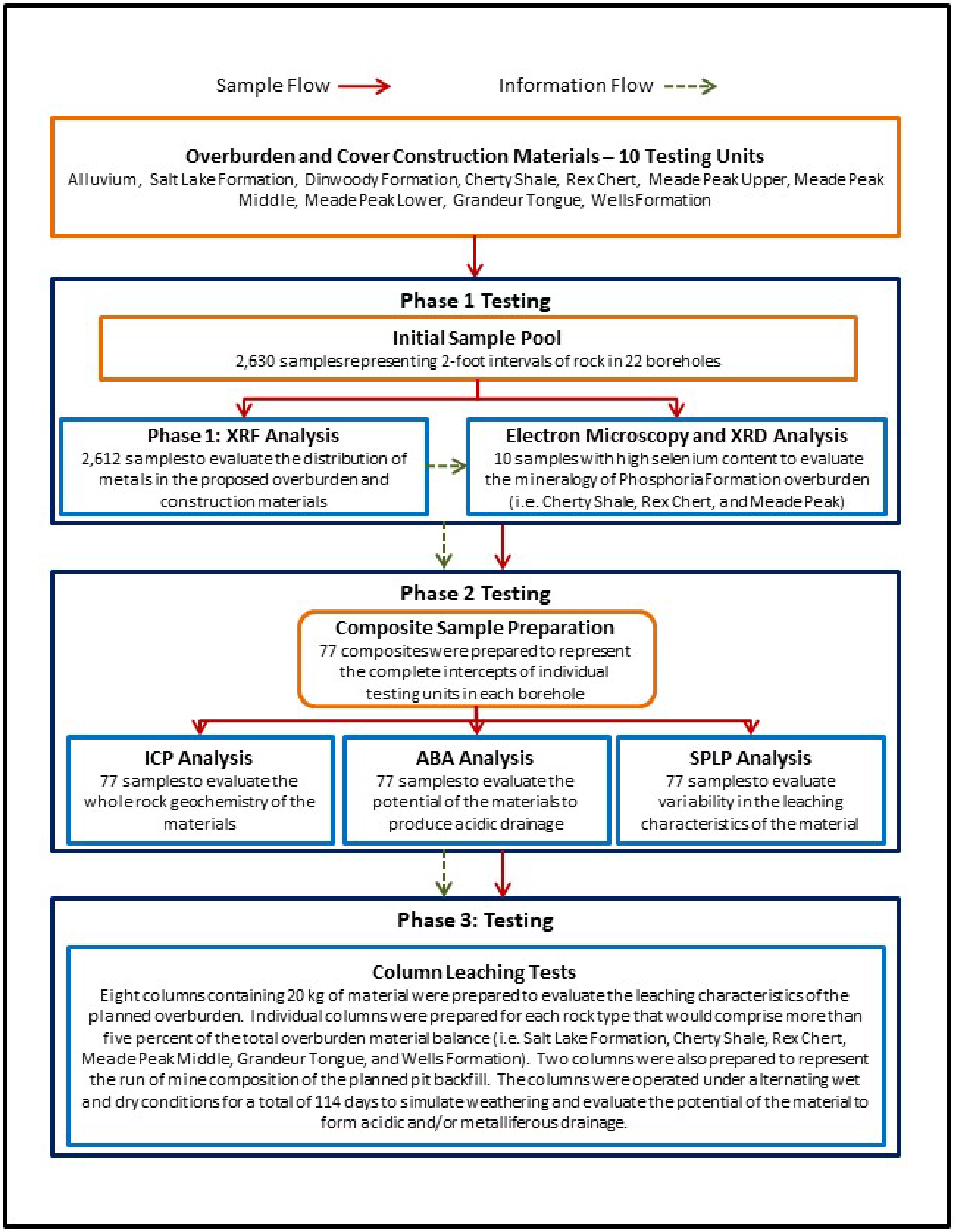


Table 3.2-1 Material Testing Analysis for ABA

UNIT	NUMBER OF SAMPLES TESTED	PYRITIC SULFUR %	AVERAGE ANP:AGP[1] RATIO	AVERAGE NNP (T $CACO_3$/KT)
Alluvium	2	0.01	27	26
Salt Lake Formation	12	0.01	318	141
Dinwoody Formation	3	1.75	7.9	288
Cherty Shale	6	0.45	21.5	40.1
Rex Chert	9	0.02	126	122
Meade Peak Upper Waste	8	0.08	36	117.6
Meade Peak Middle Waste	10	0.06	45	180
Meade Peak Lower Waste	7	0.01	290	436
Grandeur Tongue	9	0.01	855	881
Wells Formation	11	0.01	903	320

Column testing data provide additional support for the conclusion that seepage from the East Smoky Panel overburden would have neutral to alkaline pH. Columns were prepared for each material type that represents more than five percent of the planned overburden material balance. A column was also prepared for the Cherty Shale (2.7 percent) at the BLM's direction. In addition to the six columns containing a single rock type, two columns were prepared and tested using a mixture of material that proportionally represents the run-of-mine composition of the planned backfill. The columns were operated for 114 days using alternating wet and dry cycles to promote the oxidation of sulfide minerals and release of metals in water that was applied to the top of the columns at 19-day intervals (six leaching cycles total). The column testing method followed the standard protocol that was developed for the district by Whetstone Associates (2013) to provide data that are comparable to other mining sites in the region.

Data from the East Smoky Panel columns are consistent with previous studies for other mines in the area that show well-defined washout curves with initial high concentrations that decrease to near steady-state levels by about the third leaching cycle (Maxim 2002a, 2002b, 2005, 2006; Whetstone 2010, 2014, 2015b). The pH of leachates at the end of the testing period ranged from 7.95 to 8.32 and no significant trends of decreasing pH and alkalinity or increasing sulfate were observed that would indicate the overburden has the potential to generate ARD.

Although the column leachates maintained neutral to alkaline pH, several COPCs were identified at concentrations that exceed potential regulatory standards for surface water or groundwater. The COPCs include sulfate, cadmium, copper, iron, manganese, nickel, selenium, thallium, uranium, zinc and total dissolved solids (TDS). It is noted that the East Smoky Panel columns generally contained a higher percentage of sand- plus gravel-sized rock fragments and less silt- and clay-sized fragments than observed in field-scale facilities (Whetstone 2017). However, the relationship between fragment size and reactive surface area for the overburden is not as direct as it first appears. A study completed for the Blackfoot Bridge Mine (Whetstone 2010) indicated that the reactive surface area of rock fragments from the Phosphoria Formation is controlled by the size of the sand and silt grains that compose the fragments and is independent of the fragment size. Based on this information, the particle size distribution in the East Smoky Panel columns is not believed to result in significant high or low bias of leachate concentrations compared to field-scale facilities. Additional information about the results of the column tests, and a discussion of how they were applied for the impact analysis is presented in **Section 4.5.2.1**.

3.2.4 Paleontological Resources

Sedimentary rocks of southeastern Idaho have paleontological resources consisting of vertebrate, invertebrate, and paleobotanical fossils including fish and shark remains. Fossils in the Smoky Canyon Mine area are not restricted to the Study Area or southeastern Idaho. They are found throughout the region wherever the same formations exist (Stantec 2016a).

The Paleozoic and Triassic-age bedrock units are generally fossiliferous. Fossils in the Wells Formation were described by G. H. Girty (Mansfield 1927) as predominantly consisting of bryozoa and brachiopods with wide distribution (BLM and USFS 2000).

The Phosphoria Formation, named for Phosphoria Gulch near Georgetown, is one of the most fossiliferous of the Idaho Pennsylvanian and Permian Formations (BLM 2010d). The Meade Peak Member of the Phosphoria Formation contains abundant pelecypods, gastropods, and brachiopods, as well as ammonites, nautiloids, crinoids, bryozoa, and sponge spicules. The base of the Meade Peak Member contains a thin marker bed identified as the fishscale bed, which reportedly contains some fossil fish and shark fragments (BLM and USFS 1992). Heliocoprion fossils are found in the basal fishscale bed, and other units in the Meade Peak member. The Rex Chert Member of the Phosphoria Formation contains brachiopods, crinoid fragments, and sponge spicules (Mansfield 1927; BLM and USFS 2000).

The Salt Lake Formation (in combination with the Starlight Formation, which is not present in the Study Area) includes documented occurrences of plants, invertebrates, horses, camels, mastodons, fish, reptiles, birds, amphibians, carnivores, and other small mammals (BLM 2010d).

Unconsolidated valley fill sediments in southeastern Idaho have yielded Ice Age and older mammals including mammoths, mastodons, horses, bison, camels, ground sloths, carnivores, rodents, and other animals. These are from lake, stream, and/or windblown deposits and consist of clay, silt, ash, sand, and gravel (BLM and USFS 2000).

The Potential Fossil Yield Classification (PFYC) System (BLM 2007b) classifies geologic units as to the relevant abundance of vertebrate fossils or scientifically significant invertebrate or plant fossil. The Pinedale, Wyoming, BLM office (BLM 2008b) has analyzed the Wells, Phosphoria, Dinwoody, and Salt Lake formations and classified each of these as (probable) Class 3 in the PFYC scale. Class 3 is considered as moderate or unknown, where "fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential" (BLM 2007b).

The BLM's Pocatello Field Office has a goal "to provide for the identifying, protecting, and managing paleontological resources for future preservation, interpretation, and scientific uses" (BLM 2012). The BLM Manual Section 8270, Paleontological Resource Management (BLM 1998) is intended, in part, to "ensure that proposed land uses, initiated or authorized by BLM, do not inadvertently damage or destroy important paleontological resources on public lands".

3.3 AIR RESOURCES

The Study Area for air quality includes the Project Area and the general airshed (or the geographic area within which air may be confined) within which Project emissions would be released. The Study Area boundary was developed with the IDT experts and professional judgement. The airshed is approximately bounded on the west by the Diamond Creek drainage, on the east by the Highway 89 Corridor, to the north by approximately the Stump Creek drainage, and to the south by approximately the Crow Creek drainage. The airshed encompasses the greater mine region and the downwind or easterly topography.

The Study Area was developed utilizing regional meteorological and topographic information. Regional weather data, wind patterns, topographic data, and air basin boundaries were analyzed to determine the likely region of impact for emissions released from the Project. This immediate region of impact was used to define the final air quality baseline Study Area.

3.3.1 Ambient Air Quality

Criteria air pollutants are carbon monoxide (CO), lead (Pb), sulfur dioxide (SO_2), particulate matter less than or equal in diameter to 10 microns and 2.5 microns (PM_{10} and $PM_{2.5}$), ozone (O_3), and nitrogen dioxide (NO_2). The EPA has established the National Ambient Air Quality Standards (NAAQS) for these pollutants; the NAAQS are allowable concentration limits applied at the public access boundary. For criteria pollutants, Idaho has adopted these standards into the Rules for the Control of Air Pollution in Idaho. The NAAQS (EPA 2016a) are shown in **Table 3.3-1**.

Table 3.3-1 National Ambient Air Quality Standards

POLLUTANT	AVERAGING TIME	CONCENTRATION	STATISTICAL FORMAT
Carbon Monoxide (CO)	8-hour	9 ppm	Not to be exceeded more than once per year
	1-hour	35 ppm	
Lead (Pb)	Rolling 3-Month Average	0.15 µg/m^3	Not to be exceeded
Nitrogen Dioxide (NO_2)	Annual	53 ppb	Annual mean
	1-hour	100 ppb	3-year average of the annual 98th percentile highest daily 1-hour concentrations
Particulate Matter (PM_{10})	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Particulate Matter ($PM_{2.5}$)	Annual	12.0 µg/m^3	Annual mean, averaged over 3 years
	24-hour	35 µg/m^3	3-year average of the annual 98th percentile highest daily average concentrations
Ozone (O_3)	8-hour	0.070 ppm	3-year average of the annual fourth-highest daily 8-hour concentrations

POLLUTANT	AVERAGING TIME	CONCENTRATION	STATISTICAL FORMAT
Sulfur Dioxide (SO_2)	1-hour	75 ppb	3-year average of the annual 99th percentile highest daily 1-hour concentrations
	3-hour	0.5 ppm	Not to be exceeded more than once per year

μg/m^3 = micrograms (one-millionth of a gram) per cubic meter
ppm = parts per million
ppb = parts per billion
PM_{10} = Particulate Matter 10 microns
$PM_{2.5}$ = Particulate Matter 2.5 microns

3.3.1.1 IDEQ Air Quality Monitoring Data Summary

The IDEQ has an established air quality monitoring network to monitor criteria pollutant concentrations throughout the State of Idaho. The nearest IDEQ monitoring station to the East Smoky Panel Mine Project is in Soda Springs, Idaho. This station monitors and records SO_2 data. A monitoring station located in Pocatello, Idaho measures PM_{10}, $PM_{2.5}$, and SO_2 concentrations. NO_2 data was gathered from the Boulder, Wyoming station. Each of the monitoring stations are in regions outside of the air quality Study Area for the Project, but those sites represent a worst-case assessment of regional air quality due to their location relative to local industrial sources of emissions. Note that the nearest and most representative CO monitor is the Yellowstone National Park – Old Faithful site. Ozone data was evaluated at Craters of the Moon National Monument and Grand Teton National Park.

The State of Idaho also issues annual reports to inform the public of air quality throughout Idaho; these reports summarize regional air quality while presenting air monitoring results for six criteria air pollutants. The most recent summary available at the time the Air Resources TR (Stantec 2016b) was prepared is the 2013 Air Quality Monitoring Data Summary (IDEQ 2015b). In addition, data from 2014 through 2016 were evaluated for the regional monitors described above.

As stated in **Table 3.3-1**, NO_2 standards are both 1-hr and annual. The 98% percentile for years 2014 - 2016 was 14.2 parts per billion (ppb), 11.6 ppb, and 9.6 ppb, respectively. A 3-year average from 2014-2016 is 11.8 ppb, which is less than 12% of the national standard. Annual NO_2 is determined by establishing the mean value for each year. During 2014 -2016, the annual mean varied between 1.10 ppb to 2.07 ppb. The standard is 53 ppb.

As mentioned previously, the closest IDEQ PM_{10} and $PM_{2.5}$ monitoring site to the Project Area is in Pocatello, Idaho, approximately 70 linear miles away. Three-year rolling average data for 2016, representing the average of 2014, 2015, and 2016, shows PM_{10} concentrations well under the NAAQS. The second-high value for each year was obtained and averaged to represent a "not to exceed more than once per year" scenario. The average 2nd high over the three years was 75.3 μg/m^3, which is just over 50% of the 150 μg/m^3 standard. Please also note that a three-year average of the 1st high values is 83.7 μg/m^3. Each value was measured at the Pocatello Garret & Gould (G&G) monitor.

$PM_{2.5}$ is primarily measured using two different methods in Idaho, the federal reference method and the Tapered Element Oscillating Method (TEOM). The three-year annual average $PM_{2.5}$

concentration measured at the Ballard Road monitor site near Fort Hall, Idaho (the G&G site was not active between 2014 and 2016, thus this site was used) between 2014 and 2016 was 7.13 µg/m^3. The annual standard is 12.0 µg/m^3. The 24-hr $PM_{2.5}$ standard is defined by a three-year running average of the 98th percentile concentrations. The NAAQS is 35.0 µg/m^3. The 98th percentile three-year average between 2014 through 2016 at the Ballard Road site was 18.8 µg/m^3.

The Idaho Air Monitoring Network Plan has a nearby site in Soda Springs, 15 miles southwest of the Study Area, located next to the P4 Processing Plant. This monitoring site has provided 1-hour continuous SO_2 data since 2002. Initially, the monitoring objective was to assess SO_2 NAAQS for industrial impacts from a nearby source in Caribou County (IDEQ 2012a). Soda Springs has historically been affected by industrial SO_2.

Consequently, a major project to desulfurize flue gas from the source was implemented in 2001, and SO_2 emissions dropped to well below the annual, 24-hour, and 3-hour NAAQS. In 2002, one SO_2 monitor was shut down, and a site located near a phosphorous plant became the primary monitoring location. The objective was then changed from population-based monitoring to hot-spot monitoring. From 2007 through 2009, the short-term SO_2 concentrations remained well below the level of the three old SO_2 NAAQS and the new 1-hour SO_2 NAAQS of 75 parts per billion (ppb; IDEQ 2010). The only remaining primary NAAQS standard is the 1-hr standard. The 3-hr is a secondary standard, which reflects more of an environmental health standard rather than the human health impacts expressed by primary standards. Most recent 1-hr monitoring data from Soda Springs demonstrates compliance with the 99th percentile of the daily maximum averaged over three years. From 2014-2016 the 99th percentile 1-hr concentration ranges from 22.8 to 31.9 ppb, which is well below the standard of 75 ppb.

The nearest CO monitors to the Study Area can be found at Old Faithful in Yellowstone National Park. The CO national standards are 1-hr and 8-hr averaging periods. Both standards are a not to be exceeded more than once per year, or the second high as the design value. Data from 2014 through 2016, 1-hr second high concentrations range from 0.667 ppm to 0.998 ppm, which is well below the 35-ppm standard. Similarly, the 8-hr standard second high value ranges from 0.4 ppm to 0.6 ppm; also, well below the 9-ppm standard.

The Craters of the Moon National Monument and Grand Teton National Park ozone data was obtained in 2014-2016. The ozone standard is 0.070 ppm (70 ppb) as an annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years. Craters data for the 4th high 8-hr design value average over 2014-2016 is 0.060 ppm. Grand Teton is also 0.060 ppm averaged over 2014-2016.

All criteria pollutants demonstrate that regional monitors are compliant with all applicable NAAQS.

3.3.1.2 Class I Areas

Class I areas typically include wilderness areas and National Parks. Within 300 km (184 miles) of the Project Area, the federal Mandatory Class I areas include:

- Jarbidge Wilderness
- Craters of the Moon National Monument
- Sawtooth Wilderness

- Red Rock Lakes Wilderness
- Teton Wilderness
- Grand Teton National Park
- Yellowstone National Park
- North Absaroka Wilderness
- Washakie Wilderness
- Fitzpatrick Wilderness
- Bridger Wilderness

Publicly available data and associated reports for each Class I area were reviewed as part of the Air Resources TR (Stantec 2016b). Air Quality Related Values (AQRVs), like deposition and visibility, are typically monitored at all Class I areas and are helpful in visibility and dispersion modeling analyses. The 2010 Federal Land Air Managers (FLAG) indicates that visibility impact evaluations are recommended when any Class I area is located with 50 km of a project site. If a source is outside the 50 km radius then a Q/D initial screening test is applied, where Q is the concentration and D is the distance. The nearest Class I Area to the Project is Grand Teton National Park at approximately 70 miles (112.7 km). However, FLAG also states that sources located greater than 50 km from any Class I Area that emits less than 500 tons per year (tpy) of NO_x and SO_2 combined or more than 100 km that emit less than 1,000 tpy of NO_x and SO_2 combined would not be considered to cause or contribute to visibility impairment (USFS et al. 2010). As discussed in Chapter 2, the lifetime of the Proposed Action is a minimum of 3 years and up to 12 years and given projected lifetime emissions (793 tpy maximum), further visibility assessments are not required.

3.3.1.3 Smoky Canyon Mine

The Smoky Canyon Mine has an air quality permit issued by the IDEQ. This air permit was originally issued in the early 1980s and was recently revised in 2012 (IDEQ 2012b). The existing air permit applies to the mine and milling operations and the associated sources of regulated emissions. As part of the permit, Simplot maintains and implements a Fugitive Dust Control Plan that presents good operating practices to control emissions from the mine and mill operations.

In 2014 through early 2015, Simplot implemented a one-year Prevention of Significant Deterioration (PSD) pre-construction monitoring program at the Smoky Canyon Mine and reported the monitoring results to IDEQ (RTP Environmental Associates, Inc. 2015). The program was designed to help support future air permitting activities at the mine and other locations. The ambient air quality monitoring equipment was located north of Tailings Pond #1 and west of Tailings Pond #2 (see **Figure 1.1-1**). The criteria pollutants NO_2, SO_2, CO, ozone, PM_{10}, and $PM_{2.5}$ were monitored using methods and data quality objectives sufficient to obtain PSD-quality data. An overall summary of the air quality data available at the time the Air Resources TR (Stantec 2016b) was prepared is presented in **Table 3.3-2**. RTP Environmental Associates, Inc. compared the data to several other sites in the general area. They concluded that: (1) there was good agreement with other background sites they examined; and (2) the Smoky Canyon data are generally representative of background concentrations in the region (RTP Environmental Associates, Inc. 2015). Further, all measured concentrations were less than the corresponding

NAAQS. The Annual Monitoring Data Report (RTP Environmental Associates, Inc. 2015) provides information on data quality control and quality assurance, as well as detailed data tables and statistics.

Table 3.3-2 Summary of Smoky Canyon Air Quality Monitoring Results

POLLUTANT	AVERAGING TIME	SMOKY CANYON MEASURED CONCENTRATIONS	NAAQS CONCENTRATION
CO (ppm)	1-hour	0.8	35
NO_2 (ppb)	1-hour, Daily Maximum, 98th Percentile	25.3	100
PM_{10} (µg/m^3)	24-hour Highest	48	150
	24-hour Second Highest	35	
$PM_{2.5}$ (µg/m^3)	98th Percentile, 24-hr	9.4	35
	Annual Average	5.1	12
O_3 (ppb)	8-hour	56	70
SO_2 (ppb)	1-hour, Daily Maximum, 99th Percentile	28	75

3.3.2 Air Emissions

3.3.2.1 Stationary Sources

State air quality permits for sources that reside within approximately 50 km (31 miles) of the Project were reviewed for emissions data. **Table 3.3-3** shows the permitted stationary sources, along with the associated permitted emissions limits. Most of the sources are located near Soda Springs, more than 40 km (25 miles) away. Based on winds and meteorological factors, these sources are expected to have little impact on the Project Area.

Table 3.3-3 Stationary Source Permitted Emission Limits (Tons Per Year)

FACILITY	PM_{10}	$PM_{2.5}$	NO_X	SO_2	VOC	CO	HAP
NuWest Conda Phosphate Operations (2011)	80.6	---	152	736	5.78	100.8	3.25
NuWest Rasmussen Ridge Mine (2015)	3.39	3.39	82.05	0.16	26.49	23.38	0.45
P4 Production Blackfoot Bridge Mine (2010)	124.61	---	51.98	7.11	---	103.5	---
P4 Production Soda Springs Facility (2015)	823	---	3,905	2,073	0	19,600	19.93
Soda Springs Phosphate (2006)	22	---	5.4	0.03	0.3	1.1	0
Northwest Pipeline – Soda Springs (2011)	16.7	---	1708	0.4	74.7	231	49.5
Tronox, LLC (2006)	2.37	---	0.74	0.63	0.06	1.09	2.37

NO_x = nitrogen oxides

VOC = volatile organic compounds

HAP = hazardous air pollutant

3.3.2.2 National Emissions Inventory

The EPA's National Emission Inventory (NEI) database contains information about sources that emit criteria air pollutants and their precursors, and hazardous air pollutants. The database includes estimates of annual air pollutant emissions from point, nonpoint, and mobile sources in the 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands. The EPA collects information about sources and releases an updated version of the NEI database generally every three years; however, the latest update is the 2011 NEI. Data from the 2011 NEI was downloaded from the EPA (EPA n.d.) for Caribou County, Idaho. Annual criteria pollutant emissions reported in the 2011 NEI are 3,683 tpy NOx, 15,850 tpy CO, 6,212 tpy PM_{10}, 1,503 tpy $PM_{2.5}$, 1,503 tpy SO_2, and 978 tpy VOC.

3.3.3 Climatology and Meteorology

Extensive surface and upper air data surrounding the Project Area were analyzed to develop an assessment of regional climatology and meteorological conditions. The resulting assessment is presented in the following subsections.

3.3.3.1 Climatology

Idaho lies entirely west of the Continental Divide, which forms its boundary for some distance westward from Yellowstone National Park. The northern part of the State averages lower in elevation than the much larger central and southern portions, where numerous mountain ranges form barriers to the free flow of air from all points of the compass. In the north, the main barrier is the rugged chain of Bitterroot Mountains forming much of the boundary between Idaho and Montana. The extreme range of elevation in the State is from 738 feet at the confluence of the Clearwater and Snake Rivers to 12,655 feet at Mt. Borah in Custer County. Comprising rugged mountain ranges, canyons, high grassy valleys, arid plains, and fertile lowlands, the State reflects in its topography and vegetation a wide range of climates. Located some 300 miles from the Pacific Ocean, Idaho is, nevertheless, influenced by maritime air transported eastward on the prevailing westerly winds. Particularly in winter, the maritime influence is noticeable in the greater average cloudiness, greater frequency of precipitation, and mean temperatures than those at the same latitude and altitude in midcontinent. This maritime influence is most notable in the northern part of the State, where the air arrives via the Columbia River Gorge with a greater burden of moisture than at lower latitudes. Eastern Idaho’s climate has a more continental character than the west and north, a fact quite evident not only in the somewhat greater range between winter and summer temperatures, but also in the reversal of the wet winter, dry summer pattern (WRCC 2016a).

To a large extent, the source of moisture for precipitation in Idaho is the Pacific Ocean. In summer, there are some exceptions to this when moisture-laden air is brought in from the south at high levels to produce thunderstorm activity. The source of this moisture from the south is the Gulf of Mexico and Caribbean region. The area's semi-arid climate is the result of the Cascade and Sierra Nevada Mountains to the west and the Bitterroot and Rocky Mountains to the north, which effectively block large scale intrusion of Pacific moisture. Summer monsoonal moisture intrusions are infrequent and significantly modified by the arid Great Basin of Utah and Nevada. The Rocky and Bitterroot Mountains form the headwaters of the Snake River and receive copious amounts of winter snow. The Webster Range that surrounds the Project Area lies at a slightly lower elevation than either of these other ranges and as a result receives less overall snowfall.

During winter, synoptically organized storms typically move through the region resulting in cold outbreaks and can produce storm snowfall accumulations of two feet or more. Cloudy and unsettled weather is common during the winter with measurable precipitation occurring on about one third of the days.

Spring months are normally wet and windy with periods of high winds that may persist for days at a time. Weather conditions fluctuate quickly during the spring. Afternoon temperatures in the 30- to 40-degree F range, with precipitation in the form of rain or snow may occur interspersed with periods of sunny skies and afternoon temperatures in the 50- to 60-degree F range. Thunderstorms are not uncommon and are usually accompanied by rain showers and occasional snow. Low elevation snowpack usually melts quickly during the spring, but high elevation snowpack can persist into June or later.

Although snowmelt may take a month or more in the Project Area, summer weather may begin suddenly with a rapid change to warm and dry weather. Though daytime temperatures are usually warm by June, chilly nights can persist throughout the summer. Showers and/or thunderstorms are common from late spring through summer with an increased frequency surrounding regional high terrain. These storms often produce localized precipitation. Thunderstorms are seldom severe and tornadoes occur infrequently in the area. Long periods of excessively hot weather in July and August are very uncommon. Afternoon temperatures often rise to 80 degrees F, however low humidity usually results in overnight temperatures in the 50-degree F range, or even cooler. Depending on elevation, the average growing season is around 100 days, extending from June to September.

Autumn ushers in cooler weather with daytime highs generally in the 60-degree F range in early fall dipping into the mid-30-degree F range by mid-November with generally dry conditions. Autumn storms are usually very fast moving, and seldom persist for more than a few days. The first cold wave with highs less than 20 degrees F and lows around 0 degrees F or lower may arrive anytime between late November and late December.

The nearest location with a long-term climatological data record is Soda Springs, Idaho, which lies approximately 21 miles southwest of the site and approximately 1,600 vertical feet lower in elevation than the Project Area. While regionally representative, the information from the Soda Springs climatology data can be assumed to differ slightly from that at the Project Area. The influence of surface elevation would likely result in slightly lower temperatures and higher amounts of precipitation at the Project Area. **Table 3.3-4** depicts the average climatological variables for Soda Springs calculated over a period of 34 years from 1978 to 2012. All data were collected at the Soda Springs Airport and are based on the following percentage of total possible data collected: Maximum Temperature: 89.9%, Minimum Temperature: 89.7%, Precipitation: 89.3%, Snowfall: 87.8%, and Snow Depth: 79.7%.

Table 3.3-4 Average Soda Springs Climate Data from 1978 to 2012

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Average Maximum Temperature (degrees F)	30.3	32.8	42.0	54.3	63.8	74.0	84.7	83.1	72.6	58.7	41.9	31.4	55.8

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Average Minimum Temperature (degrees F)	8.6	10.1	19.0	26.5	33.7	39.6	45.0	43.9	35.7	26.7	18.8	9.5	26.4
Average Total Precipitation (inches)	1.21	1.09	1.33	1.39	2.20	1.41	1.07	1.22	1.16	1.26	1.17	1.11	15.62
Average Total Snow Fall (inches)	11.7	8.6	7.3	3.7	0.5	0.1	0	0	0	0.9	6.7	10.6	50.0
Average Snow Depth (inches)	10	11	5	0	0	0	0	0	0	0	1	5	3

Source: Soda Springs WRCC 2016b

3.3.3.2 Meteorological Characterization

Meteorological conditions represent short-term variation in climatology. As a result, in order to provide a representative meteorological review for the region, meteorological data from the last 5 years for the region were reviewed. Surface meteorological data is available from approximately 10 locations in a 25-mile radius surrounding the Project Area, depending on season and year. Although the data were reviewed from each regional surface meteorological site, two sites were selected to primarily characterize the Project Area. The sites selected were the Georgetown Summit site, operated by the Idaho Department of Transportation, and the Slug Creek Divide site, operated by the National Water and Climate Center’s Snow Telemetry (SNOTEL) network. Further, the aforementioned PSD-preconstruction air monitoring program (RTP Environmental Associates, Inc. 2015) collected a year of meteorological data at Smoky Canyon from January 10, 2014 through January 9, 2015. Those data were also used to characterize the Project Area.

The Georgetown Summit site is located 18 miles southwest of the Project Area at an elevation of 6,283 feet AMSL, approximately 700 feet lower in elevation than the Project Area. The Georgetown Summit site provides data for surface temperature and dew point as well as wind speed, gust speed, and direction.

The Slug Creek Divide SNOTEL site is located 12 miles southwest of the Project Area at an elevation of 7,225 feet AMSL, approximately 300 feet higher than the Project Area. The Slug Creek SNOTEL site provides data for surface temperature, liquid precipitation, and snow depth. Regional meteorological conditions were assessed based on temperature ranges and extremes, wind speed and direction assessments, and total precipitation and snowpack.

The RTP Environmental Associates, Inc. data were collected from a 10-meter meteorological tower and a Sodar. The tower is in a 0.3-mile wide valley associated with Smoky Creek, with ridges approximately 500 feet higher than the valley floor. The valley is oriented north-south at the location of the tower and the main mine facilities are located nearby. Wind speed (10-meter and Sodar 50-meter), wind direction (10-meter and Sodar 50-meter), air temperature, delta temperature, and solar radiation were monitored using methods and data quality objectives sufficient for use in dispersion modeling efforts.

Wind Speed and Direction

Hourly average wind speed and direction data for the Georgetown Summit Site were reviewed for the last 5 years. Annualized plots were developed to analyze wind speed and direction from the data. The annual aggregate data is presented in the Air Resources TR (Stantec 2016b). It indicates that wind directions have a strong tendency toward northwest/southeast directionality and that speeds varied widely but tended to be strongest from the south and northwest. These findings are consistent with the terrain channeling effects that occur in regions such as the Project Area with topography that run in a generally north-south direction. In combination with the tendency for synoptic weather features that move in from the northwest, these results would be consistent with those likely to occur at the Project Area.

The local, one-year data set (RTP Environmental Associates, Inc. 2015) at the Smoky Canyon Mine also reflected wind flow patterns that were strongly influenced by terrain. The data, summarized in the Air Resources TR (Stantec 2016b), indicated that patterns are complex and vary as a function of height. On average, wind speeds averaged 1 to 2 meters per second, due to blocking of synoptic flows by nearby hills and ridges.

Temperatures

Temperature data from the two public surface meteorological sites demonstrate a typical annual temperature cycle with monthly high and low temperatures that mirror the average monthly temperatures found in **Table 3.3-4**. The one-year Smoky Canyon record showed a similar mirroring (RTP Environmental Associates, Inc. 2015). Maximum annual high temperatures occurred each year during July or August, while the minimum annual low temperature occurred at various dates through the December to February timeframe. At Smoky Canyon, the maximum annual temperature of 84 degrees F occurred on July 23, 2014, and the minimum annual temperature of -4.2 degrees F occurred on January 28, 2014 (RTP Environmental Associates, Inc. 2015). Maximum and minimum annual temperature extremes at the other two sites are included in **Table 3.3-5**.

Table 3.3-5 Maximum and Minimum Annual Temperatures at the Slug Creek Divide and Georgetown Summit Sites

	SLUG CREEK DIVIDE					GEORGETOWN SUMMIT				
Year	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
Maximum Temperature (degrees F)	85	87	89	87	87	90	91	90	90	92
Minimum Temperature (degrees F)	-16	-21	-3	-20	-15	-20	-6	-17	-14	-7

Source: MESOWEST data cited in Stantec 2016b

RTP Environmental Associates, Inc. also analyzed solar radiation and delta temperatures collected at the Smoky Canyon Mine during the one-year study. Delta temperatures represent the 10-meter measurement minus the 2-meter measurement and reflect surface cooling and heating throughout the day. According to their analysis, the maximum solar radiation followed the expected seasonal pattern, as did the monthly minimum and maximum delta temperatures (RTP Environmental Associates, Inc. 2015). Temperature, delta temperature, and solar radiation data and statistics, as well as information on data quality control and quality assurance, are provided in the Annual Monitoring Data Report (RTP Environmental Associates, Inc. 2015).

Total Precipitation and Snowpack

Total precipitation and snowpack were analyzed at the Slug Creek Divide SNOTEL Site. The SNOTEL site approximates the snowpack and precipitation characteristics of the Project Area. The snowpack depths are measured based on calendar year and represent the maximum snowpack depths that occurred throughout the year listed. The precipitation data are annual totals based on the snow water year, which runs from October through September of the following year. The totals for the site are tabulated in **Table 3.3-6**.

Table 3.3-6 Maximum Snowpack Depth and Total Precipitation at Slug Creek Divide Site

	SLUG CREEK DIVIDE					SLUG CREEK DIVIDE				
	2011	2012	2013	2014	2015	10/2005 to 09/2006	10/2006 to 09/2007	10/2007 to 9/2008	10/2008 to 09/2009	10/2009 to 09/2010
Maximum Snowpack (inches)	58.6	57.7	56.8	60.1	53.0					
Total Precipitation (inches)						35.4	27.5	32.3	40.9	28.2

Source: MESOWEST SNOTEL data cited in Stantec 2016b

3.3.4 Greenhouse Gas Emissions and Climate Change

Absorbed short wave incoming energy and outgoing longer wavelengths radiating energy back to space affect the earth's temperature. Much of the thermal radiation emitted by the land and ocean is absorbed by the atmosphere, including clouds, and reradiated back to earth. This is called the greenhouse effect. The earth's greenhouse effect warms the surface of the planet. Without the natural greenhouse effect, the average temperature at earth's surface would be approximately 60 degrees F colder. The greenhouse effect creates a climate on earth that is conducive to life. Therefore, the greenhouse effect is a natural process, upon which life on earth depends.

The two primary gases in the atmosphere responsible for the greenhouse effect are water vapor and CO_2. Methane, nitrous oxide, O_3, and several other gases present in the atmosphere in small amounts also contribute to the greenhouse effect. Taken together, these are referred to as GHGs. In addition to reflecting the sun's energy back into space, GHGs also control the amount of heat radiated by the earth that is trapped beneath the atmosphere. Fluctuations in GHGs in the atmosphere are partially responsible for variances in the earth's climate along with other influences. The concentrations of these gases in the atmosphere are affected by complex natural systems that tend to either emit or sequester these gases. Anthropogenic influences and emissions also affect the prevalence of these gases in the atmosphere, particularly CO_2, which has been emitted in relatively large and growing quantities since the dawn of the Industrial Revolution when coal and later petroleum were burned for energy.

Water vapor is the most potent and abundant GHG in the earth's atmosphere. However, its concentration is controlled primarily by the rate of evaporation from the oceans and transpiration from plants, rather than by human activities, and water vapor molecules only remain in the atmosphere for a few days on average. Thus, changes in water vapor are considered a feedback that amplifies the warming induced by other climate forces.

The concentration of CO_2 in the atmosphere has been the main focus of scientific investigation with regard to anthropogenic effects on the earth's climate, largely because CO_2 is the second highest concentration of GHG in the atmosphere behind water vapor. However, other atmospheric components lend themselves to anthropogenic influence including aerosols, methane, nitrous oxide, and halocarbons. On December 7, 2009, the EPA signed two distinct findings regarding GHGs under Section 202(a) of the Clean Air Act (CAA) as defined by the Supreme Court in 2007 (*Massachusetts v. EPA*, 549 U.S. 497). The first, an "endangerment" finding, determines that GHGs are a threat to human health and welfare; the second, a "cause or contribute" finding, determines that the combined emissions of GHGs from motor vehicles contribute to the GHG pollution that threatens public health and welfare. The findings themselves do not impose any requirements on industry or other entities.

In addition to regulatory implications, GHG emissions may have an influence on the global climate system. Stantec prepared a report summarizing key findings regarding climate change impacts relevant to southeastern Idaho, drawing from several recent published materials; several key conclusions from the report (Stantec 2019) follow:

- Over the past century in southeastern Idaho, temperatures have increased, and extreme weather events have increased in frequency and intensity, including heavy precipitation, flash flooding, and droughts. Snowpack is melting earlier in the year, and the flow of snowmelt into streams during the summer is declining.
- <u>Temperature</u>: Over the next century, average temperatures in southeastern Idaho are expected to increase, daily warm and cold extreme temperatures are expected to increase at a higher rate than average temperatures, the intensity of hot waves is expected to increase, the intensity of cold waves is expected to decrease. Further, slightly greater temperature increases are projected in summer months than in winter months, and average maximums are expected to rise slightly faster than average minimums.
- <u>Precipitation</u>: Over the next century, precipitation in Idaho is expected to increase during the winter and spring months with potential decreases in the summer months specific to southeastern Idaho, frequency and intensity of extreme precipitation events are projected to increase, and it is anticipated that this precipitation will increasingly fall as rain instead of snow given the projected warmer temperatures.
- <u>Hydrology</u>: The aforementioned climate changes may result in increased flood risks including during the cold season., earlier melting of mountain snowpack, and more prevalent droughts. A reduction in the amount of water draining into streams and reduced groundwater stores are possible hydrologic effects due to these predicted changes.
- <u>Vegetation</u>: These climate changes may facilitate the growth of invasive species, cause shifting of or damage to native vegetative communities, impact the timing of biological events (e.g., spring bud burst), slow forest growth, weaken trees, and increase susceptibility to mountain pine beetle and other bark beetle attacks. In turn, these could lead to increased

fuel loads in grassland ecosystems, increased fire frequency, and decreased timber harvests.

- Terrestrial and aquatic wildlife: Climate change may cause species and populations to alter individual characteristics, timing of biological events (e.g., emergence from overwintering, the start of migrations), and geographic ranges. Local extinctions, reduced community resilience, range contractions (e.g., species having to shift to higher elevation habitats), and habitat fragmentation are other possible consequences. In regard to fisheries, increasing water temperatures and lower stream flow may impact adult spawning and juvenile rearing, although it is to be noted that timing of some aquatic migrations is controlled by other ecological factors.
- Land Use: Climate trends in southeastern Idaho may indirectly impact the suitability of land for certain uses such as agricultural operations (crops and livestock grazing) and recreation. Recreational opportunities, including sport fishing and other inland-water based recreation in southeastern Idaho, could be impacted by declining water availability, increasingly variable precipitation, and wildfire increases. Winter recreation opportunities, such as cross-country skiing in southeastern Idaho, could be negatively impacted by declines in snow and ice cover caused by warmer winter.
- Socioeconomics: The aforementioned climate changes and related effects would present numerous challenges to the socioeconomic vitality of rural communities and subsistence activities within southeastern Idaho, notably due to its potential impacts to agriculture and recreation industries. Increased wildfire occurrence could lead to significant property damage, threatening homes and polluting air. Climate change also may uniquely impact Indigenous peoples' access to traditional foods, such as fish, game, and crops, which provide sustenance and are of cultural, economic, and medicinal value.

Although GHG emissions and climate change variables (Global Mean Temperature, Radiative Balance, etc.) may co-vary, it remains very difficult to assess causality in these large-scale ecological systems. As a result, baseline studies can only confidently express the existing climate conditions, the available scientific information, and the total magnitude of project related emissions.

3.4 NOISE

The Study Area for noise includes the Project Area and surroundings (**Figure 3.4-1**) that were determined to be potentially impacted by the Project. The Study Area boundary was developed with the IDT experts and professional judgement. It focuses on the region east of the western boundary of the existing Smoky Canyon Mine Lease Area. It extends west along the entire western boundary of the existing Smoky Canyon Mine lease, east to Buck Mountain, north to the existing Smoky Canyon Road and south to Crow Creek Road. A Noise TR was prepared to assess noise conditions within the Study Area (Stantec 2016c).

3.4.1 Legal Requirements and Guidelines

The Federal Noise Control Act of 1972 established a requirement that all federal agencies administer their programs to promote an environment free of noise that jeopardizes public health or welfare. Neither the BLM (Pocatello 2012 ARMP [BLM 2012]) or the USFS (2003 RFP [USFS 2003a]) have direct regulations, standards/guidelines, or ordinances in regard to noise from this

Project. Occupational Safety and Health Administration (OSHA) regulations would not be applicable to the Project; however, OSHA methodology was used in the data collection process for the Noise Study. Further, EPA identifies outdoor noise limits to protect against effects on public health and welfare.

3.4.2 Noise Effects

To properly assess the noise resources for any area, an explanation of noise effects, consideration of the topography, climate, flora, and current ambient noise is required. The affected environment for noise impacts is usually limited to a distance of 2,640 feet from the source based on current wildlife studies (Fletcher 1980). However, if residential housing has the potential to be impacted, the affected environment includes the distance from the source of the noise to the residence but generally not beyond 1,000 feet.

The basic equations for determining noise attenuation at a receiver location, Downwind octave-band sound pressure (LfT[DW]), consider the point sound source, directivity correction, and octave-band attenuation, as defined and discussed in the Noise TR (Stantec 2016c).

3.4.3 Noise Attributes

Noise is an unwanted sound occurrence. A noise's attributes (pitch, loudness, repetitiveness, vibration, variation, duration, and the inability to control the source) determine how it affects a receptor. The study of noise involves three important characterizing parameters: pressure, power, and intensity. The power of an oscillating sound wave is composed of kinetic and potential energies. The intensity of a sound wave is defined as the average rate at which power is transmitted per cross-sectional area in the direction of travel. Noise versus sound is a subjective measurement, thus a receptor's reaction to sound is a poor measurement of noise.

3.4.4 Noise Measurements

The unit of sound level measurement (i.e., volume) is the decibel (dB), expressed as dBA (decibel-A weighted). Sound measurements in dBA give greater emphasis to sound at the mid- and high-frequency levels, which are more discernible to humans. The dB is a logarithmic measurement; thus, the sound energy increases by a factor of 10 for every 10 dBA increase. A 3 dBA change in noise levels is considered barely perceptible, while a 5 dBA change is typically perceptible to most people.

Sound transmission is improved with higher temperature, lower humidity, and in the direction the wind is blowing, and is dampened significantly by any intervening terrain or physical barriers.

EPA identifies outdoor noise limits to protect against effects on public health and welfare by equivalent sound level (Leq), which is an average measure over a given time. Outdoor limits of 55 dBA Leq have been identified by EPA as desirable to protect against speech interference and sleep disturbance for residential areas and areas with educational and healthcare facilities.

According to EPA Office of Noise Abatement and Control (1981a), locations are generally acceptable to most people if they are exposed to outdoor noise levels of 67 dBA Leq or less, potentially unacceptable if they are exposed to levels of 67 to 75 dBA Leq, and unacceptable if exposed to levels of 75 dBA Leq or greater.

Generally, natural noise levels are up to 35 dBA in rural areas away from communities and roads. Within a rural community, the man-made noise level ranges from 45 dBA to 52 dBA. The day-night sound level (Ldn) in residential areas should not exceed 55 dBA to protect against activity interference and annoyance. **Table 3.4-1** presents typical sound levels in dBA and subjective descriptions associated with various noise sources.

Table 3.4-1 Sound Levels Associated with Ordinary Noise Sources

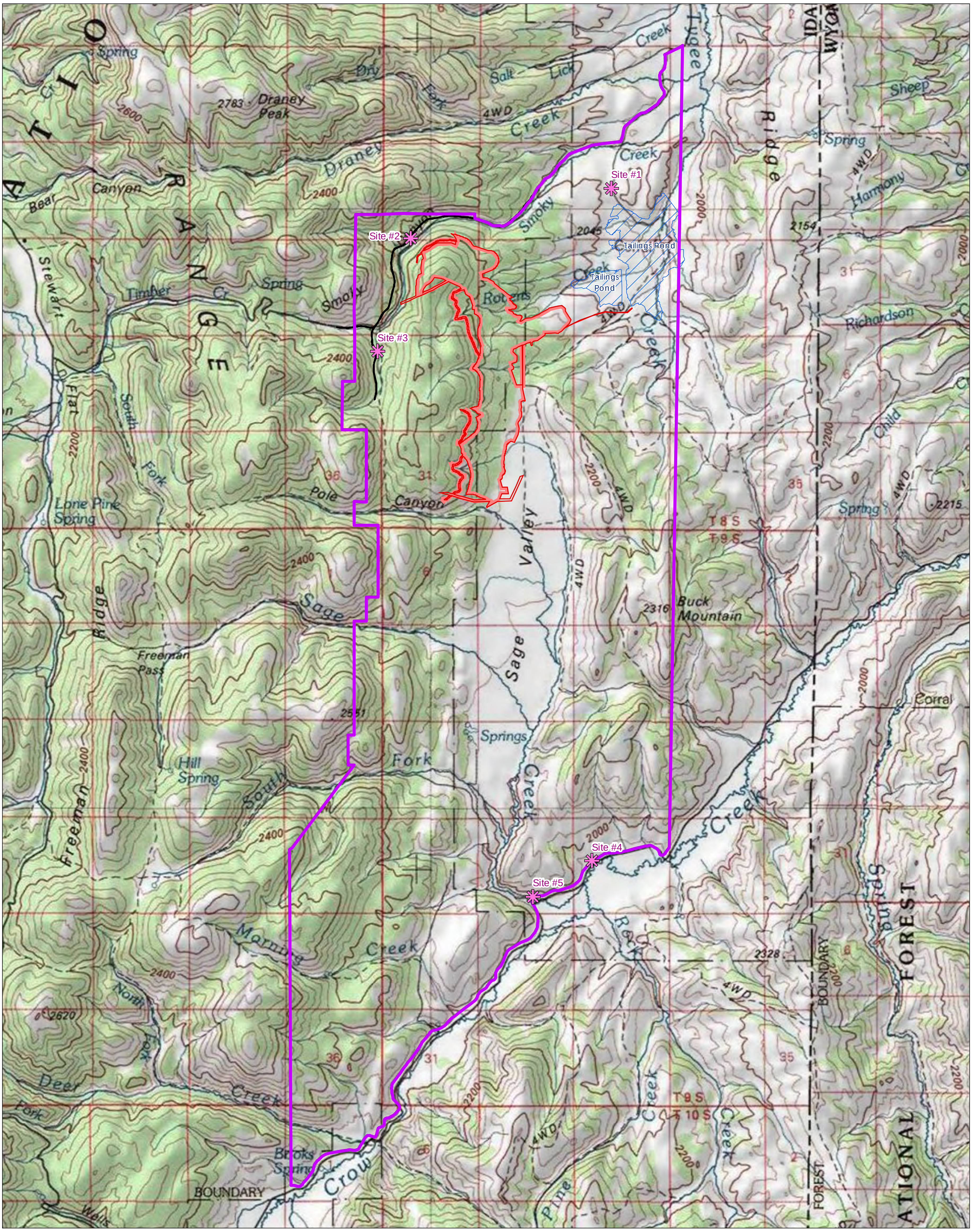
NOISE SOURCE	NOISE LEVEL	SUBJECTIVE DESCRIPTION
Commercial Jet Take-Off	120 dBA	Deafening
Road Construction Jackhammer	100 dBA	Deafening
Busy Urban Street	90 dBA	Very loud
Standard for Hearing Protection 8-Hour Exposure Permissible Exposure Limit (Mine Safety and Health Administration [MSHA]) Action Level within Active Mining Facilities	90 dBA 85 dBA	Very loud Loud – to very loud
Construction Equipment at 50 feet	80-75 dBA	Loud
Freeway Traffic at 50 feet	70 dBA	Loud
Noise Mitigation Level for Residential Areas Federal Housing Administration (FHA)	67 dBA	Loud
Normal Conversation at 6 feet	60 dBA	Moderate
Noise Mitigation Level for Undisturbed Lands (FHA)	57 dBA	Moderate
Typical Office (interior)	50 dBA	Moderate
Typical Residential (interior)	30 dBA	Faint

Source: Federal Highway Administration Highway Construction Noise Handbook (FHWA 2006)

The average noise level, expressed as dBA Leq, is often used to characterize ongoing operations or longer-term impact analyses. The maximum dBA level (dBA Lmax) is used to document the highest intensity, short-term noise level. Regular public exposure to noise levels averaging over 67 dBA L_{eq} are considered impacts that require mitigation consideration. Maximum public exposure less than moderate levels defined are considered minor.

3.4.5 Noise Data Baseline Study

The baseline collection of noise data included the direct measurement of sound data at five monitoring locations throughout the Study Area (**Figure 3.4-1**). The exact noise locations were selected based on a siting analysis, proximity to noise sources, and sensitive noise receptors in the Study Area, as described in the Noise TR (Stantec 2016c). Areas determined to be sensitive to noise impacts are points along Smoky Canyon Road and Crow Creek Road where the public could either have access to the general Study Area and/or could potentially hear Project-related noise. The locations were selected based on representativeness and public accessibility. Collectively, the data from the five monitoring sites is representative of the sound environment within the Study Area. The approximate location of each monitoring site is listed in **Table 3.4-2** and shown on **Figure 3.4-1**.



Legend

- Project Area
- Existing Tailings Pond
- Noise Monitoring Site
- Noise Study Area

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 3.4-1
Noise Monitoring Sites
East Smoky Panel Mine EIS

Table 3.4-2 Monitoring Locations

LOCATION	LATITUDE	LONGITUDE	DATUM	ELEVATION AMSL (FEET)
Site #1	42.72721° N	-111.08548° W	WGS84	6,500
Site #2	42.71960° N	-111.12641° W	WGS84	7,026
Site #3	42.70260° N	-111.13313° W	WGS84	7,026
Site #4	42.62592° N	-111.08931° W	WGS84	6,409
Site #5	42.62050° N	-111.10127° W	WGS84	6,448

The noise study required one day of monitoring, during which the monitor was deployed during daytime hours at each of the five chosen locations for a period of 15 minutes, and then re-deployed during nighttime hours at those locations for an additional period of 15 minutes.

3.4.6 Baseline Noise Study Results

Noise monitoring values at the five monitoring locations are shown in **Table 3.4-3**. Values ranged from a minimum A-weighted sound level (dBA Lmin) of 25.9 dBA to a maximum A-weighted sound level (Lmax) of 66.6 dBA. Measured Lmax, Lmin, and calculated L_{eq} levels for each location are summarized in **Table 3.4-3**. Based on the monitoring results, this noise data can be used to estimate ambient baseline noise levels for the Study Area.

Table 3.4-3 Noise Monitoring Results (dBA)

LOCATION	RUN TIME	LMAX (dBA)	LMIN (dBA)	LEQ (dBA)
Site #1 - Daytime	15 minutes	59.4	27.4	29.7
Site #1 - Nighttime	15 minutes	52.7	26.4	37.6
Site #2 - Daytime	15 minutes	65.4	29.1	36.3
Site #2 - Nighttime	15 minutes	66.3	25.9	27.6
Site #3 - Daytime	15 minutes	66.6	38.6	44.7
Site #3 - Nighttime	15 minutes	52.7	26.4	37.6
Site #4 - Daytime	15 minutes	59.4	27.4	29.7
Site #4 - Nighttime	15 minutes	43.8	31.4	35.8
Site #5 - Daytime	15 minutes	42.1	30.8	32.3
Site #5 - Nighttime	15 minutes	52.7	26.4	37.6

3.5 WATER RESOURCES

The Water Resources Baseline Study Area is shown in **Figure 3.5-1** and includes the entire topographically defined watershed areas associated with the Tygee Creek and Sage Creek drainage basins, along with a reach of Crow Creek (from its confluence with Sage Creek downstream to the Wyoming border). The Study Area boundary was developed with the IDT experts and professional judgement. These two basins encompass the existing Smoky Canyon Mine, the proposed East Smoky Panel Project, and downstream surface waters that may, or may not, be impacted by the proposed East Smoky Panel Project. Further, within a portion of the Study Area, a RI/FS (Formation Environmental, LLC 2014), as implemented under CERCLA, is being conducted to address existing environmental contamination issues at the Smoky Canyon Mine. The East Smoky Panel disturbances would occur within the same watersheds studied under the RI/FS. Thus, the RI/FS is also relevant to this EIS.

The following subsections describe baseline water resources conditions within the Study Area, with groundwater discussed first, followed by surface water. Springs are surface expressions of groundwater; they are primarily in the last subsection, which discusses groundwater/surface water interactions. Water resources information presented here focuses on baseline data collected specifically for the Project (i.e., reported in the Water Resources TR [Stantec 2016d and 2017a]), as well as Project-specific groundwater modeling. Aquatic habitat-related stream characteristics are discussed in **Section 3.9.2**.

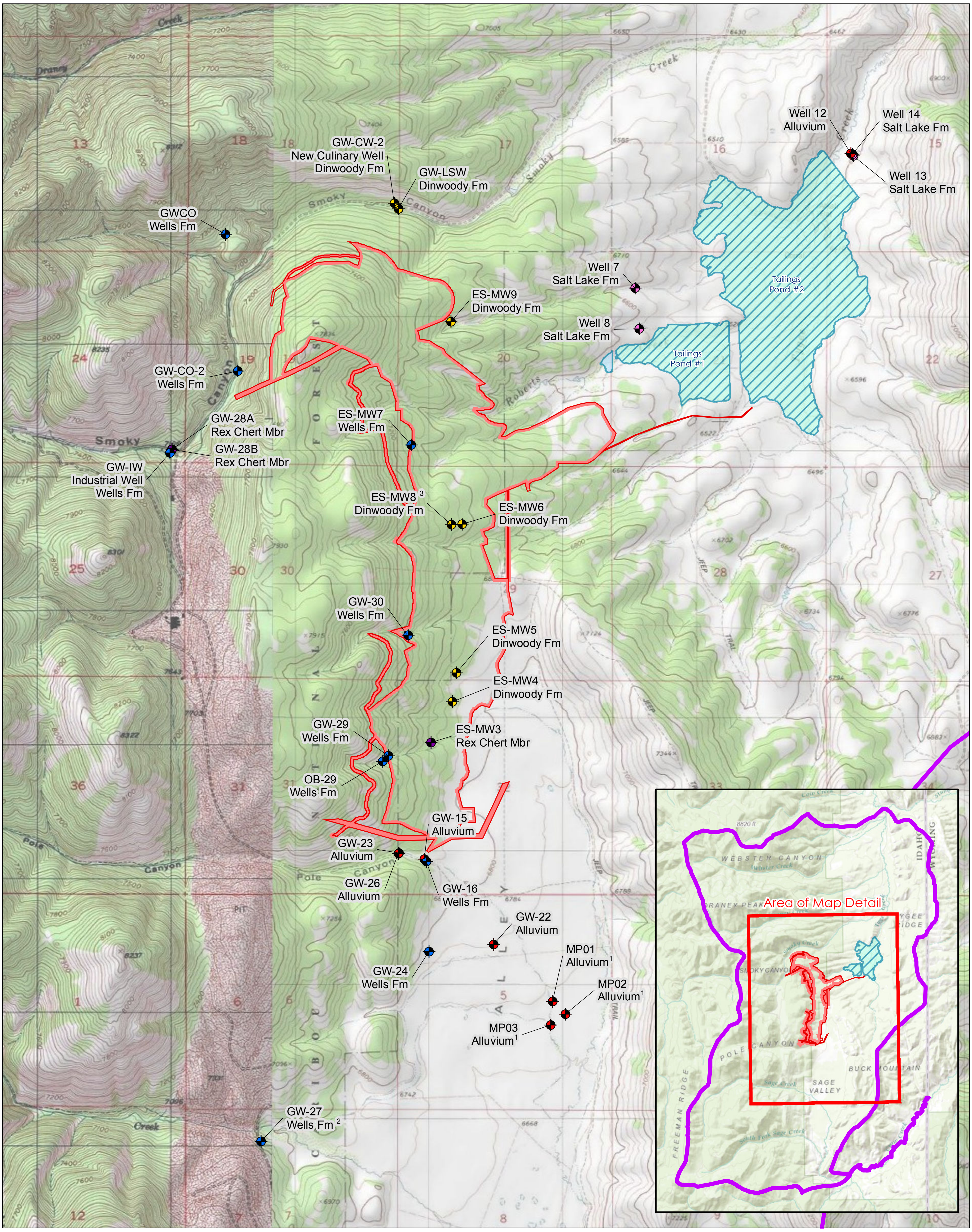
3.5.1 Groundwater

Groundwater monitoring wells across the East Smoky Project Area were completed in the Triassic Dinwoody Formation, Permian Phosphoria Formation (Rex Chert Member), and Pennsylvanian Wells Formation. These monitoring wells and other existing wells (including some completed in Quaternary Alluvial deposits and Tertiary Salt Lake Formation) in and near the Study Area – were monitored to glean information on groundwater elevations (**Figures 3.5-2** through **3.5-4**), aquifer characteristics, and groundwater quality. The information was also used in groundwater modeling conducted for the Project.

Four primary groundwater systems have been identified within the Study Area for groundwater flow within the geologic units comprising the Meade Thrust Allochthon (Muller and Mayo, 1983; Mayo et al. 1985; Mayo and Associates 2016; HGG 2016a), including:

- Quaternary Alluvium;
- Tertiary Salt Lake Formation;
- Triassic Dinwoody and Thaynes Formations (referred to as Dinwoody or Tier 1 by Mayo 2016, HGG 2016a); and
- Pennsylvanian Wells Formation (referred to as Wells or Tier 2 by Mayo 2016, HGG 2016a), with recharge areas extending beyond the Study Area (**Figure 3.5-5**).

Two wells were drilled within the Rex Chert Member of the Phosphoria Formation (ES-MW4 and MW-28A); however, this geologic unit has low permeability and the availability of groundwater is limited so it is not discussed further herein. **Figure 3.5-1** provides the locations of monitoring wells sampled during the water resources baseline study as defined by the geologic formation. Well locations were chosen based upon land ownership, topographic constraints, existing disturbances, presence of special status species, presence of cultural resources, road access, presence of exploration drill holes, stratigraphy, faults, and anticipated depth to various aquifers.



Legend

- Project Area Boundary
- Water Resources Baseline Study Area
- Existing Tailings Pond
- Roberts Creek Diversion Pond

Existing Wells

- Alluvium
- Dinwoody Formation (Fm)
- Rex Chert Member (Mbr)
- Salt Lake Formation (Fm)
- Wells Formation (Fm)

Notes

1: Sampled under EIS frequency and protocols, but for RI/FS analytes
2: Monitored under EIS SAP in Fall 2014 only; supported by data from other monitoring programs
3: Temporary borehole decommissioned in Fall 2015
4. Coordinate System: NAD 1983 UTM Zone 12N
5. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Copyright:© 2013 National Geographic Society, i-cubed

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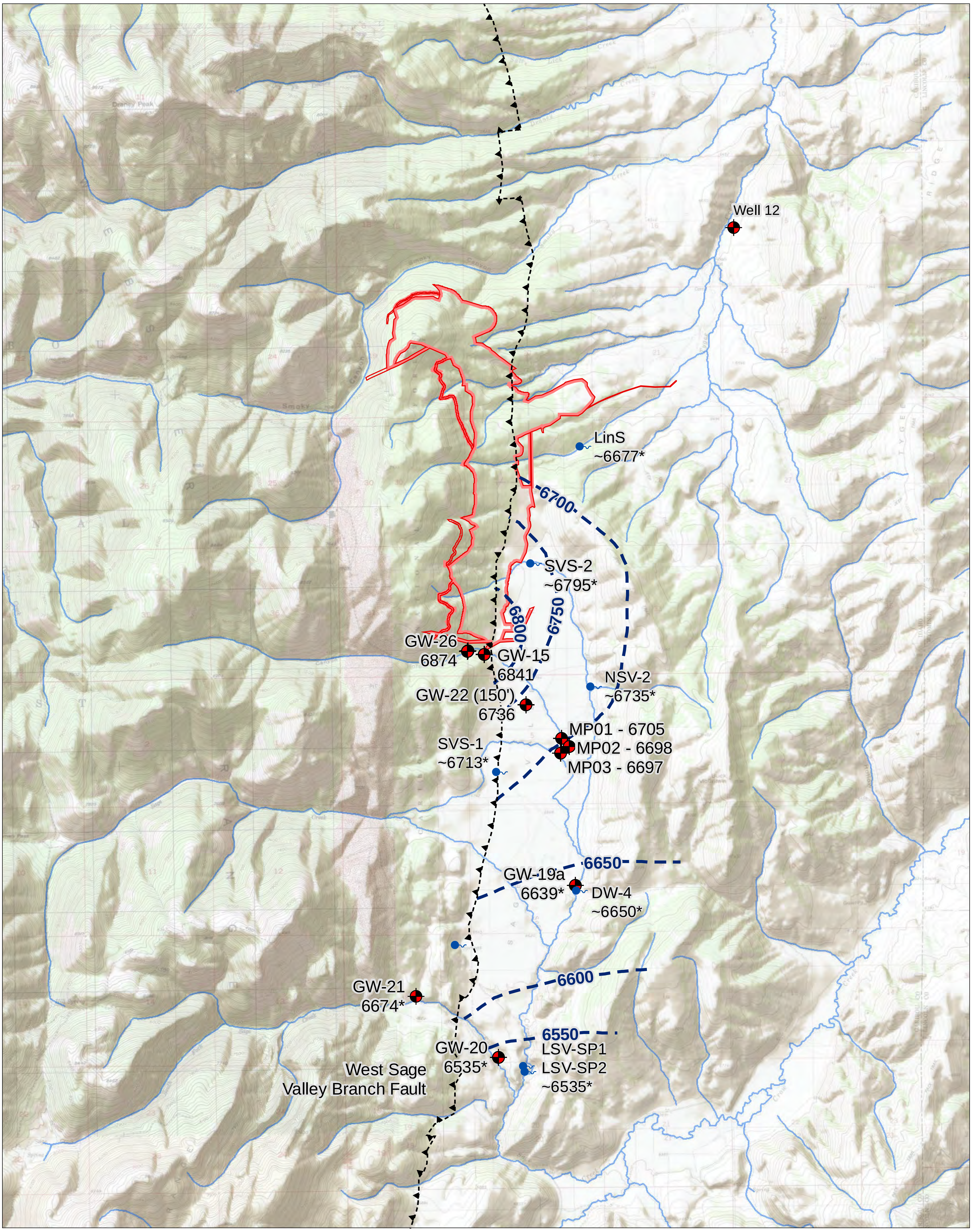
Figure 3.5-1
Water Resources Baseline Study Area and Groundwater Monitoring Sites East Smoky Panel Mine EIS



Legend

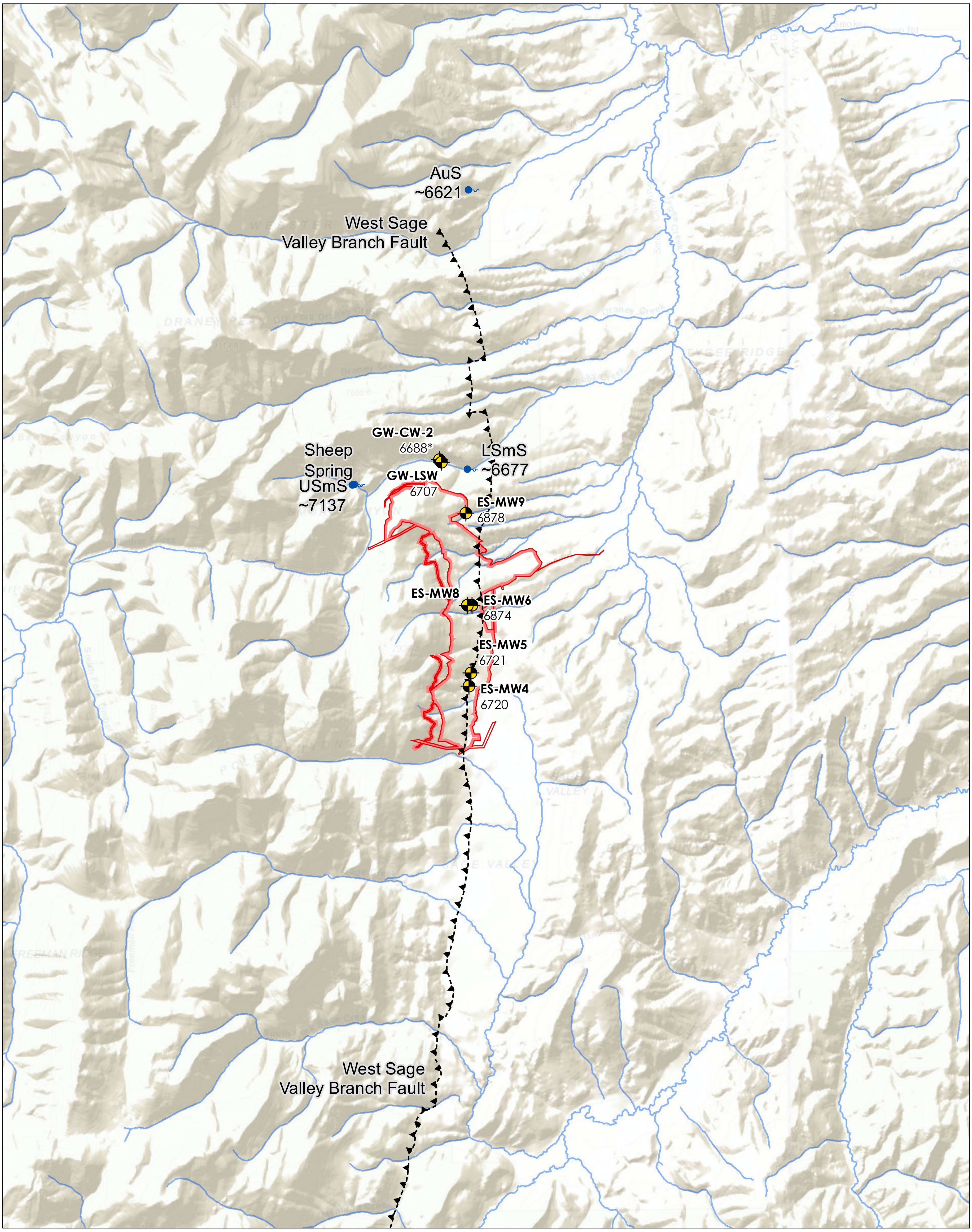
- Spring / Seep (feet, msl)
- Alluvial Monitoring Well Location and Mean Groundwater Elevation (feet, msl)
- West Sage Valley Branch Fault
- Groundwater Elevation Contour (feet, msl)
- Project Area Boundary
- Streams

0 2,000 4,000
Feet
1:50,000 (at original document size of 11x17)

N

Notes
1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
Sources: Esri, USGS, NOAA
3: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho
4. Figure originally created by HGG. Modified by Stantec for EIS formatting.
5. Mean groundwater and spring elevations calculated from depth to water measurements collected November 2014 - November 2016, except for data marked with with "*". These data were based on values reported in HGG 2016.
6. Groundwater and spring elevations rounded to the nearest foot.
7. No data available if not shown at an individual well location.

Figure 3.5-2
Mean Groundwater and Spring Elevation Contours Alluvium
East Smoky Panel Mine EIS
November 2014 - November 2016



Legend

Dinwoody Monitoring Well Location & Mean Groundwater Elevation (feet, msl)

West Sage Valley Branch Fault

Project Area Boundary

0 2,750 5,500
Feet

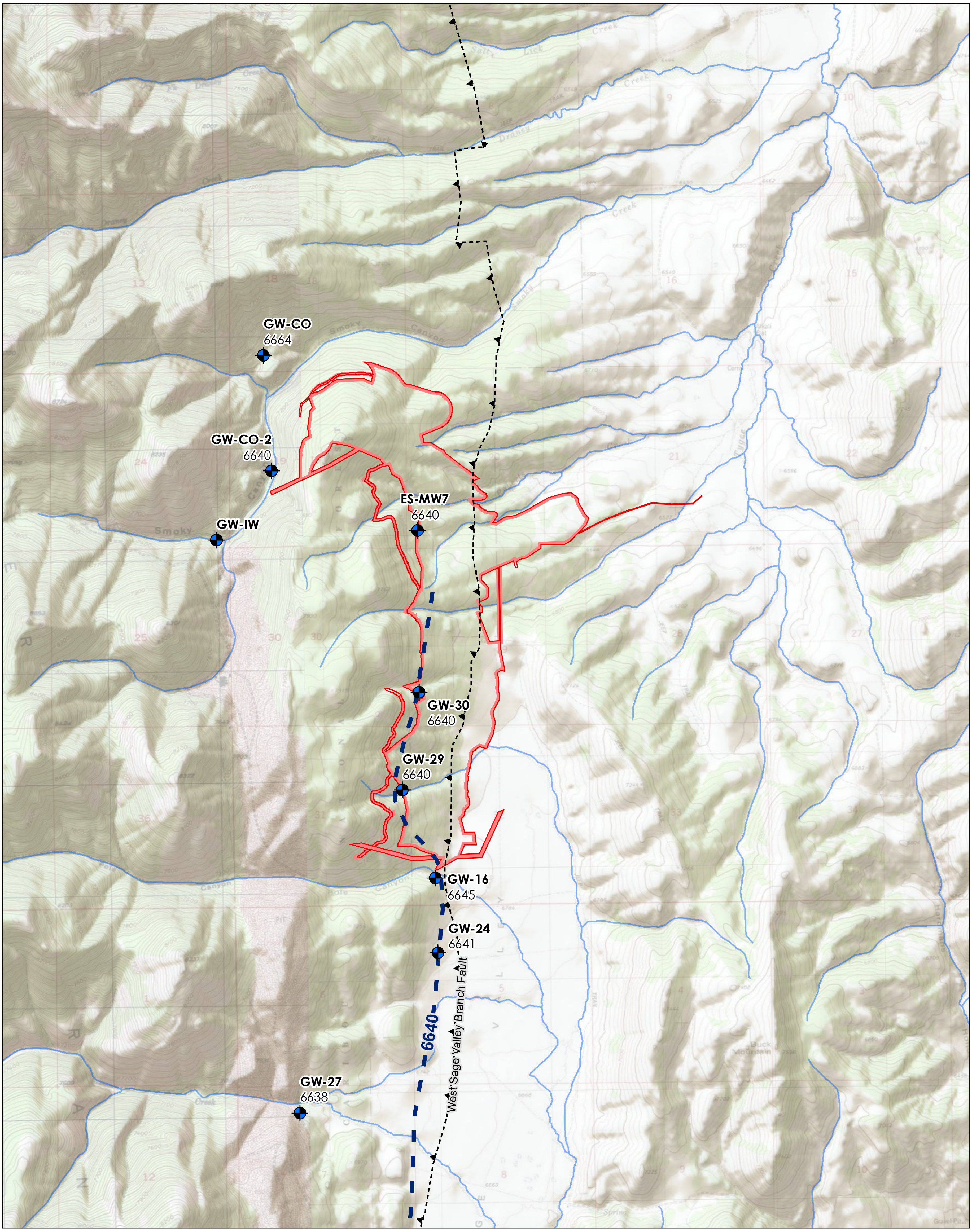
1:66,000 (at original document size of 11x17)

N

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Sources: Esri, USGS, NOAA
3. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho
4. Figure originally created by HGG. Modified by Stantec for EIS formatting.
5. Mean groundwater elevations calculated from depth to water measurements collected November 2014 - November 2016, except for data marked with with "*". These data were based on values reported in HGG 2016a.
6. Groundwater elevations rounded to the nearest foot.
7. No data available if not shown at an individual well location.

Figure 3.5-3
Mean Groundwater and Spring Elevation
Dinwoody Formation
East Smoky Panel Mine EIS
November 2014 - November 2016



Legend

- Wells Formation Monitoring Well Location and Groundwater Elevation (feet, msl)
- Groundwater Elevation Contour (feet, msl)
- Thrust Fault
- Streams
- Project Area Boundary

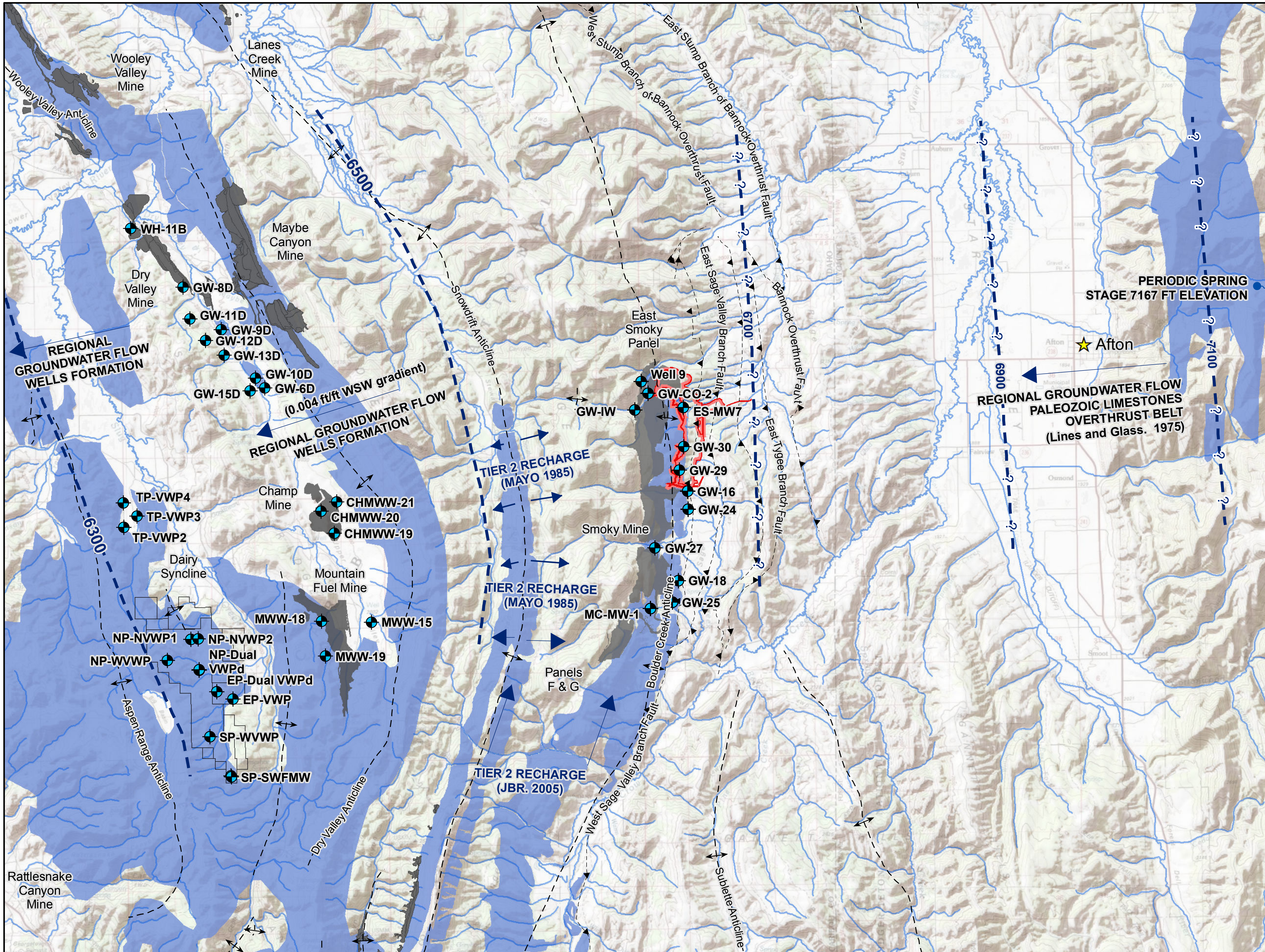
0 1,500 3,000
Feet
1:36,000 (at original document size of 11x17)

N

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
Sources: Esri, USGS, NOAA
3: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho
4. Figure originally created by HGG. Modified by Stantec for EIS formatting.
5. Mean groundwater and spring elevations calculated from depth to water measurements collected November 2014 - November 2016, except for data marked with with "*". These data were based on values reported in HGG 2016a.
6. Groundwater and spring elevations rounded to the nearest foot.
7. No data available if not shown at an individual well location.

Figure 3.5-4
Mean Groundwater and Spring Elevation Contours Wells Formation East Smoky Panel Mine EIS November 2014 - November 2016



Legend

- Spring
- Regional Wells Formation Wells
- Tier 2 Recharge
- Groundwater Elevation in Paleozoic Limestones (? denotes inferred groundwater contour)
- Anticline
- Thrust Fault
- Project Area Boundary
- City
- Phosphate Mines
- Streams
- Regional Outcrop (Wells/Brazer)

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet

2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
Sources: Esri, USGS, NOAA

3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.

4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

5. Figure originally created by HGG. Modified by Stantec for EIS formatting.

0 6,000 12,000
Feet

1:144,000 (at original document size of 11x17)

N

Figure 3.5-5

Regional Groundwater Flow and Recharge Areas, Wells Formation and Paleozoic Limestones East Smoky Panel Mine EIS

The uppermost groundwater system consists of Quaternary alluvial and colluvium deposits. The Alluvium groundwater system consists of groundwater flow in unconsolidated silts, sands, and gravels. Within the Study Area, it exists mainly along stream channels (e.g., Tygee Creek), upstream of the tailings dams, and in Sage Valley. The Alluvium exists mainly on the east side of the West Sage Valley Fault except in the southern portion of the Study Area, where it is found on both sides of the fault. The fault does not create a barrier to groundwater flow in the shallow alluvial groundwater system, as indicated by groundwater elevations trending eastward, across the fault within the alluvial system (**Figure 3.5-2**). The shallow alluvial deposits are considered to be a distinct groundwater system, separate from the Salt Lake Formation (HGG 2018). Recharge is from precipitation/natural recharge and locally is extremely dependent on-stream infiltration from Pole Canyon Creek. To mitigate selenium effects from the Pole Canyon ODA, stream infiltration and recharge has been artificially modified in the lower Pole Canyon Area. First, Pole Canyon streamflows are collected in a pipeline upstream of the ODA and discharged downstream of the ODA to the alluvium of Sage Valley. Second, flows in Pole Canyon upstream of the ODA, but which cannot be captured by the pipeline, are captured in an infiltration basin and discharged to the Wells Formation, thus avoiding the ODA, which is a source of the selenium contributions.

The Tertiary Salt Lake Formation consists of fresh water lacustrine and alluvial deposits, and groundwater flow in limestones, tuffs, and conglomerates comprise the groundwater system. Groundwater in the Salt Lake Formation generally receives water from stream infiltration and direct recharge from precipitation where it outcrops primarily on the east side of the West Sage Valley Fault (Note that groundwater data is only available for two wells installed in the Salt Lake Formation, Wells 7 and 8; therefore, a groundwater flow map for this unit is not provided.). The fault creates a barrier to groundwater flow, resulting in a separation in hydraulic systems on either side of the fault. Therefore, groundwater in the Salt Lake Formation is considered to be distinct from the Alluvial groundwater system (HGG 2018).

The underlying two groundwater systems (Tier 1 or Dinwoody and Tier 2 or Wells) are defined by the low conductivity Phosphoria Formation of Permian age, which separates them. In the Study Area, the Dinwoody groundwater system, stratigraphically below the Salt Lake Formation, consists primarily of groundwater flow in fractured siltstone, limestone, and shale of the Triassic Dinwoody and Thaynes Formations. The lowermost groundwater system (Tier 2 or Wells) in the Study Area consists primarily of groundwater flow in fractured sandstone, limestone, and dolomite comprising the Pennsylvanian Wells Formation. The Phosphoria Formation (consisting of the Rex Chert Member and the Meade Peak Member in the Project Area) forms the lower boundary of the Dinwoody groundwater system and the upper boundary of the Wells groundwater system. Under natural conditions, the lower permeability of the Phosphoria Formation generally prohibits flow between the two systems and acts as a confining layer between them (Ralston 1979; Mayo and Associates 2016). Groundwater flow within the Dinwoody groundwater system is isolated from the other groundwater systems and is generally controlled by fractures/bedding planes. It is present within a few hundred feet of the ground surface and is typically under unconfined aquifer conditions; however, heterogeneous characteristics of the system may create perched conditions locally. Recharge is via precipitation to outcrops of the Dinwoody Formation and other Mesozoic outcrop areas (**Figure 3.5-3**) and discharge is along bedding and thrust splay surfaces (Mayo 2016).

Groundwater flow within the Wells groundwater system is restricted to strata below the Phosphoria Formation and is also controlled by fracture/bedding plane characteristics with discharges typically occurring along fault planes (Mayo 2016). Groundwater recharge to the Wells Formation typically occurs via direct precipitation/snowmelt to Wells Formation outcrops of the Snowdrift Anticline to the west of the Project Area and outcrops of the Boulder Creek Anticline within and south of the Study Area, including the Pole Canyon area (HGG 2016a, **Figure 3.5-4**). Groundwater flows eastward from these outcrop areas toward the West Sage Valley Thrust Fault where it encounters the highly permeable fault damage zone and discharges at the Hoopes Spring complex and Lower South Fork Sage Creek Springs, which represent the primary discharge points for Wells Formation groundwater encountered in the Project Area (HGG 2016a). Other springs (South Fork Sage Creek Springs) and base flow to gaining streams on the east side of the Boulder Creek Anticline are also sources of discharge, as well as groundwater pumping at the industrial well (GW-IW) (500 gallons per minute [gpm]).

Based on regional groundwater elevation data, recharge to the Wells Formation groundwater system within the Project Area may also occur in Paleozoic outcrop areas to the east of the Study Area near Afton, Wyoming along the Salt River Range or via upwelling from a deeper regional groundwater system (HGG 2016a) (**Figure 3.5-5**).

3.5.1.1 Elevation and Gradient

For the Alluvial system, groundwater to the south and southeast of the Project Area (no well data are available within the Project Area) is typically found at depths of about 3 to 23 feet below ground surface (bgs); groundwater depths in the Salt Lake Formation wells are slightly deeper and range from about 9 to 35 feet bgs. Mean groundwater elevations for the Alluvial and Salt Lake Formation wells were calculated based on data collected between November 2014 through July 2016 or based on data presented in HGG 2016a. As shown on **Figure 3.5-2**, mean groundwater elevations in the Salt Lake Formation based on data collected in wells located to the northeast of the Project Area range from 6,524 feet AMSL at Well 8 to 6,545 feet AMSL at Well 7 (updated survey data are not available for Wells 12, 13, and 14). Data indicate that groundwater in the Alluvial system flows horizontally with topography/dip to the east and south in Sage Valley from the vicinity of Pole Canyon toward Hoopes Spring. Horizontal groundwater gradients in the Alluvial system are approximately 0.02 feet/feet. Based on limited data (Wells 7 and 8 and spring elevations at LinS and ESS) and groundwater modeling simulations (HGG 2016b), groundwater flow in the Salt Lake Formation is thought to also generally follow geologic dip and topography. The groundwater modeling results (HGG 2016b) also indicate that the Salt Lake Formation and Alluvial system due east of Pole Canyon within Sage Valley are not hydraulically connected, indicating that groundwater leaving Pole Canyon will likely follow the flow pathway of the Alluvial system rather than mixing with the Salt Lake Formation system.

As shown on **Figure 3.5-6**, below seasonal groundwater trends are observed in the Alluvial system wells indicating the strong influence from recharge via precipitation. Seasonal high groundwater levels in the Alluvial and Salt Lake Formation are typically observed in spring (May) and seasonal lows in fall (November) with seasonal fluctuations ranging from less than a foot at Salt Lake Formation Well 14 to the north of the Study Area and about 10 feet at Alluvial well GW-15 just south of the Project Area.

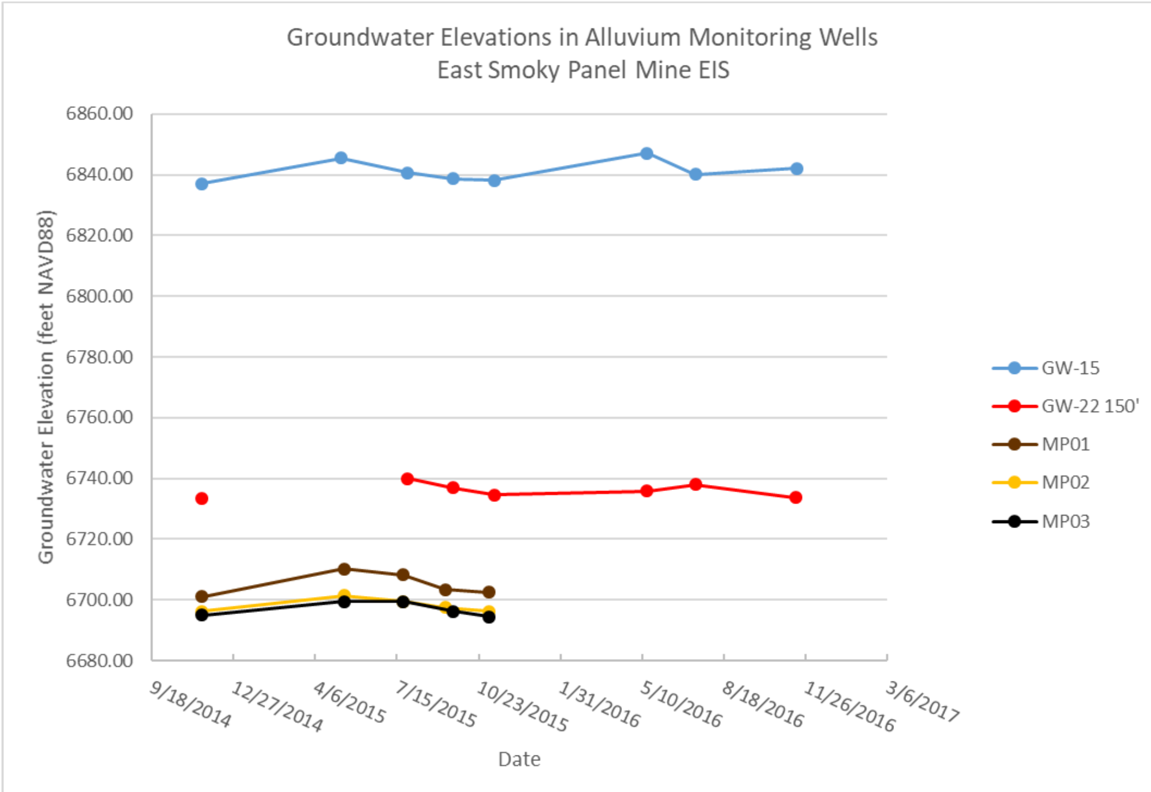


Figure 3.5-6 Groundwater Elevations in Alluvium Monitoring Wells

Groundwater in the Dinwoody system is typically found at depths approximately 33 to 105 feet bgs at the northern portion of the Study Area and from 140 to 276 feet bgs in the central and southern portion of the Study Area, based on data collected between November 2014 and July 2016. Mean groundwater elevations in the Dinwoody Formation range from 6,688 feet, AMSL at GW-CW-2 just north of the Project Area boundary to 6,878 feet AMSL at well ES-MW9 in the central portion of the Study Area (**Figure 3.5-3**). The Dinwoody system monitoring wells in and near the Project Area are located approximately along a cross-gradient north-south trending line and the difference in the groundwater elevations are minimal, inhibiting determination of groundwater flow direction. As shown on **Figures 3.5-7** and **3.5-8**, groundwater fluctuations in the Dinwoody system fluctuate seasonally, with seasonal highs occurring in the summer months (July-August) and seasonal lows occurring in the spring (March-April). For wells located in the north-central portion of the Project Area (ES-MW6) and to the north of the Project Area (ES-MW9), seasonal fluctuations appear to be more pronounced and likely indicate more direct connection to precipitation in these areas. Additionally, groundwater elevations at these wells are about 140 to 150 feet higher than those in the south-central portion of the Project Area (ES-MW4 and ES-MW5), with fluctuations ranging from about 3 feet at the southernmost wells to more than 14 feet at well ES-MW6.

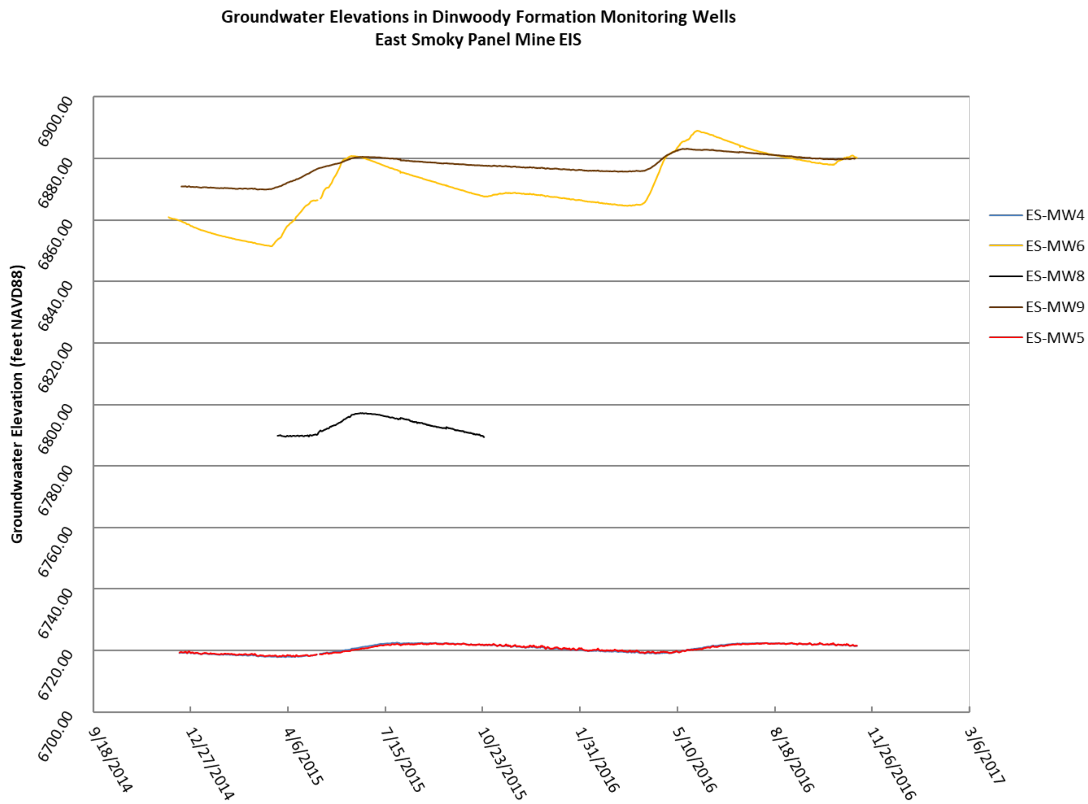


Figure 3.5-7 Groundwater Elevations in Dinwoody Formation Monitoring Wells

For the Wells Formation, groundwater is observed at depths ranging from about 151 to 576 feet bgs, with depths increasing to the north across and near the Project Area, based on data collected between November 2014 and July 2016. Mean groundwater elevations in the Wells Formation monitoring wells located within and near the Project Area range from about 6,639 to 6,640 feet, AMSL with little variability in groundwater elevations outside of the Project Area (**Figure 3.5-4**). Groundwater elevations in Wells Formation wells GW-16 and GW-24, located near Pole Canyon, have historically been slightly greater than in Wells Formation wells located immediately to the north and south of this area. Pole Canyon is a known Wells Formation recharge zone for surface water inflows, which accounts for the localized elevated water levels (HGG 2016a). Groundwater elevations are generally slightly less at well GW-29 located in the southern portion of the Project Area, than those in the north-central (ES-MW7) and south-central (GW-30) portions of the Project Area. Similar to the Dinwoody Formation wells, the Wells Formation wells are located approximately along a cross-gradient north-south trending line and the difference in the groundwater elevations are minimal, inhibiting determination of groundwater flow direction. As shown on **Figure 3.5-9**, similar to the Dinwoody Formation system, groundwater fluctuations in the Wells Formation wells fluctuate seasonally, with seasonal highs occurring in the summer months (July-August) and seasonal lows occurring in the spring (March-April). Seasonal fluctuations are about four feet across the Project Area.

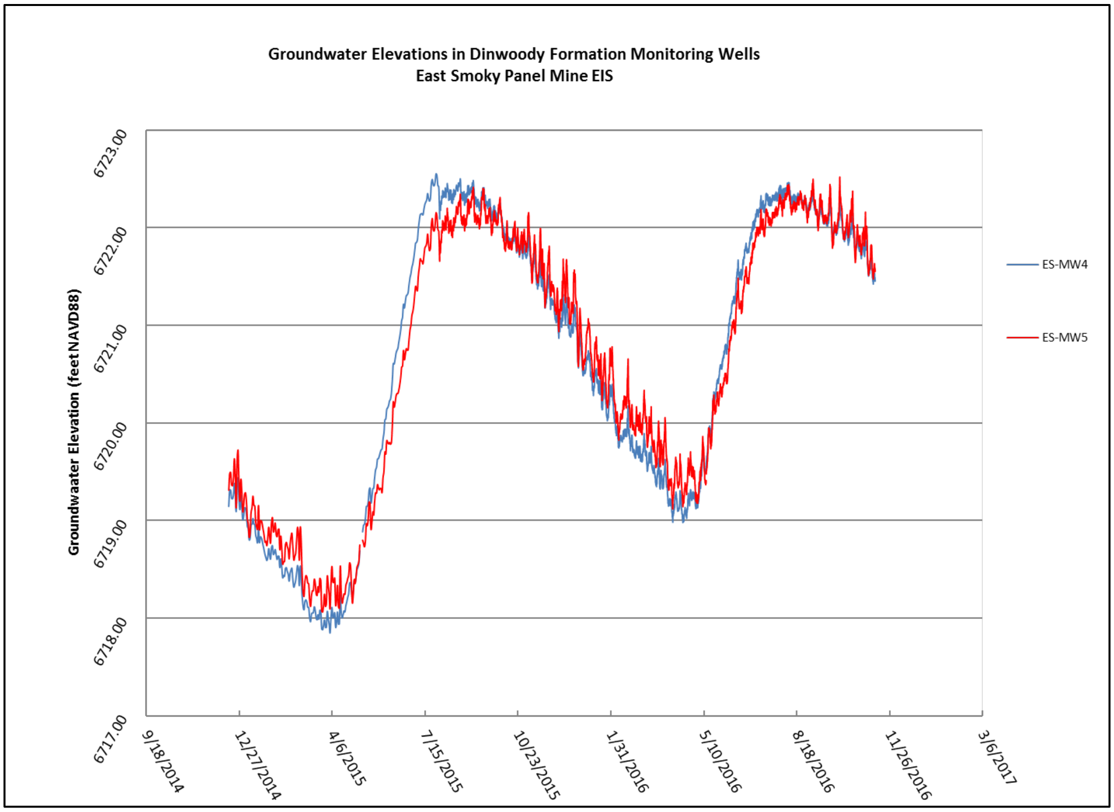


Figure 3.5-8 Groundwater Elevations in Dinwoody Formation Monitoring Wells – Zoom

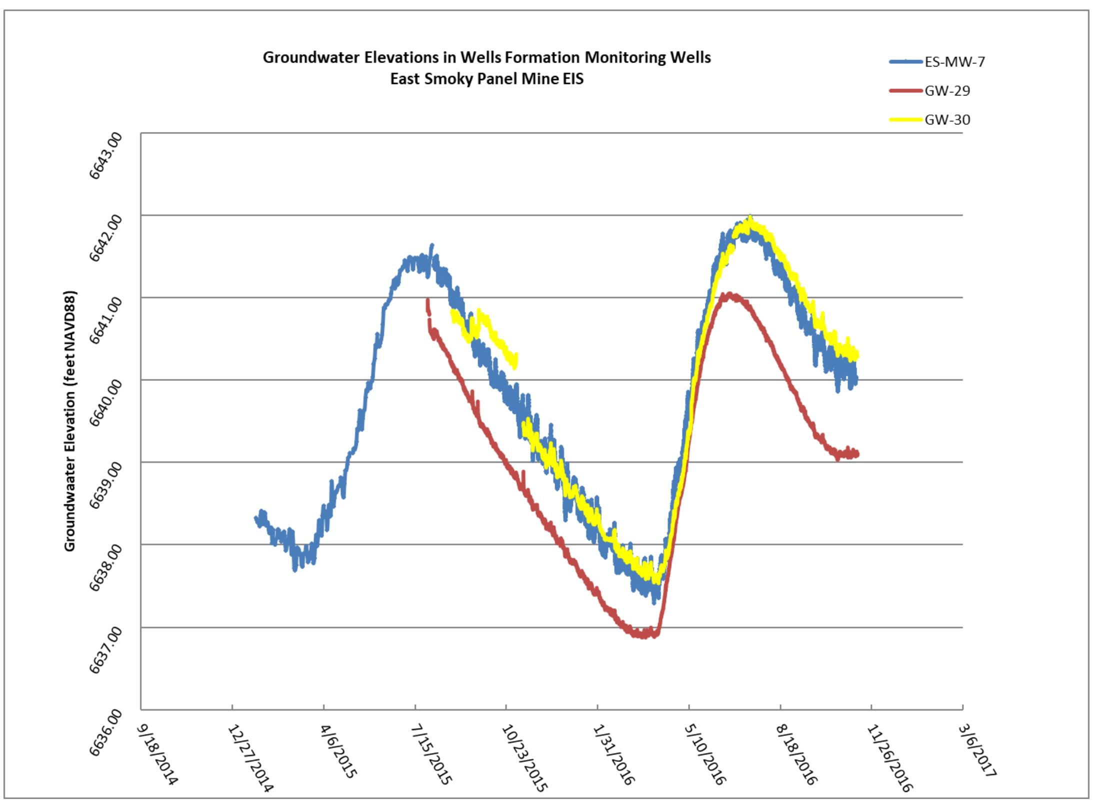


Figure 3.5-9 Groundwater Elevations in Wells Formation Monitoring Wells

3.5.1.2 Groundwater Quality

Groundwater quality samples have been collected from wells installed in each of the groundwater systems discussed above, as well as one well in the Rex Chert. Monitoring well locations and the corresponding aquifer systems are shown on **Figure 3.5-1**. Groundwater samples were collected during eight events between November 2014 and November 2016 at most wells. Groundwater analyses included:

- Metals (total and dissolved): Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium (dissolved only), Chromium, Cobalt, Copper, Iron, Lead, Magnesium (dissolved only), Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium (dissolved only), Thallium, Uranium, Vanadium, and Zinc
- Total alkalinity as calcium carbonate ($CaCO^3$)
- Bicarbonate as $CaCO^3$
- Carbonate as $CaCO^3$
- Chloride
- Hardness
- Hydroxide
- Nitrate+Nitrite
- Sulfate as SO_4
- TDS
- Total Organic Carbon (TOC)
- Total Suspended Solids (TSS)

Water quality parameters measured in the field during each event included: pH, conductivity, temperature, turbidity, and dissolved oxygen.

The collected data indicate that groundwater at many of the monitoring sites is typed as calcium-bicarbonate (Stantec 2016a). These compositions are consistent with dissolution of carbonate minerals containing variable amounts of gypsum (Mayo 2016). Exceptions to this include the following: calcium/magnesium bicarbonate (monitoring wells ES-MW5, ES-MW6, ES-MW7, GW-CO-2, and GW-CW-2 and temporary borehole ES-MW8), calcium chloride (monitoring Well 12), sodium chloride (monitoring Well 13 and monitoring Well 14), and calcium sulfate (monitoring wells GW-16 and GW-26). In addition, while groundwater collected from monitoring well GW-29 was calcium-bicarbonate type for four of the monitoring events, the spring 2015 groundwater sample was notably different with a magnesium-bicarbonate type among other differences. The high chloride content in Wells 12, 13, and 14 are likely related to the location of these wells near the toe of the tailings impoundment #2 (Mayo 2016). A single sample collected at the GW-27 observation point for groundwater modeling was also calcium-bicarbonate and had a TDS concentration of 352 milligrams per liter (mg/L). The difference in sampling frequency can be responsible for some of the differences in solute chemistry between GW-27 and the other wells. Additionally, GW-27 is located on the southern limit of the Project Area boundary for the EIS and is furthest away from the majority of the mining activities in the study.

Sulfate is another major ion that is found in varying concentrations in the groundwater data set. Sulfate concentrations ranged from 2.14 mg/L (at ES-MW5) to 1,230 mg/L (at GW-26). TDS ranged from 104 mg/L (at ES-MW5) to 23,600 mg/L (at Well 14), with most sites being less than approximately 350 mg/L. Wells immediately downgradient topographically of the TP2 dam (Well 12, Well 13, and Well 14) and a well completed in alluvium near the mouth of Pole Canyon (GW-26) had elevated TDS ranging from a low of 775 mg/L (GW-26) to the previously noted high of 23,600 mg/L (Well 14). Sulfate concentration at GW-27, as measured by a single sample collected during the baseline study at that location, was 26 mg/L.

Dissolved aluminum, antimony, arsenic, beryllium, cadmium, cobalt, lead, mercury, silver, and thallium were typically present at concentrations less than the laboratory's reporting limit in the groundwater samples. Other trace metals were more often present at concentrations greater than the laboratory's reporting limit in samples collected at some of the groundwater sites.

Total selenium concentrations in groundwater samples ranged from less than the method detection limit (MDL) up to 5.93 mg/L. The highest total selenium concentration of 5.93 mg/L was from a sample collected at GW-26, an Alluvium system well located slightly south of the Project Area boundary. Other samples from that monitoring well also had elevated selenium, with the average being 3.88 mg/L (range 1.16-5.93 mg/L). These results are an order of magnitude higher than total selenium results reported in any of the other groundwater samples collected during the baseline study. There appears to be a strong correlation between elevated sulfate concentrations and total selenium concentrations at GW-29 (a Wells Formation completion) and other Wells Formation and Alluvium monitoring wells in the vicinity of Pole Canyon (i.e. GW-15, GW-16, GW-22, GW-26, MP01, MP02, and MP03), and these elevated sulfate and selenium concentrations are likely associated with previous mining activities. Selenium concentration at GW-27, as measured by a single sample collected during the baseline study at that location, was 0.0104 mg/L.

Dissolved manganese concentrations in groundwater samples ranged from less than the MDL up to 2.24 mg/L. The latter result was from a sample collected at MP01, which is a shallow temporary piezometer. At GW-27, the single sample collected during the baseline study had a dissolved manganese concentration of 0.004 mg/L. At GW-IW, dissolved manganese concentration ranged from < 0.00091 to 0.0035 mg/L and averaged 0.002 mg/L for the eight samples. GW-27 and GW-IW are locations that serve as observation points for the groundwater fate and transport modeling.

Groundwater data were compared to primary and secondary groundwater standards at IDAPA 58.01.11 (**Table 3.5-1**). Selenium was the main constituent that exceeded the primary standard (0.05 mg/L) in groundwater samples. Groundwater samples collected from GW-15, GW-16, GW-22 (98'), and GW-26 had dissolved selenium concentrations greater than the 0.05 mg/L primary standard in every monitoring event. Several monitoring wells (GW-22 (150'), MP01, MP02, and MP03) had concentrations greater than the dissolved selenium standard in one or more of the monitoring events. Mean selenium concentrations for the four groundwater systems (Alluvium/Salt Lake Formation, Dinwoody Formation, and Wells Formation) are illustrated on **Figures 3.5-10**, **3.5-11**, and **3.5-12**, respectively. As shown, the locations where the mean groundwater concentrations exceed the primary standard are focused in Alluvium wells (GW-15, GW-22, GW-26, MP-02) and one Wells Formation well (GW-16) near and south of the Project Area.

Table 3.5-1 Groundwater Quality Standards for Idaho

SELECTED CONSTITUENT	UNIT	IDAHO GROUNDWATER STANDARDS	
		PRIMARY	SECONDARY
Major Ions and Solution Parameters			
pH	(standard units)	–	6.5–8.5
Chloride	(mg/L)	–	250
Fluoride	(mg/L)	4	–
Sulfate	(mg/L)	–	250
TDS	(mg/L)	–	500
Nutrients			
Nitrate as N	(mg/L)	10	–
Nitrite as N	(mg/L)	1	–
Nitrate/nitrite as N	(mg/L)	10	–
Trace Metals (Total)			
Aluminum	(mg/L)	–	0.2
Antimony	(mg/L)	0.006	–
Arsenic	(mg/L)	0.05	–
Barium	(mg/L)	2	–
Beryllium	(mg/L)	0.004	–
Cadmium	(mg/L)	0.005	–
Chromium	(mg/L)	0.1	–
Copper	(mg/L)	1.3	–
Iron	(mg/L)	–	0.3
Lead	(mg/L)	0.015	–
Manganese	(mg/L)	–	0.05
Mercury	(mg/L)	0.002	–
Selenium	(mg/L)	0.05	–
Silver	(mg/L)	–	0.1
Thallium	(mg/L)	0.002	–
Zinc	(mg/L)	–	5

Dash = No Standard
Source: IDAPA 58.01.11
Concentrations are total recoverable.

Dissolved antimony in the November 2016 sample collected at GS-LSW exceeded the 0.006 mg/L primary standard. The reported result was 0.016 mg/L, which was well above the other sample results (primarily less than the MDL of 0.00019 mg/L) at this location in previous events.

Secondary groundwater standards for aluminum (0.2 mg/L), iron (0.3 mg/L), manganese (0.05 mg/L), chloride (250 mg/L), sulfate (250 mg/L), and TDS (500 mg/L) were also exceeded in some groundwater samples. The dissolved aluminum standard was exceeded in one of the samples collected at Well 14. The dissolved iron standard was exceeded in all the groundwater samples collected from ES-MW3, and in one or more of the groundwater samples collected from ES-MW7, GW-29, GW-CO-2, Well 12, and Well 14. The dissolved secondary manganese standard was exceeded in all the groundwater samples collected from ES-MW3 (ranged from 0.181 to 0.593 mg/L), MP01 (ranged from 0.725 mg/L to 2.24 mg/L), MP02 (ranged from 0.414 to 1.86 mg/L), MP03 (ranged from 0.171 to 0.646 mg/L), Well 12 (ranged from 0.787 to 1.35 mg/L), Well 13 (ranged from 0.261 to 0.386 mg/L), Well 14 (ranged from 0.236 to 1.57 mg/L), and temporary borehole ES-MW8 (0.0812 to 0.144 mg/L). In addition, the dissolved secondary manganese standard was exceeded in one or more of the groundwater samples collected from ES-MW4 (mean 0.14 mg/L), ES-MW5 (mean 0.03 mg/L), ES-MW6 (mean 0.07 mg/L), ES-MW7 (mean 0.14 mg/L), GW-29 (mean 0.03 mg/L), and GW-CO-2 (mean 0.051 mg/L). The chloride standard was exceeded in all the groundwater samples collected from Wells 12, 13, and 14. The secondary sulfate standard was exceeded in all the groundwater samples collected from GW-26, and in three groundwater samples collected from Well 14. Lastly, TDS was greater than the 500 mg/L standard in all the groundwater samples collected from GW-16, GW-26, Well 12, Well 13, and Well 14. As stated above, all of the groundwater standards for which exceedances are described in this paragraph are secondary standards. Secondary groundwater standards are generally based on aesthetics, unlike primary groundwater standards, which are based on protection of human health.

While the above-described data represents baseline conditions at the noted groundwater monitoring locations throughout the Study Area, IDEQ has a separate process for determining baseline conditions relevant to compliance monitoring for the Project. The IDEQ has determined that GW-24 will be used for compliance monitoring with the Idaho groundwater rule as a Wells Formation Point of Compliance well, and wells ES-MW7, GW-27, GW-29, and GW-30 will be used as Wells Formation indicator wells (IDEQ 2020).

3.5.2 Surface Water

The Study Area for water resources is primarily in two drainage basins: Tygee Creek basin (Hydrologic Unit Code [HUC] #170401050204) to the north and Sage Creek basin (HUC #170401050103) to the south (**Figure 3.5-13**). Several area streams in these watersheds originate on and drain the eastern slope of the Webster Range passing through the ridge formed by the Boulder Creek Anticline and into Sage Valley to the east. Existing Simplot mine disturbances west of the Project Area have disrupted the up-gradient natural surface water patterns of some of these streams. Both Tygee Creek and Sage Creek are tributary to the Salt River via Stump Creek and Crow Creek, respectively. The reach of Crow Creek that is within the Study Area is in HUC #170401050102. The Salt River is part of the Columbia River system.

Spring, Webster Canyon, Salt Lick, and Draney creeks are tributaries to lower Tygee Creek and are located north of the existing mine disturbances (**Figure 3.5-13**). Smoky Creek is located to the south of Draney Creek. Smoky Creek flows northeast, joining with Tygee Creek approximately two miles downstream from the mouth of Smoky Canyon. Roberts Creek, located in the central portion of the Study Area, is located east of the existing Panels B and C and east of the Project Area. This creek is also tributary to Tygee Creek, although it is routed around the tailing ponds via the Roberts Creek Diversion (**Figure 3.5-13**) before reaching Tygee Creek. Both the Smoky and

Roberts Creek watersheds (with drainage areas of 6.6 and 2.5 square miles, respectively) have been disturbed by mining and/or would be disturbed by the Project. Water in Tygee Creek joins Stump Creek and eventually enters the Salt River Valley about 10 miles distant.

Other streams within the Study Area that cross the anticline to the south of Roberts Creek are: Pole Canyon Creek, Sage Creek, and South Fork Sage Creek. Pole, Sage, and South Fork Sage creeks all flow to Sage Valley. These tributary streams have been affected by past and/or existing mining activities. Sage Creek is the mainstem for these tributaries. It drains a 23.7 square mile watershed and flows south to Crow Creek. Crow Creek flows northeastward into the Salt River Valley.

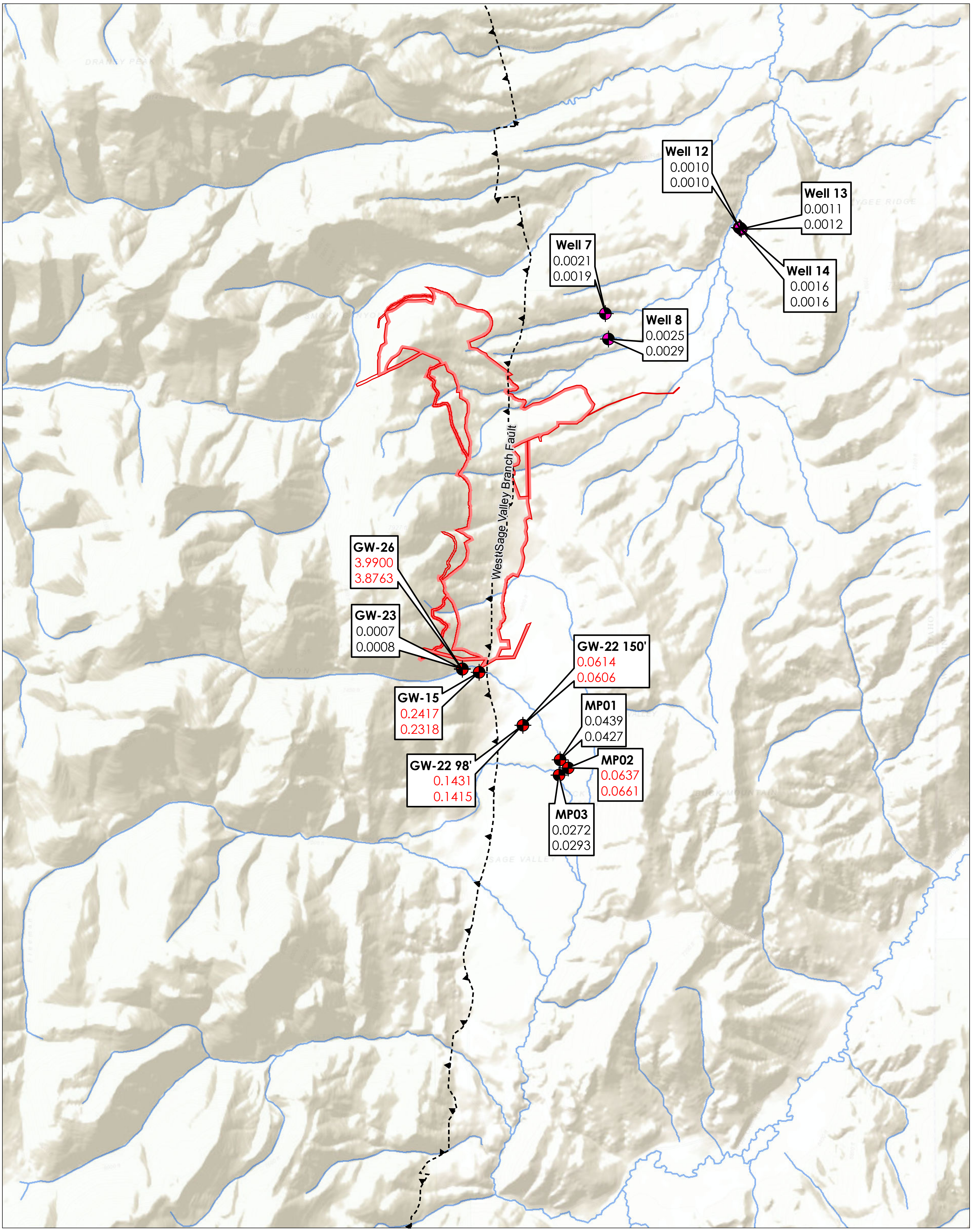
3.5.2.1 Watershed Conditions

The CTNF RFP EIS (USFS 2003b) notes that the EPA and USGS assessed the Salt River watershed (4th scale HUC) overall with the best possible rating of "1" on their 1 to 5 Index of Watershed Indicators (IWI). The rating indicates that the basin has "low vulnerability to additional stressors such as pollutant loadings" according to the IWI description. This does not mean that individual HUC 6 subwatersheds (e.g., the Study Area's Tygee Creek or Sage Creek basins) within the Salt River watershed would also have a "1" rating. Nor does it indicate that the Salt River watershed or its subwatersheds could accept any level or type of additional disturbance or stressor.

More recently, the USFS has expanded on the IWI by conducting a Watershed Condition Framework (WCF) analysis (USFS 2017a). The WCF inventoried 6th level HUCs including the two comprising the Study Area. The potential WCF classifications are: functioning properly, functioning at risk, or impaired; they are derived by individually rating 12 watershed condition indicators. Both the Sage Creek and Tygee Creek HUCs are classed as impaired (USFS 2017a). They are the only watersheds rated as impaired in the Salt River drainage. (Note that this WCF impairment classification is different from IDEQ's designation of a waterbody's impairment of beneficial uses, which is described in **Section 3.5.2.3**). In addition to the classification system, the WCF intends to identify priority watersheds and prepare Watershed Restoration Action Plans.

To date, neither the Sage Creek HUC nor the Tygee Creek HUC have had a priority identified or a Plan prepared, according to the WCF website (USFS 2017a).

The RFP (USFS 2003a) states that no more than 30 percent of the NFS lands component of a watershed or subwatershed should be in a hydrologically disturbed condition (defined in the RFP as "Changes in natural canopy cover (vegetation removal) or a change in surface soil characteristics, such as compaction, that may alter natural streamflow quantities and character") at any one time. **Table 3.5-2** provides the total acres and NFS land acres within the Tygee and Sage creeks 6^{th} level HUC watersheds, and the acreage and percentage currently disturbed within the NFS land component of the HUC. As shown, neither of these NFS-defined watersheds currently exceed the 30 percent hydrologic disturbance cutoff.



Legend

- Alluvial Monitoring Well Location
- Salt Lake Formation Monitoring Well Location
- West Sage Valley Branch Fault
- Project Area Boundary
- Streams

MP03	= Well Location ID
0.0272	= Dissolved Selenium, mg/L
0.0293	= Total Selenium, mg/L

Red values denotes concentration exceeding Idaho Administrative Procedures Act (IDAPA) 58.01.11 Primary Constituent Standard for Selenium (0.05 mg/L)

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, USGS, NOAA
3: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho
4. Figure originally created by HGG. Modified by Stantec for EIS formatting.

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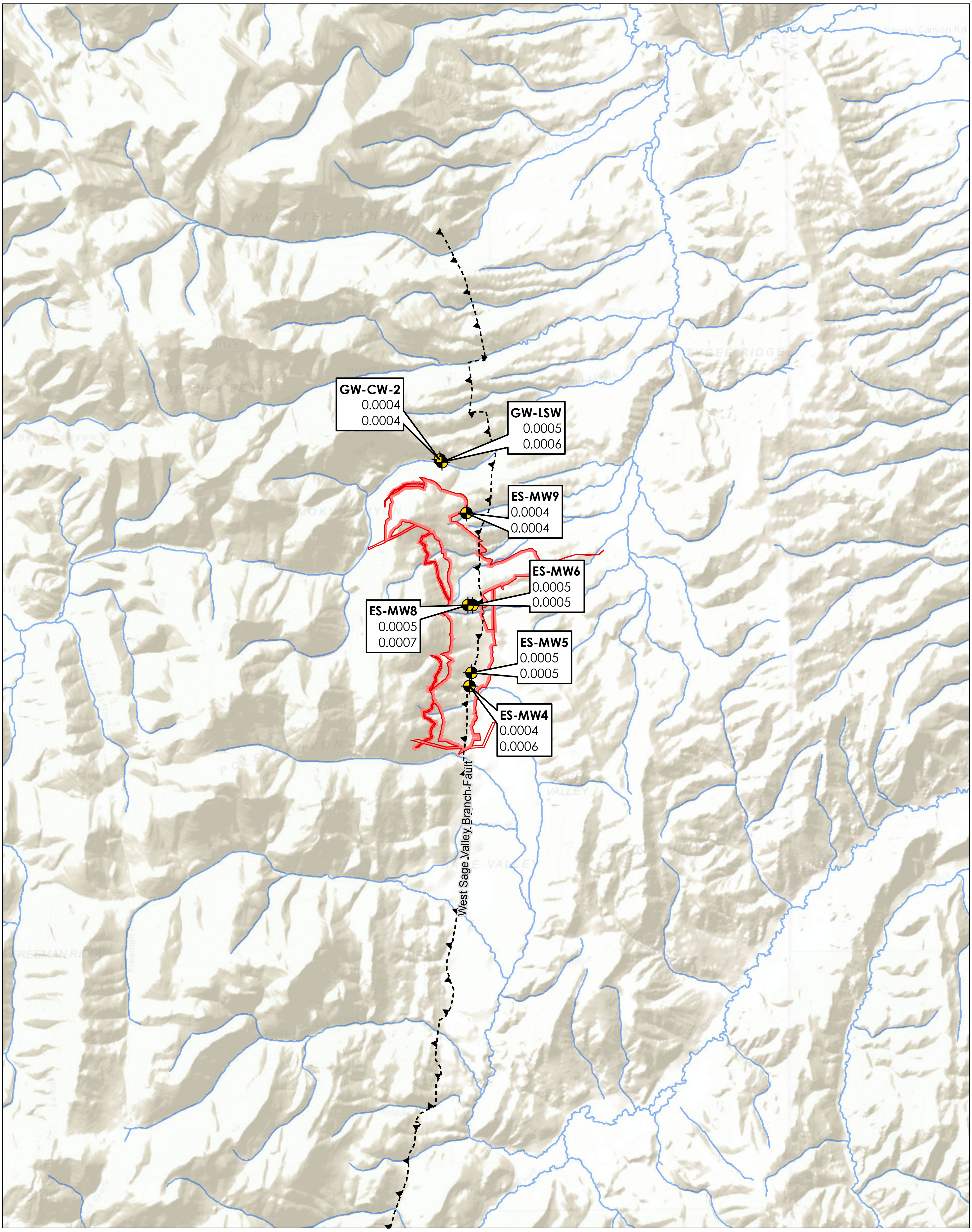
Figure 3.5-10
Mean Dissolved and Total Selenium Concentrations in Groundwater
Salt Lake Formation and Alluvium
East Smoky Panel Mine EIS



Legend

- Dinwoody Monitoring Well Location
- West Sage Valley Branch Fault
- Project Area Boundary

MP03	= **Well Location ID**
0.0272	= Dissolved Selenium, mg/L
0.0293	= Total Selenium, mg/L

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet

2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, USGS, NOAA

3. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

4. Figure originally created by HGG. Modified by Stantec for EIS formatting.

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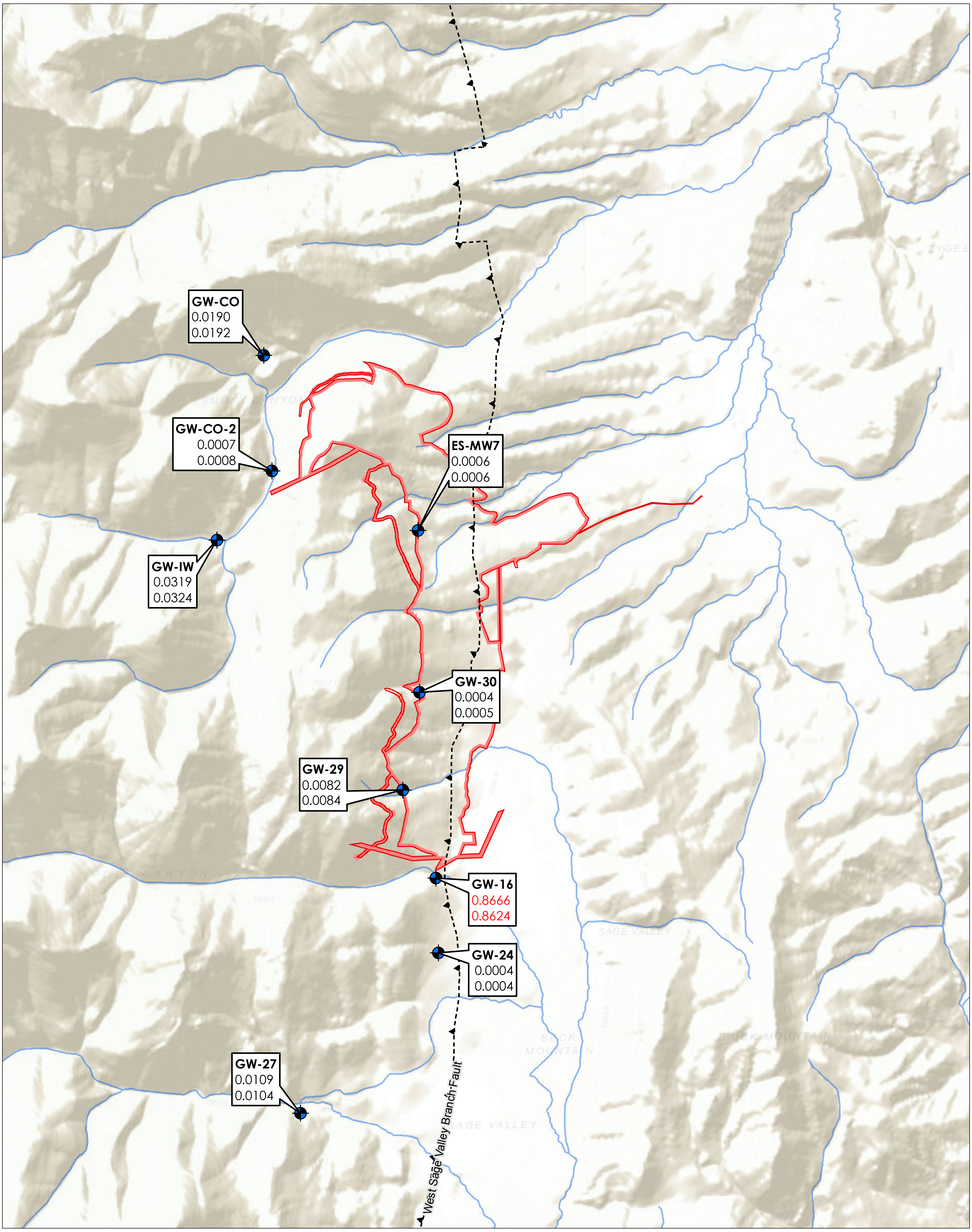
Figure 3.5-11
Mean Dissolved and Total Selenium Concentrations in Groundwater Dinwoody Formation East Smoky Panel Mine EIS



Legend

- Wells Formation Monitoring Well Location
- Thrust Fault
- Streams
- Project Area Boundary

MP03 = Well Location ID
0.0272 = Dissolved Selenium, mg/L
0.0293 = Total Selenium, mg/L

Red values denotes concentration exceeding Idaho Administrative Procedures Act (IDAPA) 58.01.11 Primary Constituent Standard for Selenium (0.05 mg/L)

Notes
1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, USGS, NOAA
3: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho
4: Figure originally created by HGG. Modified by Stantec for EIS formatting.

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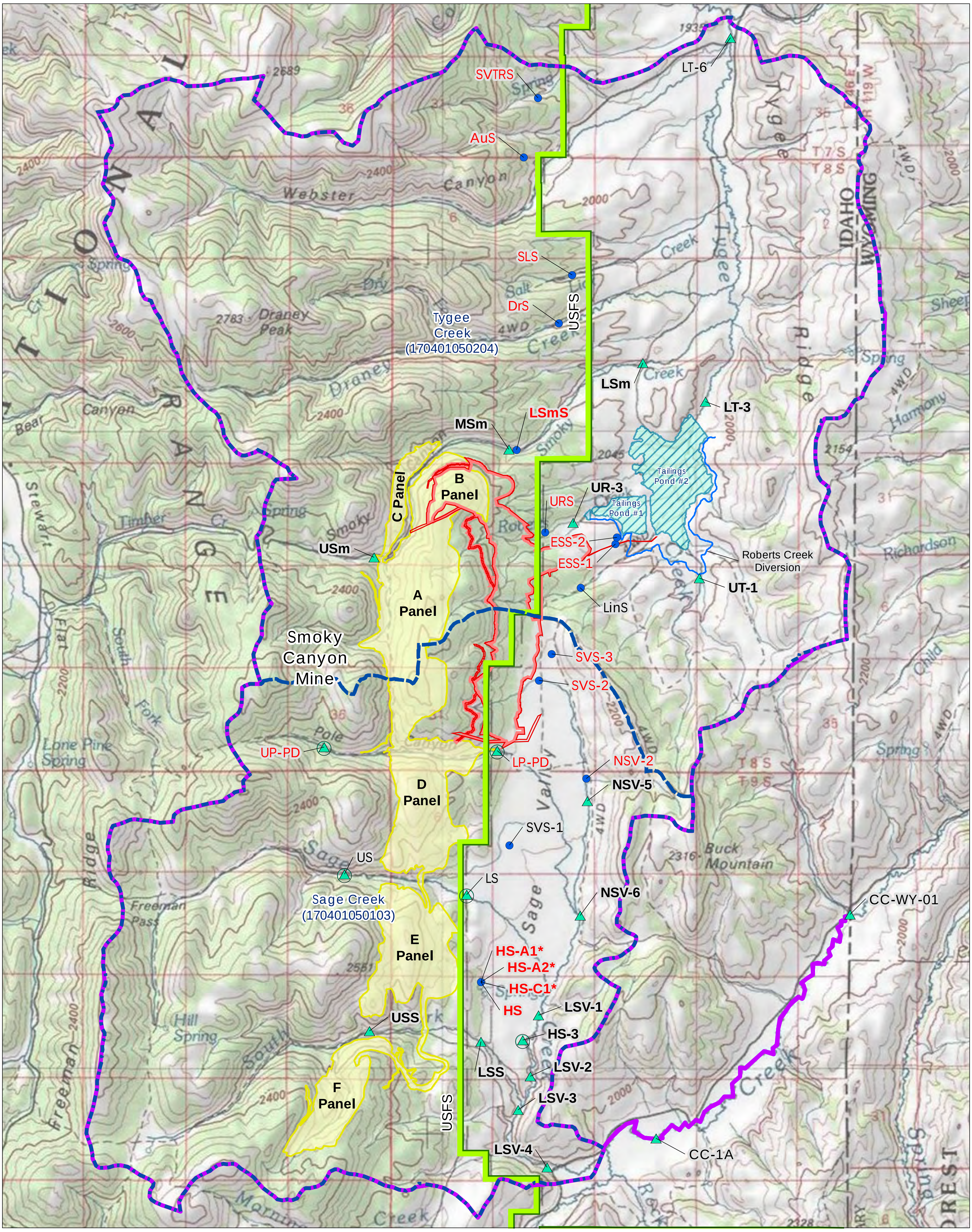
Figure 3.5-12
Mean Dissolved and Total Selenium Concentrations in Groundwater
Wells Formation
East Smoky Panel Mine EIS



Legend

- Project Area Boundary
- Existing Disturbance Area
- Existing Tailings Pond
- Water Resources Study Area
- Surface Ownership Boundary
- Hydrologic Unit Code (HUC) Boundary
- Spring Monitoring Site
- Stream Channel Monitoring Site
- Stream Channel Monitoring Site - Monitored under EIS SAP in Fall 2014 only
- ESS-1 Fall 2014 Isotope Sampling
- * Isotope Samples Only

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Copyright:© 2013 National Geographic Society, i-cubed
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 3.5-13
HUC 6 Watersheds and Surface Water Monitoring Sites
East Smoky Panel Mine EIS

Table 3.5-2 Hydrologically Disturbed Areas

WATER-SHED	HUC #	TOTAL AREA (ACRES)	HUC AREA ON NFS LANDS (ACRES)	CURRENT DISTURBED ACRES	PERCENT OF TOTAL HUC CURRENTLY DISTURBED	CURRENT DISTURBED ACRES ON NFS LANDS	PERCENT OF HUC CURRENTLY DISTURBED ON NFS LANDS
Tygee Creek	170401050204	24,284	13,012	3,276	13.5	1,117	8.6
Sage Creek	170401050103	15,149	10,617	2,122	14	2,043	19.2

3.5.2.2 Streamflows

Seven stream sites within the Tygee Creek watershed were monitored to establish the current baseline condition. Flow measurements at Upper Smoky Creek (USm) ranged from 0.27 cubic feet per second (cfs) to 1.6 cfs, but the creek became dry or had very low (unmeasurable) flows by the time it reached Middle Smoky Creek (MSm) about 1.5 miles downstream. Immediately downstream from MSm, however, the stream is fed by the spring known as Lower Smoky Spring (LSmS). Flows then increased towards the mouth of Lower Smoky Creek (LSm), as reflected by flow measurements. LSmS flows ranged from 0.10 cfs in November 2015 and November 2016 to 0.39 cfs in both May and July 2016. LSm flows ranged from 0.66 cfs in September 2015 to 2.1 cfs in May 2015.

Roberts Creek (at UR-3) flows ranged from 0.10 to 0.33 cfs.

Tygee Creek is measured at three locations. Furthest upstream (above the tailings pond), UT-1 could not be measured but an estimate of 0.2-0.3 cfs was reported in September 2015. Immediately downstream of the tailings pond at LT-3, flows ranged from 0.22 cfs in November 2014 to 1.84 cfs in May 2016. The mouth of Tygee Creek (LT-6) had measured flows ranging from 12.4 cfs in November 2015 to 21.6 cfs in May 2016. **Figure 3.5-14** shows the seasonal variation in LT-3 and LT-6 flows, which highlights the difference in flow rates between the two sites due to contributions from other tributaries in the lower watershed.

Numerous stream channel sites within the Sage Creek watershed were also monitored, including several in Sage Valley. NSV-5 is located upstream of the mouth of Pole Canyon Creek and NSV-6 is located downstream of it. NSV-5 had water (or was frozen solid in the case of the November 2014 event) during all monitoring events, but flow was such that it could only be measured in July 2015, when it was reported at 0.07 cfs. At NSV-6, flows were measured during most monitoring events, and ranged from 0.14 to 3.7 cfs. In November 2014, this site was frozen solid and in May 2015 flows were too diffuse to measure. In lower Sage Valley, there are four stream sites. LSV-1 is located downstream of the confluence with Sage Creek, but upstream of the confluence with the Hoopes Spring discharge channel. LSV-2 is located downstream of that confluence, but upstream of the South Sage Creek confluence. LSV-3 is located downstream of the confluence with South Sage Creek and LSV-4 is located at the mouth of Sage Creek. Flows at these four sites are shown in **Figure 3.5-15**, which depicts similar seasonal variation among the sites and increasing flows in a downstream direction between LSV-1 and LSV-3, but little difference between LSV-3 and LSV-4.

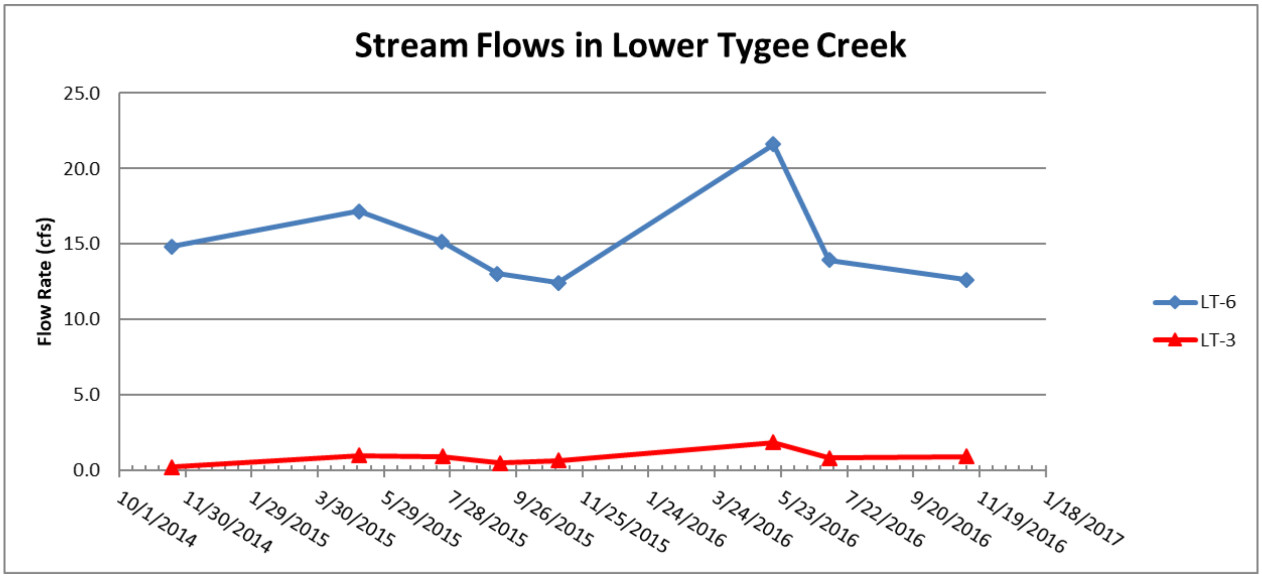


Figure 3.5-14 Stream Flows in Lower Tygee Creek

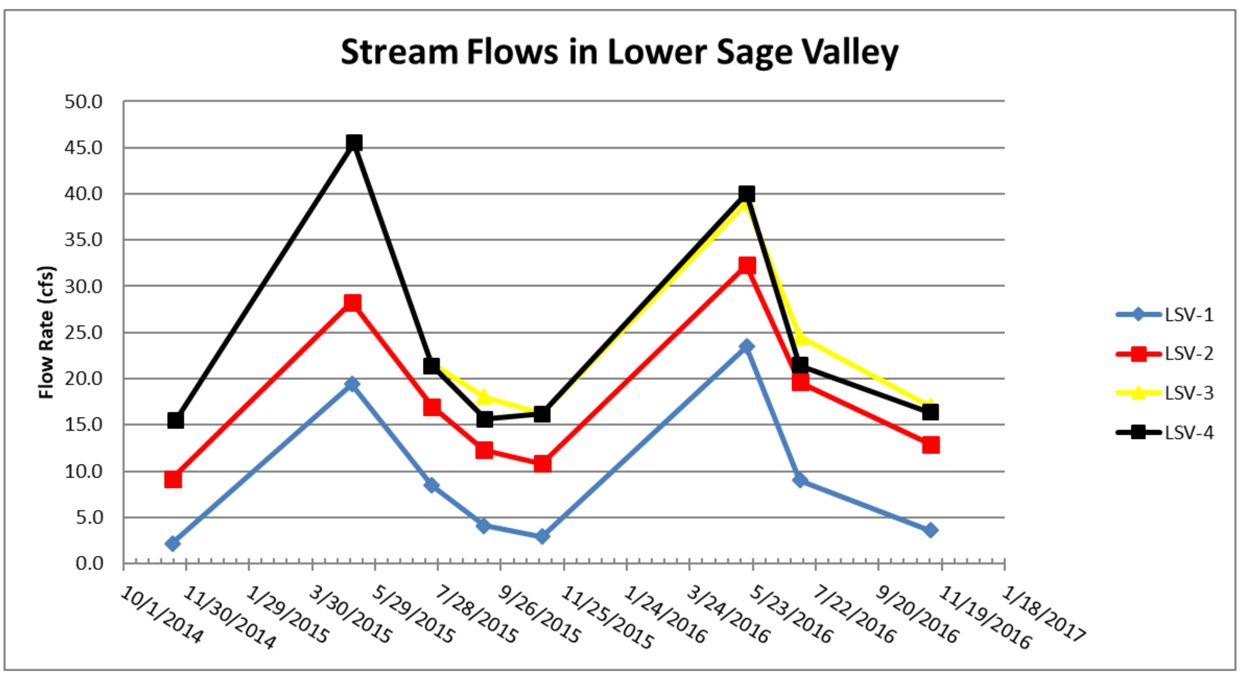


Figure 3.5-15 Stream Flows in Lower Sage Valley

The streams that are tributary to Sage Valley from the west (Pole Canyon, Sage, and South Sage creeks) were monitored in November 2014. Further, they have been monitored extensively under other Simplot programs. In each stream, two sites – one upstream of existing mining disturbances and one downstream – have been monitored. Additionally, HS-3 is a channel site that collects discharges from all of the Hoopes Spring complex sources; it was flowing at 8.0 cfs in November 2014 and 9.0 cfs in July 2015. In November 2014, flows were similar between the upstream Pole Canyon site (UP-PD measured at 0.10 cfs) and the downstream (LP-PD measured at 0.09 cfs) site. In Sage Creek in November 2014, the upstream site (US) was measured at 3.1 cfs and was flowing but not measured at the downstream site (LS) because it was frozen. South Sage Creek was also monitored in November 2014, as well as throughout the Study Area. The upstream site (USS) was dry in November 2014, but the downstream site (LSS) had a measured flow of 6.1 cfs. USS had flow (but measurements could not be made) in May and July and was dry in September and November. Flows at LSS ranged from 5.4 cfs in November 2015 to 9.0 cfs in May 2015.

Two of the baseline monitoring sites are located in Crow Creek. CC-1A is downstream of the confluence with Sage Creek and CC-WY-01 is a few miles further downstream at the Idaho-Wyoming border. As shown in **Figure 3.5-16**, the two Crow Creek sites have similar flow rates and variability; LSV-4 flows are shown for comparison.

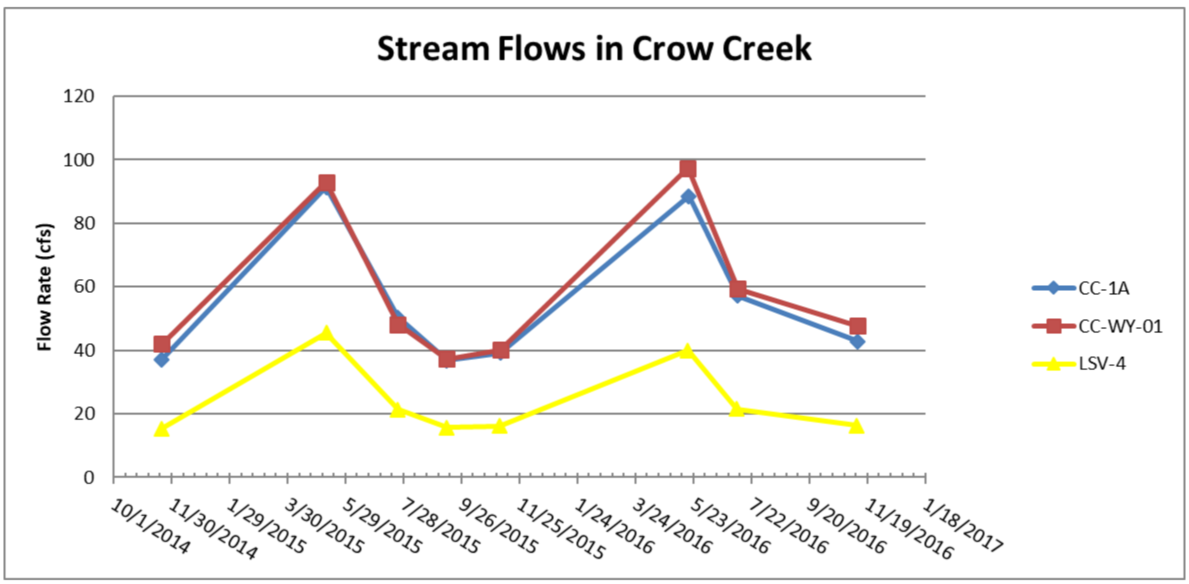


Figure 3.5-16 Stream Flows in Crow Creek

3.5.2.3 Surface Water Quality

The surface water samples are generally typed as calcium-bicarbonate, although a few are technically of a mixed type with calcium representing slightly less than 50 percent of the major cations. Sulfate is another major ion that is found in varying concentrations in the data set (**Figure 3.5-17**). Generally, as these box and whisker plots indicate, sulfate levels are fairly consistent at a given site, but vary more across the Study Area. Specifically, some sites such as alluvial springs (e.g., ESS-1, ESS-2) consistently had sulfate concentrations of 5 mg/L or less, while other sites (e.g., URS, UR-3) had sulfate concentrations an order of magnitude higher, ranging from about 50 to 80 mg/L. Upper Tygee Creek (UT-1) had sulfate concentrations around 7-8 mg/L, but at its mouth (LT-6), Tygee Creek sulfate concentrations ranged from 57 to 87 mg/L. These sulfate variations among sites likely reflect variations in geology. Additionally, elevated sulfate can also be associated with mining impacts, such as at Hoopes Spring (HS), where concentrations ranged from 56 to 67 mg/L.

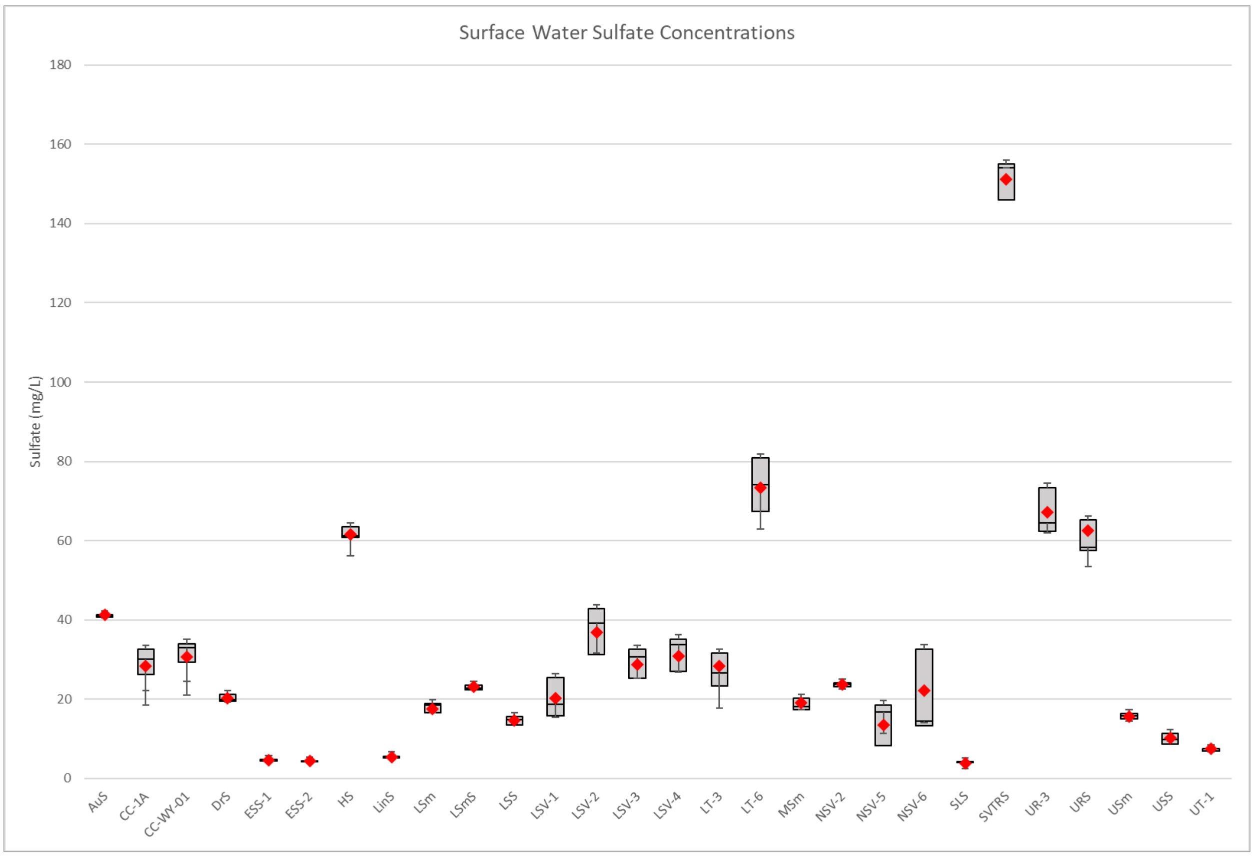


Figure 3.5-17 Sulfate Concentrations in Surface Waters

TDS ranged from 116 mg/L to 514 mg/L. **Table 3.5-3** shows TDS data for the sites that were sampled in all eight events, along with the average for each event. As shown, there is not a lot of seasonal variation in these results.

Table 3.5-3 Total Dissolved Solids (mg/L) – Surface Water

SITE	NOV-DEC 2014	MAY 2015	JULY 2015	SEPT 2015	NOV 2015	MAY 2016	JULY 2016	NOV 2016	AVERAGE FOR SITE
CC-1A	304	301	290	268	328	278	292	331	299
CC-WY-01	330	326	306	285	354	315	321	335	322
ESS-1	234	258	262	236	267	260	252	257	253
ESS-2	235	253	266	250	253	256	255	266	254
HS	284	298	312	298	304	303	304	305	301
LSmS	222	250	247	230	277	264	257	256	250
LSS	237	216	212	211	222	191	218	226	217
LSV-1	246	224	212	202	243	210	198	244	222
LSV-2	239	228	239	221	280	229	251	262	244
LSV-4	242	231	239	232	258	221	245	242	239
LT-3	450	312	316	181	349	297	297	356	320
LT-6	419	404	349	367	514	373	317	406	394
NSV-2	255	223	215	214	235	228	230	219	227
UR-3	376	349	365	310	341	332	351	357	348
URS	321	325	317	309	350	324	328	361	329
USm	243	223	220	221	217	211	191	244	221
Average for Event	290	276	273	252	300	268	269	292	

CC-1A: Crow Creek below Sage Creek; CC-WY-01: Crow Creek at Wyoming border

ESS-1: Seep 1 west of Tailings Pond; ESS-2: Seep 2 west of Tailings Pond

HS: Hoopes Springs

USm: Upper Smoky Creek; LSmS: Lower Smoky Spring

LSS: Lower South Fork Sage Creek

LSV-1: Lower Sage Creek above Hoopes Springs; LSV-2: Lower Sage Creek below Hoopes Springs; LSV-4: Lower Sage Creek above bridge for Main Crow Creek Road

LT-3: Tygee Creek below Tailings Pond; LT-6: Mouth of Tygee Creek

NSV-2: North Sage Valley Spring

UR-3: Upper Roberts Creek below springs; URS: Main Roberts Spring

Dissolved aluminum, antimony, arsenic, beryllium, boron, cadmium, chromium, cobalt, copper, lead, mercury, nickel, silver, thallium, and zinc were typically present at concentrations less than the laboratory's reporting limit in the surface water samples. Barium, iron, manganese, molybdenum, selenium, uranium, and vanadium were more often present at concentrations greater than the laboratory's reporting limit in samples collected at some or all the surface water sites. Generally, these concentrations were found to be well under the regulatory standards with which they were compared, with the exception of selenium, as discussed further, as follows.

IDEQ has developed water quality standards for Idaho streams based upon beneficial uses. Beneficial uses and water quality standards are codified in IDAPA 58.01.02. Beneficial uses of cold water aquatic life and primary or secondary contact recreation are applicable to the streams within the Study Area. Specifically, as undesignated waters, these streams come under IDAPA

58.01.02.101.01, which presumes that those uses are appropriate unless and until other information and rulemaking changes their designation.

Table 3.5-4 provides cold water aquatic life numeric criteria, which are the most stringent numeric criteria relevant to surface waters in the Project vicinity. Recently, the selenium water quality standard for protection of aquatic life has changed. The new criterion for selenium consists of both fish tissue and water column elements. The tissue component supersedes the water column component. Only the water column component is discussed in this subsection (see **Section 3.9.5.1** for discussion of the tissue component). Further, some stream reaches in the Study Area have approved site-specific selenium criteria (SSSC) that differ numerically from the general statewide selenium criterion. Regarding the water column component, the relevant EPA-approved SSSCs (EPA 2019) apply to the Crow Creek baseline monitoring sites, the Sage Creek monitoring sites, and monitoring sites on Sage Creek tributaries, excluding Pole and North Sage creeks as noted in **Table 3.5-4**.

Table 3.5-4 Selected Idaho Surface Water Quality Criteria

CHEMICAL	AQUATIC LIFE				HUMAN HEALTH FOR CONSUMPTION OF:	
	CMC (µG/L)		CCC (µG/L)		WATER & ORGANISMS (µG/L)	ORGANISMS ONLY (µG/L)
Antimony	---		---		5.2	190
Arsenic	340	a	150	a	10	10
Beryllium	---		---		---	---
Cadmium	1.3	b	0.6	b	---	---
Chromium III	570	b	74	b	---	---
Chromium VI	16	a	11	a	---	---
Copper	17	b	11	b	1,300	---
Lead	65	b	2.5	b	---	---
Mercury	---		---		---	---
Nickel	470	b	52	b	58	100
Selenium	---		c		29	250
Silver	3.4	b	---		---	---
Thallium	---		---		0.017	0.023
Zinc	120	b	120	B	870	1,500

Source: IDAPA 58.01.02. --- Numeric criteria not established.

a Function of water effect ratio; dissolved concentration.

b Function of hardness and water effect ratio. Listed value is example based on hardness of 100 mg/L; dissolved concentration.

c The selenium aquatic life criteria are those in effect as of the date of this FEIS, reflecting EPA actions in July 2019 to approve and disapprove Idaho's new and revised selenium aquatic life criterion (EPA 2019) and Idaho's subsequent rulemaking under Docket Number 58-0102-1901, consistent with the EPA action. Tissue concentration elements (**Section 3.9.5.1**) take precedence over water column elements. The statewide water column criterion for lotic conditions in Idaho streams either without an approved SSSC or that come under the SSSC for non-sturgeon waters (such as the Study area streams where another less stringent SSSC is not in effect) is 3.1 µg/L (0.0031 mg/L). Applicable approved SSSC water column concentrations in the Study Area are 4.2 µg/L (0.0042 mg/L) for Crow Creek and 16.7 µg/L (0.0167 mg/L) for Sage Creek. Water column criterion are based on total concentration. The potential exists that the selenium criterion for other streams such as Pole Canyon and North Fork Sage Creek could change with the development of site-specific selenium criteria following the procedure outlined in EPA (2019). Further, the State of Idaho is in the process of developing a guidance document for implementation of the selenium criterion.

For several metals (i.e. cadmium, chromium III, copper, lead, nickel, silver, and zinc), the aquatic life standards are based upon the water's hardness because their toxicity is reduced as hardness increases. Further, aquatic life standards (except selenium) are divided into an acute or Criterion Maximum Concentration (CMC) and a chronic or Criterion Continuous Concentration (CCC) standard. Selenium does not have a CMC.

Per the Clean Water Act, every two years IDEQ assesses the status of surface waters in regard to whether water quality is sufficient such that beneficial uses are met. EPA has approval authority over the assessment, which is contained within what is known as the 305(b) Integrated Report. In the Integrated Report, surface waters are classed among several categories based upon the current status of their water quality regarding ability to support designated beneficial uses. Category 5 waters make up the §303(d) list of impaired waters, which, by definition, do not meet applicable water quality standards for one or more beneficial uses by one or more pollutants and require an EPA-approved TMDL. Note that Category 4 waters also do not support one or more beneficial uses, but they do not require a TMDL because either: one has been completed and approved by EPA (4a); they are expected to meet water quality standards soon because pollution controls are in place (4b); or the impairment is caused by pollution rather than a pollutant (4c).

The Integrated Report used for this analysis is the 2014 version, which EPA approved in June 2017. This report (IDEQ 2017a) details whether stream segments fully support appropriate beneficial uses, and if not, whether a TMDL has been prepared. **Figure 3.5-18** shows impairment status and **Table 3.5-5** summarizes information from the Integrated Report for the streams within the Study Area. Note that all Study Area streams that are impaired for selenium are in Category 5 (i.e., on the 303(d) list), not Category 4. Therefore, they are in need of a TMDL. While by IDAPA 58.01.02.055.02, Idaho water quality standards allow IDEQ to forego TMDLs when other pollution control requirements would achieve full support of uses within a reasonable amount of time (such as CERCLA), there is no CERCLA remedy yet selected and IDEQ has not yet made an exception for the Study Area waters' selenium pollution. If or when that occurs, these impaired streams could be reclassified as Category 4b.

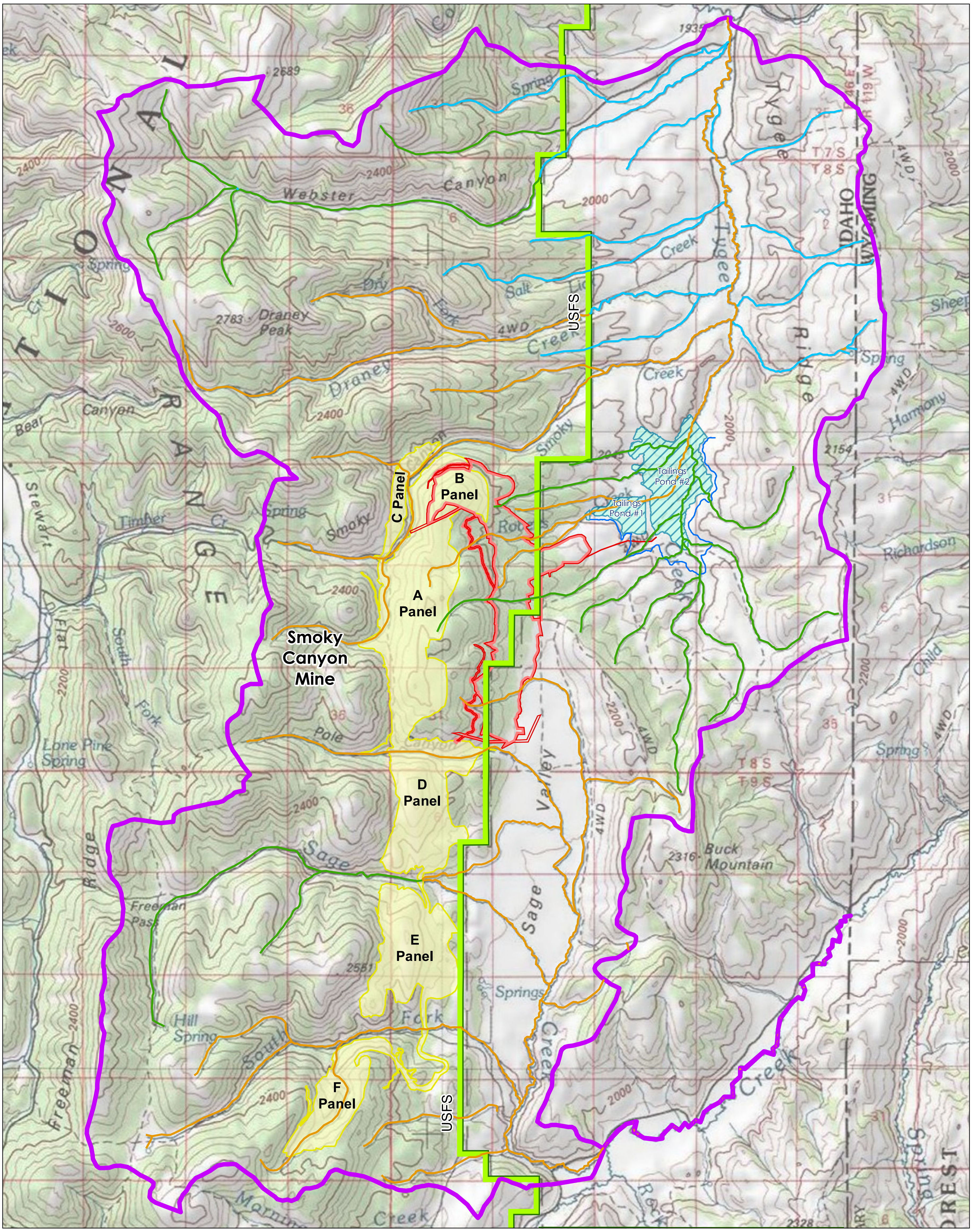
Relatedly, also in 2017 IDEQ finalized a subbasin assessment and TMDL for the Salt River Subbasin (HUC 17040105), in which the Study Area streams occur (IDEQ 2017b). TMDLs were developed for *Escherichia coli* (*E. coli*) and sediment/siltation, but not for selenium (due to CERCLA precedence). Further, a wasteload allocation (WLA) for TSS for Smoky Canyon Mine stormwater was developed between the draft and final versions of the TMDL and is reported in a supplement (IDEQ 2017c). A target of 44.5 mg/L TSS was used as the basis for the Smoky Canyon Mine WLA (IDEQ 2017b). The result of the WLA is an allowable load that varies by month, from 18.4 pounds per day in October to 824.9 pounds per day in May (IDEQ 2017c).

The subbasin assessment also made certain recommendations for changes to the next Integrated Report. Notably, Roberts Creek (ID17040105SK007_02g) was recommended to be delisted for combined biota/habitat bioassessments and instead be reported as "unassessed" (IDEQ 2017b).

Table 3.5-5 Study Area Streams and 2014 Integrated Report Assessment

ASSESSMENT UNIT	UNIT NAME	MILES	ONE OR MORE BENEFICIAL USES NOT SUPPORTED DUE TO THE LISTED PARAMETER (CATEGORY)
ID17040105SK008_04	Crow Creek - Deer Creek to border	10.43	Selenium (5), *E. coli* (5), sediment/siltation (5)
ID17040105SK009_02a	Upper Sage Creek	5.18	Full support for all assessed uses (2)
ID17040105SK009_02	North Fork Sage Creek	12.43	Selenium (5)
ID17040105SK009_02c	Sage Creek	1.81	Combined biota/habitat bioassessments (5)
ID17040105SK009_02d	Pole Canyon Creek	3.62	Selenium (5)
ID17040105SK009_03	Sage Creek - confluence with North Fork Sage Creek to mouth	3.22	Selenium (5)
ID17040105SK009_02e	South Fork Sage Creek	7.95	Selenium (5), combined biota/habitat bioassessments (5)
ID17040105SK007_02c	Smoky Creek	10.79	*E. coli* (5), physical substrate habitat alterations (4c), sediment/siltation (5)
ID17040105SK007_03	Tygee Creek, source to mouth (downstream of Roberts Creek)	5.98	Low flow alterations (4c), physical substrate habitat alterations (4c), and sediment/siltation (5)
ID17040105SK007_02d	Upper Tygee Creek, minus Roberts Creek (Tygee Creek)	18.64	Full support for all assessed uses (2)
ID17040105SK007_02g	Roberts Creek (including tributaries)	5.58	Combined biota/habitat bioassessments (5)
ID17040105SK007_02b	Draney Creek (downstream of USFS boundary) to mouth & N tributary	3.43	Not assessed (3)
ID17040105SK007_02f	Draney Creek (upstream of USFS boundary and N tributary)	6.86	*E. coli* (5), physical substrate habitat alterations (4c), sediment/siltation (5)
ID17040105SK007_02	Salt Lick (in Tygee Creek AU) source to mouth	16.13	Not assessed (3)
ID17040105SK007_02e	Upper Webster Creek (& includes trout resort tributary), both to USFS boundary	9.17	Full support for all assessed uses (2)
ID17040105SK007_02a	Webster Creek (downstream of USFS boundary to mouth	2.48	Not assessed (3)

Source: 2014 Integrated Report (IDEQ 2017a)
Categories:
Category 1 and 2: Fully Supporting
Category 3: Not Assessed
Category 4a, 4b, 4c, and 5: Not Supporting



Legend

- Project Area Boundary
- Existing Disturbance Area
- Existing Tailings Pond
- Water Resources Study Area
- Surface Ownership Boundary

ID §305B Streams (2014-FINAL)

- Fully Supporting (category 1, 2)
- Not Assessed (category 3)
- Not Supporting (category 4a, 4b, 4c, 5)

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 3.5-18
Beneficial Use Assessment Categories -
IDEQ 2014 Integrated Report
East Smoky Panel Mine EIS

Surface water monitoring results were compared to the most stringent of Idaho cold water aquatic life standards, Idaho standards for domestic water supplies, or EPA's primary or secondary drinking water Maximum Contaminant Level (MCLs). Throughout this section, data are compared to the currently applicable criteria (**Table 3.5-4**) even if those criteria were not in effect at the time a specific sample was collected. The latter two are not necessarily applicable to the sites monitored but are simply used to provide a point of comparison to the results. The surface water data set generally meet these water quality standards. Exceptions include the elevated total selenium concentrations at several sites that exceed the applicable water column element criteria of the aquatic life criterion (**Table 3.5-6**). In addition, EPA's secondary drinking water MCLs of 0.05 mg/L for aluminum, manganese, and selenium were exceeded in a few samples at various sites. EPA's secondary drinking water MCL of 500 mg/L for TDS was exceeded in one sample.

Table 3.5-6 Selenium Exceedances in Surface Water

Site ID	Site Name (Applicable Water Column Criteria)	Date	Total Selenium Concentration (mg/L)
CC-1A	Crow Creek Below Sage Creek (0.0042 mg/L)	11/20/2014	0.0226
		05/09/2015	0.011
		07/22/2015	0.016
		09/11/2015	0.021
		11/05/2015	0.02
		05/18/2016	0.012
		07/08/2016	0.016
		11/09/2016	0.02
CC-WY-01	Crow Creek at Wyoming Border (0.0042 mg/L)	11/20/2014	0.0215
		05/09/2015	0.01
		07/22/2015	0.015
		09/11/2015	0.02
		11/05/2015	0.018
		05/19/2016	0.0097
		07/08/2016	0.015
		11/09/2016	0.018
HS	Hoopes Spring (0.0167 mg/L)	11/17/2014	0.108
		05/07/2015	0.134
		07/22/2015	0.116
		09/10/2015	0.114
		11/04/2015	0.11
		05/17/2016	0.121
		07/07/2016	0.119
		11/08/2016	0.121
HS-3	Hoopes Spring Creek at mouth (0.0167 mg/L)	11/17/2014	0.0938

Site ID	Site Name (Applicable Water Column Criteria)	Date	Total Selenium Concentration (mg/L)
LSS	Lower South Fork Sage Creek (0.0167 mg/L)	11/17/2014	0.021
		07/22/2015	0.019
		09/10/2015	0.019
		11/04/2015	0.018
		07/07/2016	0.02
		11/08/2016	0.02
LSV-2	Lower Sage Creek below Hoopes Spring (0.0167 mg/L)	11/17/2014	0.0739
		05/07/2015	0.029
		07/22/2015	0.047
		09/10/2015	0.066
		11/04/2015	0.065
		05/17/2016	0.028
		07/07/2016	0.048
		11/08/2016	0.064
LSV-3	Lower Sage Creek below South Fork Sage Creek (0.0167 mg/L)	05/09/2015	0.024
		07/22/2015	0.038
		09/11/2015	0.051
		11/04/2015	0.044
		05/17/2016	0.026
		07/07/2016	0.039
		11/08/2016	0.046
LSV-4	Lower Sage Creek above Bridge for Main Crow Creek Road (0.0167 mg/L)	11/20/2014	0.0508
		05/09/2015	0.023
		07/22/2015	0.039
		09/11/2015	0.05
		11/04/2015	0.047
		05/17/2016	0.025
		07/07/2016	0.042
		11/08/2016	0.048
NSV-6	North Sage Valley at Pole Canyon (0.0031 mg/L)	5/8/2015	0.0045
		5/18/2018	0.0057

Based upon the total selenium concentrations, as shown in the table, Crow Creek remains affected by selenium releases from the Smoky Canyon Mine.

3.5.3 Springs and Groundwater/Surface Water Interactions

Based upon the current understanding and interpretation of geology and aquifer characteristics, springs within the Study Area are associated with the Thaynes, Wells, Dinwoody, and Salt Lake formations, and Quaternary Alluvium. Specifically, SVTRS and AuS are considered to be associated with the Thaynes Formation; HS is considered to be associated with the Wells

Formation; and LSmS is associated with the Dinwoody Formation. URS, ESS-1, ESS-2, and LinS are likely associated with either the Salt Lake Formation or with alluvium, and SVS-1, SVS-2, SVS-3, NSV-2, DrS, and SLS are likely associated with alluvium. Within the Study Area and surrounding region, surface water and groundwater are notably interrelated: springs and diffuse groundwater discharge provide flow to support perennial and intermittent streams; in turn, those streams also provide recharge to aquifers in other formations as they lose flow downstream.

Lower Smoky Creek is fed by the spring known as Lower Smoky Spring (LSmS), which issues immediately downstream from MSm. LSmS flows ranged from 0.10 cfs in November 2015 to 0.34 cfs in July 2015.

Within the Roberts Creek area, ESS-1 and ESS-2 appear to be perennial based upon the five monitored events, but flow could only be measured during the May 2015 sampling event, when it was 0.10 and 0.09 cfs, respectively. URS is the spring at the head of Roberts Creek. Its flows were never able to be measured.

The other four springs in the Tygee Creek basin that were monitored had much lower flows. NSV-2 is a small spring that appeared to have water year-round, but flow could only be measured during the November 2014 event, when it was reported at 0.07 cfs. The RI identified SVS-1, SVS-2, and SVS-3 as alluvial spring areas but no flow was found during that investigation. While SVS-1 was visited during each of the baseline study sampling events in 2014 and 2015, there was not only never any flow or sign of water, the site itself (or areas nearby) did not appear to have any characteristics of a spring or seep. SVS-2 and SVS-3 were dry during all sampling events except the May 2015 one, when flows could not be measured. Of these four springs, only NSV-2 appears to contribute directly to surface flow in Sage Valley.

Within the Sage Creek watershed, the Hoopes Spring complex is one of the most notable springs, as it is relatively large and has been contaminated by selenium from past mining. It is part of the previously mentioned CERCLA investigation. While it has numerous points of issuance, the baseline study monitored HS, which is one of the largest points of the complex's discharge. A flow rate could only be measured at HS during the November 2014 sampling event, when a rate of 2.1 cfs was reported; subsequent remediation work resulted in flows being piped.

As with stream channel sites, the monitored springs in the Study Area are generally typed as calcium-bicarbonate. Sulfate was found in varying concentrations in springs (**Figure 3.5-17**): generally consistent at a given site but varying across the area. Specifically, some sites such as alluvial springs (e.g., ESS-1 and ESS-2) consistently had sulfate concentrations of less than 5 mg/L, while other sites (e.g., URS) had sulfate concentrations an order of magnitude higher, ranging from about 40 to 80 mg/L. These sulfate variations among sites likely reflect variations in geology, as do TDS variations (**Table 3.5-3**). Additionally, elevated sulfate can also be associated with mining impacts, such as at Hoopes Spring, where concentrations ranged from 56 to 64 mg/L.

Trace metals concentrations in springs were similar to those reported for stream channel sites. As previously noted, Hoopes Spring contains elevated selenium concentrations due to past mining impacts. Over the five sampling events reported herein, total selenium ranged from 0.108 to 0.134 mg/L.

3.5.4 Streambed Sediments

Streambed sediments were sampled at six surface water monitoring sites in September 2015. The six sites were located on Smoky Creek (LSm), Roberts Creek (UR-3), North Sage Creek (NSV-6), Hoopes Spring channel (HS-3), and Lower Sage Creek (LSV-4 and LSV-1). **Table 3.5-7** provides the results, which all indicate selenium concentrations greater than the benchmark screening value of 2 milligrams per kilogram (mg/kg) that was used in the RI/FS. However, this screening value does not indicate a regulatory threshold.

Table 3.5-7 Streambed Sediment Data

SITE	SELENIUM CONCENTRATION, SEPTEMBER 2015 (MG/KG DRY)
LSm	4.7
UR-3	8.1
UR-3 (duplicate)	7.0
LSV-4	13.4
LSV-1	4.2
HS-3	42.6
NSV-6	10.3

3.5.5 Water Rights and Water Uses

As discussed in the Water Resources TR (Stantec 2016d), a total of 15 active water rights were identified within the Smoky Creek, Roberts Creek, and Pole Canyon watersheds (a portion of the Water Resources Baseline Study Area). Their water right number, diversion rate, beneficial use, and owner were reported in Stantec (2016d).

Three of the aforementioned 15 active water rights are associated with groundwater. All three of these groundwater rights are for industrial use, are owned by Simplot, and are associated with the Smoky Canyon Mine (Stantec 2016d). In addition, the Water Resources TR researched wells located within the Water Resources Baseline Study Area that were not found during water rights search. A total of 25 wells were found, 20 of which were installed by Simplot and five of which were installed by other entities. Nineteen of these wells are described as monitoring or test wells, four wells are described as domestic wells, one well is described as a domestic/stock well, and one well does not have a specific recorded use. All of the domestic or domestic/stock wells are located at least 3 miles to the northeast and upgradient of the Project Area. The Water Resources TR (Stantec 2016d) provides details on all 25 wells.

Twelve of these 15 active water rights are associated with surface water rights from springs or creeks. Beneficial uses of these 12 surface water rights include industrial use, stockwater, and irrigation (Stantec 2016d). Water right owners included Simplot (2), USFS (5), and private individuals (5). In closest proximity to the Project are Simplot's Roberts Creek (#24-20005A) and Pole Canyon (#24-4078) industrial rights; USFS's Smoky Creek stockwater rights (#24-10097, #24-10098); and a private entity's stockwatering right at LinS, (also known as the Linford Spring [#24-7183]).

3.6 SOILS

The Study Area for soils is the Project Area surrounded by a small buffer except on the northwest side where it is within the existing mine disturbance area and no buffer was assigned (**Figure 3.6-1**). The Study Area boundary was developed with the IDT experts and professional judgement. This area is appropriate because soil impacts would not have the potential to extend beyond it. The Study Area includes the east facing mountain slope at the north end of Sage Valley and the south end of the Tygee Creek valley, as well as portions of the adjacent valleys. It is in Major Land Resource Area 43B (Soil Survey Staff 2006). The Study Area was previously mapped by two broad Order 3 soil surveys. The *Soil Survey of the Caribou National Forest* (USDA 1990) covers the western or national forest portion of the Study Area. The *Soil Survey of the Star Valley Area, Wyoming-Idaho* (Ravenholt et al. 1976) covers the eastern private ownership portion of the Study Area. The soils baseline report (Stantec 2015b) reported on these surveys. In addition, a more detailed Order 2 soil survey was completed as part of the baseline study. That information is also provided in the baseline report (Stantec 2015b) and summarized as follows.

3.6.1 Regional Setting

The Project Area is located in the middle Rocky Mountain Physiographic Province of southeastern Idaho. Much of the province is made up of interior basins. Mountains rise steeply from the semiarid sagebrush-covered plains or agricultural valleys. The mountains are generally well covered with vegetation and the higher elevations support conifer forests on the north and east facing slopes (USDA 1990).

The annual water losses through evaporation exceed the annual water gains from precipitation (USDA 1990). Vegetation distribution is controlled mostly by altitude, latitude, direction of prevailing winds, and slope exposure.

Parent materials for the soils are derived from Wells and Phosphoria formations. The limestones of the Wells Formation are characterized by some outcrops and steep breaks in rugged side slopes. The Dinwoody Formation consists of siltstones and sandstones that have weathered into long smooth slopes. The Phosphoria Formation, which contains the phosphatic ore, underlies the upper concave slopes. The Rex Chert Member of the Phosphoria Formation is prominent as cobbles and gravels in the soil profile and as major outcroppings forming the ridge crest.

The soil temperature regime ranges from frigid in the sagebrush areas to cryic in the conifer and aspen stands. Recent soil temperature studies by the Natural Resources Conservation Service (NRCS) in Caribou County, Idaho have determined that mountain big sagebrush areas are frigid up to approximately 8,000 feet elevation where these areas become cryic and are typically dominated by alpine sagebrush (Stantec 2015b).

Conifer and aspen stands were determined to be cryic by the temperature studies (Stantec 2015b).

The Study Area contains two soil moisture regimes**.** Sagebrush areas have a xeric soil moisture regime that is typical of eastern Idaho and northern Utah. Conifer and aspen stands have an udic soil moisture regime. Elevation and aspect are determining features of these two moisture regimes.

Xeric areas have moist winters and springs with drier summers (WRCC 2015). Udic areas receive deep snowfall and brief intense mountain thunderstorms are common in the summer (Soil Survey Staff 2006). Late summer and early fall are the driest part of the year (Stantec 2015b).

3.6.2 Order 2 Survey Procedures

The soil survey was made in accordance with the guidelines for an Order 2 soil survey as detailed in the *Soil Survey Manual* (Soil Survey Staff 1993). Soil profiles were classified to the family level using *Keys to Soil Taxonomy, Twelfth Edition* (Soil Survey Staff 2014a) based on the field descriptions and laboratory analysis of representative soil profiles. Soil family names were selected from soil series established in Idaho, with naming priority based on Official Soil Series Descriptions (Soil Survey Staff 2015).

Thirty-five soil profiles and one miscellaneous landform (rock outcrop) were described using the *Field Guide for Describing and Sampling Soils* (Schoeneberger et al. 2012) and samples were collected from each soil horizon from each soil profile for laboratory analysis.

Soil profile descriptions were completed for each sample location. Soil colors were evaluated as described in the soils baseline report (Stantec 2015b). Soil *Pedon Description Forms* were completed for each soil pit using the methods detailed in the *Field Book for Describing and Sampling Soils*, version 3.0 (Schoeneberger et al. 2012; Stantec 2015b).

The geomorphic setting for each soil profile location was determined using the *Geomorphic Description System* (Soil Survey Staff 2008).

Soil sample locations were coded by the year that the sample was collected (2014). For example, soil sample location 14ES11 was the 11th soil description location collected in the East Smoky (ES) Study Area in 2014 (14).

3.6.3 Mapped Soil Unit Characteristics

Profile descriptions, laboratory analysis results, and complete soil map unit data for each sample site are presented in the soils baseline report (Stantec 2015b). **Table 3.6-1** provides a summary of the soil map units, identifying the classification, properties, and characteristics of the soils, and their total composition within the Study Area. Soils in the Study Area are classified to the soil family level (**Section 3.6.4**) in accordance with *Keys to Soil Taxonomy* (Soil Survey Staff 2014a).

Soils in the Study Area were delineated by eight soil map units and two miscellaneous landform units. The soil map units consist of three consociations and five complexes. Consociations are dominated by a single major soil family. Complexes in the Study Area consist of two or three major soil types that could not be separated at the scale of mapping used for the soil survey. Delineations of the soil map units are shown in **Figure 3.6-1**. The composition of each soil map unit in the Study Area is detailed in **Table 3.6-1**.

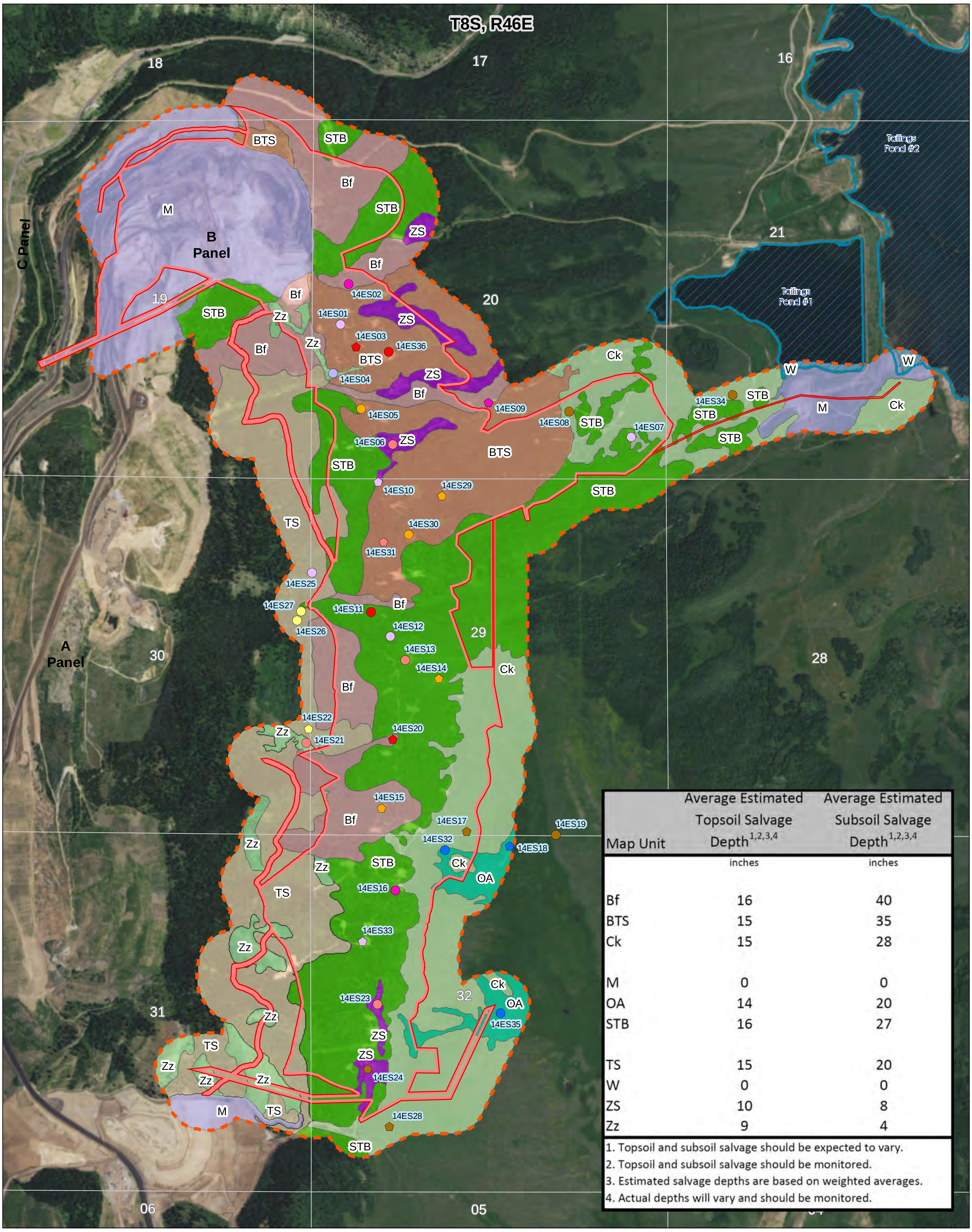
Table 3.6-1 Composition of Order 2 Soil Map Units in the East Smoky Panel Study Area

MAP SYMBOL	PERCENT	FAMILY	TAXONOMIC CLASSIFICATION[1,2]	VEG TYPE[3]	TYPIFYING PROFILE
Bf – Acres in Study Area = 187.1	Buffork family silt loam, 18 to 40 percent slopes				
	75	Buffork	Alfic Argicryolls fine-loamy, mixed, super	LP	14ES02
	10	Beaverdam	Vertic Argicryolls fine, smectitic	MCA	
	10	Swede	Typic Argicryolls fine-loamy, mix, super	LP	
	5	Tahquats	Typic Argicryolls loamy-skeletal, mix, super	MCA	
BTS – Acres in Study Area = 203.6	Beaverdam - Tahquats - Swede families complex, 2 to 18 percent slopes				
	55	Beaverdam	Vertic Argicryolls fine, smectitic	MCA	14ES05
	20	Tahquats	Typic Argicryolls loamy-skeletal, mixed, super	MCA	14ES36
	15	Swede	Typic Argicryolls fine-loamy, mixed, super	MCA	14ES01
	5	Skelter	Ultic Argixerolls fine-loamy, mix, super, frigid	Sage	
	5	Zimmer	Lithic Ultic Haploxerolls loamy, mix, super, frig	Shrub	
Ck – Acres in Study Area = 278.6	Skelter family silty loam, 3 to 12 percent slopes				
	75	Skelter	Ultic Argixerolls fine-loamy, mixed, super, frig	Sage	14ES34
	10	Skelter*	Pachic Ultic Argixeroll fi-loamy, mix, super, frig	Sage	14ES17
	10	Swede	Typic Argicryolls fine-loamy, mixed, super	Aspen	
	5	ZZZ	Oxyaquic Argixeroll fi-loamy, mix, super, frig	WM	
M – Acres in Study Area = 250.4	Mine Disturbances				
OA – Acres in Study Area = 32.6	ZZZ family silt loam, 1 to 3 percent slopes				
	90	ZZZ	Oxyaquic Argixerolls fi-loamy, mix, super, frig	WM	14ES35
	10	Skelter	Ultic Argixerolls fine-loamy, mixed, super, frig	Sage	
STB – Acres in	Swede – Tahquats - Buffork families complex, 4 to 25 percent slopes				
	50	Swede	Typic Argicryolls fine-loamy, mixed, super	LP	14ES12
	20	Tahquats	Typic Argicryolls loamy-skeletal, mixed, super	MCA	14ES11

MAP SYMBOL	PERCENT	FAMILY	TAXONOMIC CLASSIFICATION[1,2]	VEG TYPE[3]	TYPIFYING PROFILE
Study Area = 434.9	15	Buffork	Alfic Argicryolls fine-loamy, mixed, superactive	MCA	14ES16
	10	Zimmer	Lithic Ultic Haploxerolls loamy, mix, super, frig	Shrub	14ES13
	5	Swede*	Eutric Haplocryalfs fine-loamy, mixed, super	LP	14ES33
TS – Acres in Study Area = 244.2	Targhee - Swede families complex, 15 to 60 percent slopes				
	45	Targhee	Typic Haplocryepts loamy-skel, mixed, super	Aspen	14ES26
	30	Swede	Typic Argicryolls fine-loamy, mixed, super	MCA	14ES25
	10	Tahquats	Typic Argicryolls loamy-skeletal, mixed, super	MCA	
	10	Skelter	Ultic Argixerolls fine-loamy, mixed, super, frig	Sage	
	5	Rock Outcrop			
ZS – Acres in Study Area = 39.3	Zimmer loam family, 8 to 35 percent slopes				
	75	Zimmer	Lithic Ultic Haploxerolls loamy, mix, super, frig	Shrub	14ES23
	10	Skelter	Ultic Argixerolls fine-loamy, mixed, super, frig	Sage	14ES24
	10	Swede	Typic Argicryolls fine-loamy, mixed, super	MCA	
	5	Tahquats	Typic Argicryolls loamy-skeletal, mixed, super	MCA	
Zz – Acres in Study Area = 50.3	Zimmer family gravelly loam, 35 to 60 percent slopes				
	80	Zimmer	Lithic Ultic Haploxerolls loamy, mix, super, frig	Shrub	14ES21
	5	Skelter	Ultic Argixerolls fine-loamy, mixed, super, frig	Sage	
	5	Targhee	Typic Haplocryepts loamy-skel, mixed, super	MCA	
	5	Swede	Typic Argicryolls fine-loamy, mixed, super	MCA	
	5	Rock Outcrop			14ES04
W - Acres in Study Area = 5.3	Water Bodies				

1. Taxonomic classification based on Keys to Soil Taxonomy, Twelfth Edition (Soil Survey Staff 2014a).
2. Taxonomic abbreviations: fi-loamy = fine-loamy; frig = frigid; mix = mixed; skel = skeletal; super = superactive.
3. Vegetation Types: Aspen = quaking aspen; LP=lodgepole pine; MCA = mixed conifer and aspen; Shrub=mountain shrub; Sage=mountain big sagebrush; and WM=wet meadow.

* Similar soil.



Map Unit	Average Estimated Topsoil Salvage Depth[1,2,3,4]	Average Estimated Subsoil Salvage Depth[1,2,3,4]
	inches	inches
Bf	16	40
BTS	15	35
Ck	15	28
M	0	0
OA	14	20
STB	16	27
TS	15	20
W	0	0
ZS	10	8
Zz	9	4

1. Topsoil and subsoil salvage should be expected to vary.
2. Topsoil and subsoil salvage should be monitored.
3. Estimated salvage depths are based on weighted averages.
4. Actual depths will vary and should be monitored.

Legend

Project Area Boundary
Tailings Ponds
Extended Soil Survey Area

Soil Family

- Beaverdam
- Beaverdam similar
- Buffork
- Buffork similar
- Rock Outcrop
- Skelter
- Skelter similar
- Swede
- Swede similar
- Tahquats
- Tahquats similar
- Targhee
- Targhee similar
- Zimmer
- Zimmer similar
- ZZZ
- ZZZ similar

Soil Map Units

Bf	Buffork silt loam, 18-40%
BTS	Beaverdam-Tahquats-Swede complex, 2-18%
Ck	Skelter silty loam, 3-12%
M	Mine areas
OA	ZZZ family loam, 1-3%
STB	Swede-Tahquats-Buffork complex, 4-25%
TS	Targhee-Swede complex, 15-60%
W	Water
ZS	Zimmer loam, 8-35%
Zz	Zimmer gravelly loam, 35-60%

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

0 0.25 0.5
Miles
1:18,000 (at original document size of 11x17)
N

Figure 3.6-1
Order 2 Soil Survey Map Units and Soil Profile Locations
East Smoky Panel Mine EIS

The following map unit descriptions for the Order 2 survey are based on field observations, traverses across the landscapes, soil profile descriptions, laboratory analysis of soil samples, and local geology (Conner 1980 and Stantec 2016a).

3.6.3.1 Bf Buffork family silt loam, 18 to 40 percent slopes

The Bf map unit is located on moderately steep to steep mountain sideslopes. Map unit Bf is the transition between the lower conifer and aspen slopes (map units BTS and STB) and the steeper upper elevation conifer and aspen slopes (map unit TS). These soils formed in slope wash, colluvium, and residuum from sandstone, limestone, shale, and chert. This map unit consists of 75 percent Buffork family soils. Also included in this map unit are 10 percent Beaverdam family soils, 10 percent Swede family soils, 5 percent Tahquats family soils, and other similar soils.

Buffork family soils are medium textured, have a dark surface (mollic epipedon), have albic materials (albic or glossic horizon), and have an accumulation of illuvial clay (argillic horizon). These soils are cryic. Soil profile 14ES02 is representative of Buffork family soils in map unit Bf. Vegetation on Buffork family soils in map unit Bf includes lodgepole pine, Douglas fir, aspen, mountain snowberry, fescue, and needlegrass.

This map unit is of moderate extent and comprises approximately 10 percent (187.1 acres) of the Study Area.

3.6.3.2 BTS Beaverdam - Tahquats - Swede families complex, 2 to 18 percent slopes

The BTS map unit is located on gently sloping to moderately steep mountain sideslopes. Map unit BTS is the mid elevation conifer and aspen slopes in the northern portion of the Study Area. These soils formed in slope wash and colluvium from sandstone, limestone, and chert. This map unit consists of 55 percent Beaverdam family soils, 20 percent Tahquats family soils, and 15 percent Swede family soils. Also included in this map unit are 5 percent Skelter family soils, 5 percent Zimmer family soils, and other similar soils.

Beaverdam family soils are fine textured, have a dark surface (mollic epipedon), and have an accumulation of illuvial clay (argillic horizon). These soils are cryic. Soil profile 14ES05 is representative of Beaverdam family soils in map unit BTS. Vegetation on Beaverdam family soils in map unit BTS includes Douglas fir, lodgepole pine, aspen, and snowberry.

Tahquats family soils are medium textured, have a dark surface (mollic epipedon), have an accumulation of illuvial clay (argillic horizon), and have greater than 35 percent rock fragments in the control section. These soils are cryic. Soil profile 14ES36 is representative of Tahquats family soils in map unit BTS. Vegetation on Tahquats family soils in map unit BTS includes Douglas fir and aspen.

Swede family soils are medium textured, have a dark surface (mollic epipedon), and have an accumulation of illuvial clay (argillic horizon). These soils are cryic. Soil profile 14ES01 is representative of Swede family soils in map unit BTS. Vegetation on Swede family soils in map unit BTS includes lodgepole pine, aspen, snowberry, Oregon grape, needlegrass, and wild strawberry.

This map unit is of moderate extent and comprises approximately 12 percent (203.6 acres) of the Study Area.

3.6.3.3 Ck Skelter family silty loam, 3 to 12 percent slopes

The Ck map unit is located on gently to strongly sloping hillslopes and mountain footslopes. These soils formed in mixed alluvium from chert, sandstone, and shale. Map unit Ck is the warmer transition zone between the moist valley floor (map unit OA) and the conifer and aspen covered upper slopes. This map unit consists of 75 percent Skelter family soils. Also included in this map unit are 10 percent pachic (thick mollic surface) soils similar to Skelter family soils, 10 percent Swede family soils, and 5 percent ZZZ family soils, and other similar soils.

Skelter family soils are medium textured, have a dark surface (mollic epipedon) and have an accumulation of illuvial clay (argillic horizon). These soils are frigid. Soil profile 14ES34 is representative of Skelter family soils in map unit Ck. Vegetation on Skelter family soils in map unit Ck includes mountain big sagebrush, snowberry, Columbia needlegrass, bluegrass, Basin wildrye, wild strawberry, and sticky geranium.

This map unit is the second most extensive and comprises approximately 18 percent (278.6 acres) of the Study Area.

3.6.3.4 OA ZZZ family silt loam complex, 1 to 3 percent slopes

The OA map unit is located on the nearly level valley floor in Sage Valley. These soils formed in mixed alluvium from sandstone, shale, chert, and limestone. This map unit consists of 90 percent ZZZ family soils. Also included in this map unit are 10 percent Skelter family soils, and other similar soils. Small potholes fed by either groundwater or surface runoff are also present in this map unit, but comprise less than 5 percent.

ZZZ family soils are medium textured, have a dark surface (mollic epipedon), have an accumulation of illuvial clay (argillic horizon), and a seasonal water table within 40 inches (100 centimeters [cm]) of the soil surface. These soils are frigid. Soil profile 14ES35 is representative of ZZZ family soils in map unit OA. Vegetation on ZZZ family soils in map unit OA includes timothy, silver sage, lupine, Columbia needlegrass, bluegrass, and elk thistle.

This map unit is of limited extent and comprises approximately 2 percent (32.6 acres) of the Study Area.

3.6.3.5 STB Swede – Tahquats - Buffork families complex, 4 to 25 percent slopes

The STB map unit is located on strongly sloping to moderately steep mountain sideslopes and hillslopes. Map unit STB is the transition between the lower elevation sagebrush soils (map unit C) and the steeper upper elevation soils (map units Bf, TS, and ZS). These soils formed in slope alluvium, colluvium, and residuum from sandstone, shale, and chert. This map unit consists of 50 percent Swede family soils, 20 percent Tahquats family soils, and 15 percent Buffork family soils. Also included in this map unit are 10 percent Zimmer family soils, 5 percent soils similar to Swede family (lacking a mollic epipedon) and other similar soils.

Swede family soils are medium textured, have a dark surface (mollic epipedon), and have an accumulation of illuvial clay (argillic horizon). These soils are cryic. Soil profile 14ES12 is representative of Swede family soils in map unit STB. Vegetation on Swede family soils in map unit STB includes lodgepole pine, aspen, Columbia needlegrass, bluegrass, brome grass, snowberry, sticky geranium, and arnica.

Tahquats family soils are medium textured, have a dark surface (mollic epipedon), have an accumulation of illuvial clay (argillic horizon), and have greater than 35 percent rock fragments in the control section. These soils are cryic. Soil profile 14ES11 is representative of Tahquats family soils in map unit STB. Vegetation on Tahquats family soils in map unit STB includes subalpine fir, lodgepole pine, quaking, snowberry, pinegrass, bluegrass, sticky geranium, and wild strawberry.

Buffork family soils are medium textured, have a dark surface (mollic epipedon), have albic materials (albic or glassic horizon), and have an accumulation of illuvial clay (argillic horizon). These soils are cryic. Soil profile 14ES16 is representative of Buffork family soils in map unit STB. Native vegetation on Buffork family soils in map unit STB consists of lodgepole pine, Douglas fir, quaking aspen, mountain snowberry, fescue, and needlegrass.

This map unit is the most extensive and comprises approximately 26 percent (434.9 acres) of the Study Area.

3.6.3.6 TS Targhee - Swede families complex, 15 to 60 percent slopes

The TS map unit is located on moderately steep to steep mountain sideslopes. Map unit TS occurs on easterly to northerly upper elevation slopes in an alternating pattern with map unit Zz on very steep southerly slopes. These soils formed in residuum and colluvium from sandstone. This map unit consists of 45 percent Targhee family soils and 30 percent Swede family soils. Also included in this map unit are 10 percent Tahquats family soils, 10 percent Skelter family soils, 5 percent rock outcrop, and other similar soils.

Targhee family soils are coarse-textured, have a cambic horizon, and greater than 35 percent rock fragments in the control section. These soils are cryic. Soil profile 14ES26 is representative of Targhee family soils in map unit TS. Vegetation on Targhee family soils in map unit TS includes aspen, Douglas fir, lodgepole pine, snowberry, elderberry, bluegrass, Columbia needlegrass, sticky geranium, lupine, and Indian paintbrush.

Swede family soils are medium textured, have a dark surface (mollic epipedon), and have an accumulation of illuvial clay (argillic horizon). These soils are cryic. Soil profile 14ES25 is representative of Swede family soils in map unit TS. Vegetation on Swede family soils in map unit TS includes Douglas fir, aspen, snowberry, Columbia needlegrass, Oregon grape, sticky geranium, and arnica.

This map unit is of moderate extent and comprises approximately 14 percent (244.2 acres) of the Study Area.

3.6.3.7 ZS Zimmer loam family, 8 to 35 percent slopes

The ZS map unit is located on strongly sloping to steep mountain footslopes, hillslopes, and structural benches. Map unit ZS comprises approximately the mid elevation shrub and rock outcrop areas. These soils formed in residuum and slope alluvium from chert and shale. This map unit consists of 75 percent Zimmer family soils. Also included in this map unit are 10 percent Skelter family soils, 10 percent Swede family soils, 5 percent Tahquats family soils, and other similar soils.

Zimmer family soils in map unit ZS are medium textured, have a dark surface (mollic epipedon), and are shallow to bedrock. These soils are frigid. Soil profile 14ES23 is representative of Zimmer family soils in map unit ZS. Fractured chert is at 12 inches (31 centimeters [cm]) in the representative soil profile. Vegetation on Zimmer family soils in map unit ZS includes snowberry, mountain big sagebrush, arrowleaf balsamroot, fescue, bluegrass, and buckwheat.

Depth to bedrock is *Limiting* (shallow soils) to *Somewhat Limiting* (moderately deep soils) for topsoil salvage in map unit ZS.

This map unit is of limited extent and comprises approximately 2 percent (39.3 acres) of the Study Area.

3.6.3.8 Zz Zimmer family gravelly loam, 35 to 60 percent slopes

The Zz map unit is located on steep to very steep mountain sideslopes. Map unit Zz occurs on southerly upper elevation slopes in an alternating pattern with map unit TS on the easterly and northerly slopes. These soils formed in residuum from limestone sandstone. This map unit consists of 80 percent Zimmer family soils. Also included in this map unit are 5 percent Skelter family soils, 5 percent Targhee family soils, 5 percent Swede family soils, 5 percent rock outcrop, and other similar soils.

Zimmer family soils are medium textured, have a dark surface (mollic epipedon), and are shallow to bedrock. These soils are frigid. Soil profile 14ES21 is representative of Zimmer family soils in map unit Zz. Decomposing sandstone bedrock is at 10 inches and hard sandstone is at 17 inches in the representative soil profile. Vegetation on Zimmer family soils in map unit Zz includes antelope bitterbrush, mountain big sagebrush, arrowleaf balsamroot, Oregon grape, and buckwheat.

Steep to very steep slopes and shallow depth to bedrock is *Limiting* to topsoil salvage in map unit Zz.

This map unit is of limited extent and comprises approximately 3 percent (50.3 acres) of the Study Area.

3.6.3.9 Miscellaneous Landforms

M Mine Disturbances

The northern end of the Study Area is currently being mined. This map unit also includes topsoil and subsoil stockpiles near the tailings ponds.

This map unit is moderately extensive and comprises approximately 14 percent (250.4 acres) of the Study Area.

W Water Bodies

This map unit consists of the tailings ponds in the northeastern portion of the Study Area.

This map unit is of very limited extent and comprises approximately 0.3 percent (5.2 acres) of the Study Area.

3.6.4 Soil Families

Soils in the Study Area were classified to the taxonomic family using the *Keys to Soil Taxonomy, Twelfth Edition* (Soil Survey Staff 2014a). Eight distinct soil families were identified in the Study Area. Soil family names were selected from soil series established in Idaho. The priority for soil family name (Soil Survey Staff 2015) selection was based on the following criteria:

- Soil family name was established in Caribou County, Idaho.
- Soil family name was previously used in the Order 3 *Soil Survey of the Caribou National Forest* (USDA 1990) as part of the soil survey.
- Soil family name was established in Idaho.
- Soil family name was established in an adjacent county in Wyoming.

The taxonomic classification of each soil profile described in the Study Area is listed in **Table 3.6-2**. Asterisked soils are those that were selected for laboratory analysis.

Table 3.6-2 Soil Family and Taxonomic Classification

SOIL PROFILE	SOIL FAMILY	TAXONOMIC CLASSIFICATION[1]	VEGETATION[2]
14ES01	Swede	Typic Argicryolls fine-loamy, mixed, superactive	MCA
14ES02*	Buffork	Alfic Argicryolls fine-loamy, mixed, superactive	MCA
14ES03	Tahquats similar	Pachic Argicryolls loamy-skeletal, mixed, superactive	MCA
14ES04	Rock Outcrop	Rock outcrop	
14ES05*	Beaverdam	Vertic Argicryolls fine, smectitic	LP
14ES06*	Zimmer	Lithic Ultic Haploxerolls loamy, mixed, superactive, frigid	Shrub
14ES07*	Swede	Typic Argicryolls fine-loamy, mixed, superactive	Aspen/shrub
14ES08	Skelter	Ultic Argixerolls fine-loamy, mixed, superactive, frigid	Sage
14ES09*	Buffork similar	Pachic Argicryolls fine-loamy, mixed, superactive	LP
14ES10*	Swede similar	Typic Haplocryolls fine-loamy, mix, superactive	Aspen/grass
14ES11	Tahquats	Typic Argicryolls loamy-skeletal, mixed, superactive	MC/aspen
14ES12*	Swede	Typic Argicryolls fine-loamy, mixed, superactive	LP/aspen
14ES13*	Zimmer	Lithic Ultic Haploxerolls loamy, mixed, superactive, frigid	Shrub
14ES14	Beaverdam similar	Vertic Haplocryalfs fine, smectitic	MCA
14ES15*	Beaverdam similar	Vertic Haplocryalfs clayey-skeletal, smectitic	Aspen/shrub
14ES16*	Buffork	Alfic Argicryolls fine-loamy, mixed, superactive	LP/aspen
14ES17*	Skelter similar	Pachic Ultic Argixerolls fine-loamy, mixed, super, frigid	Sage
14ES18*	ZZZ similar	Oxyaquic Haploxerolls fine-loamy, mixed, super, frigid	WM
14ES19	Skelter	Ultic Argixerolls fine-loamy, mixed, superactive, frigid	Sage
14ES20	Tahquats similar	Typic Palecryolls loamy-skeletal, mixed, superactive	LP/aspen
14ES21*	Zimmer	Lithic Ultic Haploxerolls loamy, mixed, superactive, frigid	Shrub

SOIL PROFILE	SOIL FAMILY	TAXONOMIC CLASSIFICATION[1]	VEGETATION[2]
14ES22*	Targhee similar	Typic Haplocryolls loamy-skeletal, mixed, superactive	Aspen/grass
14ES23*	Zimmer	Lithic Ultic Haploxerolls loamy, mixed, superactive, frigid	Shrub
14ES24	Skelter similar	Ultic Haploxeralfs fine-loamy, mixed, superactive, frigid	Sage
14ES25	Swede	Typic Argicryolls fine-loamy, mixed, superactive	MCA
14ES26*	Targhee	Typic Haplocryepts loamy-skeletal, mixed, superactive	MC
14ES27	Targhee	Typic Haplocryepts loamy-skeletal, mixed, superactive	MC
14ES28*	Skelter similar	Ultic Haploxeralfs fine-loamy, mixed, superactive, frigid	Sage
14ES29*	Beaverdam similar	Vertic Haplocryalfs fine, smectitic	MCA
14ES30	Beaverdam	Vertic Argicryolls fine, smectitic	MCA
14ES31	Zimmer similar	Lithic Haplocryolls loamy, mixed, superactive	MCA
14ES32	ZZZ	Oxyaquic Argixerolls fine-loamy, mixed, superactive, frigid	WM
14ES33*	Swede similar	Eutric Haplocryalfs fine-loamy, mixed, superactive	LP/aspen
14ES34*	Skelter	Ultic Argixerolls fine-loamy, mixed, superactive, frigid	Sage
14ES35*	ZZZ	Oxyaquic Argixerolls fine-loamy, mixed, superactive, frigid	Silver sage
14ES36*	Tahquats	Typic Argicryolls loamy-skeletal, mixed, superactive	MCA

1. Taxonomic classification based on Keys to Soil Taxonomy, Twelfth Edition (Soil Survey Staff 2014a).
2. Vegetation Types: Aspen = quaking aspen; LP=lodgepole; MC = mixed conifer; MCA = mixed conifer and aspen; Shrub=mountain shrub; Sage=mountain big sagebrush; and WM=wet meadow.

* Profile submitted for laboratory analysis.

3.6.4.1 Beaverdam Family

Vertic Argicryolls fine, smectitic

Beaverdam family soils are characterized by a dark surface (mollic), an accumulation of illuvial clay (argillic horizon), and 35 or more percent clay in the control section (upper 50 cm of argillic horizon). There are less than 35 percent rock fragments in the control section.

These soils occur on gently sloping to steep foothills and mountain sideslopes in the northern part of the Study Area.

Soil pH of less than 5.5 and clay content of 40 percent or greater are *Limiting* features in the Beaverdam family subsoil.

Vertical cracking was observed between soil peds in the argillic horizons of the Beaverdam family soils. The width of the cracks ranged from 5 to 10 millimeters (0.2 to 0.4 inches). This soil profile feature takes taxonomic precedence over other characteristics, such as pachic (thick mollic surface) and alfic (albic materials in subsurface), which were observed in some Beaverdam soil profiles in the Study Area (Soil Survey Staff 2014a).

Native vegetation on Beaverdam family soils consists of Douglas fir, lodgepole pine, aspen, snowberry, Columbia needlegrass, fescue, Oregon grape, and wild strawberry.

The Beaverdam soil series was established in Bannock County, Idaho (Soil Survey Staff 2015). These soils were mapped in the *Soil Survey of the Caribou National Forest* (USDA 1990).

3.6.4.2 Buffork Family

Alfic Argicryolls fine-loamy, mixed, superactive

Buffork family soils have a dark surface (mollic epipedon), an albic or glossic horizon, and an accumulation of illuvial clay (argillic horizon). The control section has 18 to 34 percent clay and less than 35 percent rock fragments. Gravels and channers are the dominant rock fragment size.

The representative soil profile has an albic horizon above the argillic horizon.

Native vegetation on Buffork family soils includes lodgepole pine, Douglas fir, quaking aspen, mountain snowberry, mountain brome, and sticky geranium.

The Buffork soil series was established in Teton County, Wyoming.

3.6.4.3 Skelter Family

Ultic Argixerolls fine-loamy, mixed, superactive, frigid

Skelter family soils are characterized by a dark surface (mollic) and an accumulation of illuvial clay in the subsurface (argillic horizon). The control section has 24 to 34 percent clay and less than 35 percent rock fragments. Gravels are the dominant rock fragment size.

These soils occur on strongly sloping sagebrush footslopes in Sage Valley and upper Tygee Valley.

Soil pH is *Somewhat Limiting* in some portions of the Skelter family soil profiles. The surface (0 to 14 cm) of the representative profile has a soil pH of 5.4, which is considered *Limiting* by the updated reclamation material guideline (Soil Survey Staff 2014b).

Skelter family soils have base saturation of less than 75 percent in at least one horizon between 10 and 30 inches (25 and 75 cm) below the mineral soil surface. In soil profiles 14ES17 and 14ES28 the base saturation was less than 75 percent throughout the soil profile.

The soil below the control section can be very to extremely gravelly or cobbly in some Skelter family profiles.

Native vegetation on Skelter family soils consists of mountain big sagebrush, snowberry, Columbia needlegrass, bluegrass, fescue, basin wildrye, wild strawberry, buckwheat, yarrow, lupine, and sticky geranium. Scattered Utah serviceberry is also present on these soils.

The Skelter soil series was established in Gooding County, Idaho (Soil Survey Staff 2015).

3.6.4.4 Swede Family

Typic Argicryolls fine-loamy, mixed, superactive

Swede family soils have a dark surface (mollic epipedon) and an accumulation of illuvial clay (argillic horizon) in the subsurface. The control section has 18 to 34 percent clay and less than 35 percent rock fragments. Gravels are the dominant rock fragment size. Some soil profiles have greater than 35 percent rock fragments below the control section.

Stone content increases below the control section in some Swede family profiles.

The percent clay increases below the control section in some Swede family profiles.

These soils are on strongly sloping to very steep mountain sideslopes.

Native vegetation on Swede family soils consists of Douglas fir, lodgepole pine, aspen, bromegrass, needlegrass, fescue, snowberry, chokecherry, lupine, wild strawberry, buckwheat, sticky geranium, arnica, and Oregon grape.

The Swede soil series was established in Valley County, Idaho (Soil Survey Staff 2015). These soils were mapped in the *Soil Survey of the Caribou National Forest* (USDA 1990).

3.6.4.5 Tahquats Family

Typic Argicryolls loamy-skeletal, mixed, superactive

Tahquats family soils have a dark surface (mollic epipedon) and an accumulation of illuvial clay (argillic horizon) in the subsurface. The control section has 28 to 34 percent clay and greater than 50 percent rock fragments. Gravels are the dominant rock fragment size, but cobbles and stones are also present.

The percent clay increases below the control section in some Tahquats family profiles.

These soils are on strongly sloping mountain sideslopes.

Native vegetation on Tahquats family soils consists of Douglas fir, subalpine fir, lodgepole pine, aspen, snowberry, bluegrass, pinegrass, wild strawberry, and sticky geranium.

The Tahquats soil series was established in Caribou County, Idaho (Soil Survey Staff 2015).

3.6.4.6 Targhee Family

Typic Haplocryepts loamy-skeletal, mixed, superactive

Targhee family soils have a base saturation of greater than 50 percent. Profile development in these soils is limited to cambic horizons, which Targhee family soils. The particle size control section has less than 18 percent clay and greater than 35 percent rock fragments. Gravels and channers are the dominant rock fragment size.

They are on steep to very steep mountain sideslopes.

Soil pH was 5.3 below a depth of 15 cm (6 inches) in the representative soil profile. Soil pH of less than 5.5 is considered Limiting by the updated guideline for reclamation material (Soil Survey Staff 2014b). Soil pH should be monitored on Targhee family soils during topsoil salvage operations. Blending of the Limiting soil pH material with Somewhat Limiting and Not Limiting topsoil during salvage operations could help mitigate this limitation.

Targhee family soils are typically moderately deep (20 to 40 inches or 50 to 100 cm) to sandstone.

Native vegetation on Targhee family soils consists of aspen, Douglas fir, lodgepole pine, elderberry, arnica, snowberry, lupine, Indian paintbrush, bluegrass, and Columbia needlegrass.

The Targhee soil series was established in Fremont County, Idaho (Soil Survey Staff 2015). These soils were mapped in the Soil Survey of the Caribou National Forest (USDA 1990).

3.6.4.7 Zimmer Family

Lithic Ultic Haploxerolls loamy, mixed, superactive, frigid

Zimmer family soils are characterized by shallow depth (less than 50 cm or 20 inches) to bedrock and a dark surface (mollic). Base saturation ranges from 47.4 to 67.7 percent in the Zimmer profiles submitted for laboratory analysis. Cambic horizons were identified in some profiles. Soil profiles submitted for analysis contained 15 to 21 percent clay in the control section and less than 35 percent rock fragments.

They are on steep to very steep mountain sideslopes.

Soil pH was 5.3 in the representative soil profile for Zimmer family soils. Soil pH less than 5.5 is considered Limiting by the updated guideline for reclamation material (Soil Survey Staff 2014b). Soil pH should be monitored on Targhee family soils during topsoil salvage operations. Blending of the Limiting soil pH material with Somewhat Limiting and Not Limiting topsoil during salvage operations could help mitigate this limitation.

Native vegetation on Zimmer family soils consists of snowberry, mountain big sagebrush, arrowleaf balsamroot, fescue, bluegrass, buckwheat, and Oregon grape.

The Zimmer soil series was established in Boise County, Idaho (Soil Survey Staff 2015).

3.6.4.8 ZZZ Family

Oxyaquic Argixerolls fine-loamy, mixed, superactive, frigid

ZZZ family soils are characterized by a seasonal high-water table, a dark surface (mollic epipedon), and an accumulation of illuvial clay (argillic horizon) in the subsurface. These soils occur in the nearly level concave depressions and drainages in Sage Valley. ZZZ family soils are of limited extent in the Study Area.

The depth to redox mottles ranges from 28 to 68 cm (11 to 27 inches) below the mineral soil surface in ZZZ family soils and similar soils. Redox mottles indicate the presence of a high-water table at some point in time. Based on the physiographic setting and observed field conditions it is assumed that "...in normal years the soil is saturated with water within 100 cm (40 inches) of the mineral soil surface..." (Soil Survey Staff 2014a) long enough to meet the taxonomic requirements of the oxyaquic subgroup.

Small depressions with surface water were observed in areas where ZZZ family soils were described.

The presence of cobbles or stones in the subsoil of ZZZ family soil profiles limited hand digging to a depth of 74 to 102 cm (29 to 40 inches).

The ZZZ family soils appeared to have been disturbed at some time and planted with timothy. Bluegrass, rushes, lupine, Columbia needlegrass, elk thistle, and sticky geranium were also observed on the ZZZ family soils. Silver sage was observed growing along the interface between ZZZ family soils and the drier Skelter family soils.

No soil series have been established in this soil family. The term ZZZ was coined for identifying this soil family in the Study Area.

3.6.5 Determination of Reclamation Suitability

The CTNF has adopted an updated version of the National Soil Information System (NASIS) interpretation guideline "ENG: Construction Materials; Reclamation" to determine suitability of topsoil and subsoil for use as reclamation growth media (Soil Survey Staff 2014b). The update involved raising the lower pH limit from 4.0 up to 5.5 and lowering the upper limit from 8.5 down to 8.4 (Soil Survey Staff 2014b). Parameters and limits for the updated "ENG: Construction Materials; Reclamation" interpretation guideline are listed in **Table 3.6-3**.

Table 3.6-3 Parameters and Rating Ranges for Determining Topsoil and Subsoil Suitability Based on ENG: Construction Materials; Reclamation

REASON	PROPERTY	LIMITING	SOMEWHAT LIMITING	NOT LIMITING
Too Clayey[1]	Clay %	≥ 40%	> 30% to < 40%	≤ 30%
Cobble Content[2]	Cobble by % weight	> 50%	> 25% to ≤ 50%	≤ 25%
	Cobble by % volume	> 35%	>16% to ≤35%	≤16%
Stone Content[3]	Stone by % weight	> 15%	>5% to ≤15%	≤5%
	Stone by % volume	> 10%	>3% to ≤10%	≤3%
Carbonate Content[4]	Calcium Carbonate Equivalent	≥ 40%	> 15% to ≤40%	≤ 15%
Sodium Content[5]	Sodium Adsorption Ration (SAR)	> 13	> 4 to ≤ 13	≤ 4
Water Erosion[6]	K factor	> 0.7	> 0.35 to < 0.7	≤ 0.35
Low Organic Matter[7]	Organic Matter %	0	> 0 to < 1%	≥ 1%
Too Alkaline[8]	Soil pH (1:1 water)	> 8.4		≤ 8.0
Too Acid[9]	Soil pH (1:1 water)	< 5.5	≥ 5.5 to < 6.0	≥ 6.0
Salinity[10]	ECe (mmhos/cm)	> 16	≤ 8 to ≥ 16	< 8
Too Sandy[11]	#4 sieve minus #200 sieve	≥ 85%	> 70% to < 85%	≤ 70%
Wind Erosion[12]	Wind Erodibility Group	"1" and "2"	Not applicable	All others
Droughty[13]	Available Water Capacity (AWC) cm/cm	≤ 0.05	> 0.05 to < 0.10	≥ 0.10
Depth to Bedrock	Depth (RV) to bedrock, cm	< 50	≥ 50 to < 100	≥ 100
Depth to Cemented Pan	Depth (RV) to Cemented Pan, cm	< 50	≥ 50 to < 100	≥ 100

Procedure for feature determination:
1. Clay percent thickest layer in depth 0 to 100 cm.
2. Weighted average by weight coarse fragments 3 to 10 inches in size in upper72 inches of soil profile or above a restrictive layer.
3. Weighted average by weight coarse fragments > 10 inches in size in upper72 inches of soil profile or above a restrictive layer.
4. Soil layer with maximum calcium carbonate equivalent.
5. Highest sodium adsorption ratio for horizons in depth range of 0 to 20 inches (0 to 50cm).
6. Soil layer with maximum K factor within a depth of 40 inches (100 cm).
7. Weighted average organic matter content of sampled soil profile.
8. Maximum soil pH (1:1 water) of any soil layer.

9. Minimum soil pH (1:1 water) of any soil layer. Low pH values below 40 inches (100 cm) are not as restrictive as those above 100 cm.
10. Highest salinity (ECe = electrical conductivity in milliMhos per centimeter [mmhos/cm]) for all layers.
11. Percent clay and #4 sieve #200 sieves of the thickest layer within 40 inches (100 cm) of the soil surface or above a cemented restrictive feature.
12. Wind erodibility group.
13. Sum of AWC Layer Thickness summed through the last soil layer or to a cemented layer, then divided by depth of soil to obtain weighted average AWC. AWC adjusted for rock fragment content.

The following suitability discussions for native soils in the Study Area are based on profile descriptions, laboratory analysis data, and the interpretation guideline recommended by the CTNF (Soil Survey Staff 2014b).

3.6.5.1 Too Clayey

Clayey soils are a *Limiting* feature in the Study Area for Beaverdam soils. These soils have a fine particle-size class. Clay ranges from 43 to 45 percent from 10 to 40 inches (24 to 103 cm) in the representative soil profile for the Beaverdam family. The overlying topsoil in Beaverdam family soils ranges from 18 to 22 percent clay and the subsoil has 23 percent clay in the representative soil profile. The weighted average clay is 40 percent in the subsoil of the representative Beaverdam soil profile (10 to 51 inches or 24 to 122 cm). Beaverdam subsoil should not be salvaged for use as topsoil based on the percent clay.

Percent clay in the Tahquats family increases to 40 percent below 45 inches (115 cm) in the representative soil profile. The effect of clay in the lower subsoil of some Tahquats profile could be mitigated by blending with less clayey materials during the salvage and stockpiling process.

3.6.5.2 Cobble Content

Cobbles are not a limiting feature for soils in the Study Area. The maximum weighted average cobble content was 12.3 percent by volume. Cobbles are not considered limiting until the weighted average for the soil profile is greater than 35 percent by volume.

3.6.5.3 Stone Content

Stones are not a limiting feature for soils in the Study Area. The maximum weighted average stone content was 8.7 percent by volume. Stones are not considered limiting until the weighted average for the soil profile is greater than 10 percent by volume.

3.6.5.4 Carbonate Content

Carbonate content is not a limiting feature for soils in the Study Area. The maximum calcium carbonate equivalent for any horizon was 4.8 percent for soil samples submitted for laboratory analysis. Carbonate content is not considered limiting until the calcium carbonate equivalent is greater than or equal to 40 percent.

3.6.5.5 Sodium Content

Sodium content is not a limiting feature for soils in the Study Area. The maximum sodium adsorption ratio (SAR) for any soil horizon submitted for laboratory analysis was 2.85. Sodium content is not considered limiting until the SAR is greater than 13.

3.6.5.6 Water Erosion

Water erosion is not a limiting feature for soils in the Study Area based on K factors calculated for soil samples submitted for laboratory analysis. Some horizons in Skelter, Swede, Targhee, and ZZZ families are *Somewhat Limiting* for water erosion based on the calculated K factors.

3.6.5.7 Low Organic Matter

Low organic matter is not a limiting feature for soils in the Study Area when profile weighted averages are used to determine reclamation suitability. Weighted averages are an estimate of what the resulting organic matter percent may be after blending of topsoil and subsoil during salvage and stockpiling operations.

The weighted average organic matter content was used to determine the suitability of soils in the Study Area. The surface and subsurface of most profiles are high in organic matter, while most subsoil has organic matter contents of less than two percent and some less than one percent. Even though the surface organic horizons (Oi and Oe) horizons were not included in the weighted average calculations, all of the profiles submitted for laboratory analysis have a weighted average organic matter content of 1.20 to 9.27 percent.

3.6.5.8 Too Alkaline

Alkalinity is not a limiting feature for soils in the Study Area. The maximum measured soil pH (1:1 water) for soil samples submitted for laboratory analysis was 7.5.

3.6.5.9 Too Acid

Soil pH (1:1 water) ranged from 5.2 to 7.5 in the soil samples submitted for laboratory analysis.

Soil pH (1:1 water) was identified as being in the range of 5.2 to 5.4 in ten soil samples submitted for analysis. Soil pH is considered to be *Too Acid* and *Limiting* for reclamation materials when the soil pH is less than 5.5. These ten soil samples were for horizons distributed among Beaverdam (below 42 cm), Skelter (surface 14 to 22 cm), Targhee (subsoil below 15 cm), Zimmer, and ZZZ (full profile) soil families. The horizons with *Limiting* soil pH apply only to specific soil profiles and not to any specific soil family. The number of soil samples with pH (1:1 water) below 5.5 comprises only 13 percent of all samples submitted for analysis.

Five soil samples had paste pH of less than 5.5. Two of these five samples were in the group with pH (1:1 water) less than 5.5.

Soil pH should be monitored during topsoil salvage operations. Blending of the *Limiting* soil pH material with *Somewhat Limiting* and *Not Limiting* topsoil or subsoil during salvage operations could help mitigate this limitation.

3.6.5.10 Salinity

Salinity is not a limiting feature for soils in the Study Area. The maximum electrical conductivity (ECe) measured in soil samples submitted for laboratory analysis was 1.51 deciSiemens per meter (dS/m, or milliMhos per centimeter [mmhos/cm]).

3.6.5.11 Too Sandy

Soils in the Study Area are dominated by loamy and clayey textures. Loam, clay loam, and clay are the dominant soil textures in the Study Area. The amount of sand ranged from 14 to 62 percent. The statistical mean for sand is 31 percent and the median value is 28 percent. Blending of localized pockets of coarse textured soils with loamy and clayey soils during the salvage, stockpiling, and placement processes can help mitigate the effects of sandy soils.

3.6.5.12 Wind Erosion

Soil textures of soil samples submitted for laboratory analysis does not include any of the textures listed for wind erodibility groups 1 and 2. Wind erodibility is not a limiting feature of soils in the Study Area based on the soil samples submitted for analysis and field textures.

Wind erodibility groups are based on soil texture. Group 1 consists of very fine sand, fine sand, sand, or coarse sand textures. Wind erodibility group 2 consists of loamy very fine sand, loamy fine sand, loamy sand, and loamy coarse sand; very fine sandy loam and silt loam with less than 5 percent clay and 25 percent or less very fine sand (Stantec 2015b).

3.6.5.13 Droughty

Droughty soil conditions are not a limiting feature for soils in the Study Area. Available water capacities (AWC) for soil profiles submitted for laboratory analysis do *not* have AWC weighted averages less than the *Not Limiting* threshold of 0.10 cm per cm. This determination is based on AWC that was adjusted for rock fragment content.

The statistical mean AWC is 0.17 cm/cm and the median AWC is 0.19 cm/cm for soil profiles submitted for laboratory analysis. These statistics are based on the weighted soil profile averages for AWC adjusted for rock fragment content.

3.6.5.14 Depth to Bedrock

Depth to bedrock is *Limiting* in the Zimmer family (lithic). Bedrock depth is *Somewhat Limiting* in the Beaverdam family, Skelter family, Swede family, and Targhee family in profiles that are moderately deep (20 to 40 inches or 50 to 100 cm) to shale, chert, or sandstone.

The limiting feature of shallow and moderately deep soils that would affect reclamation is the reduced amount of topsoil and subsoil that can be salvaged. This would subsequently reduce the amount of topsoil and subsoil available for reclamation.

3.6.5.15 Depth to Cemented Pan

No cemented pans were identified in the Study Area.

3.6.5.16 Selenium

Total selenium concentrations ranged from non-detectable (less than 0.02 mg/kg) up to a maximum reported concentration of 12.8 mg/kg. The maximum *Total* selenium value was detected in soil profile 14ES10 (62 to 106 cm).

Plant available and ammonium bicarbonate-diethylenetriaminepentaacetic acid (*ABDTPA*) extractable selenium analyses were run on all the Study Area soil samples submitted for laboratory analysis.

One soil sample (14ES22 2 to 20 cm) had an analysis result of 0.27 mg/kg in the *Plant Available* test with. *Total* selenium in this same sample was non-detectable (<2.2 mg/kg). *ABDTPA* extractable selenium for this sample was non-detectable (<0.16 mg/kg). The ABDTPA detection limit was higher for this sample because the sample was much lighter than the other soil samples and adjustments were made to the amount of sample analyzed (Stantec 2015b). The lighter weight of this surface soil sample is likely attributable to the 20.9 percent organic matter which could also be a contributing factor for the *Plant Available* selenium value.

Based on the results of the laboratory analysis for total and extractable, it appears that selenium is not a limiting feature for naturally developed in-situ soils in the Study Area. Blending of soil materials during the salvage, stockpiling, and placement process would help mitigate potential selenium issues.

3.6.5.17 Topsoil and Subsoil Salvage Depths

Estimated topsoil and subsoil salvage were determined for each major soil family identified in the Study Area. The criteria listed in **Table 3.6-3** were the basis for determining whether material should be salvaged as topsoil or subsoil, even though all suitable material would be salvaged and not separated nor distinguished between topsoil or subsoil.

The primary parameters which determined whether material was classified as topsoil or subsoil in the Study Area are:

- Depth to where the percent organic matters decreases substantially (typically less than one percent) based on either the laboratory analysis or soil color, if lab data was not available;
- Changes in the percent clay;
- Limiting soil pH (1:1 water); and,
- Depth to bedrock.

The characteristics of each soil profile was evaluated on an individual basis, the average estimated salvage depths were determined for each soil family. Soils listed as similar to a family were included in the soil family estimates. Estimated topsoil and subsoil salvage depths were determined for each soil map unit based on the weighted averages for the map unit components. Actual salvage depths would vary across the landscape.

Table 3.6-4 lists the estimated average topsoil and subsoil salvage depths by soil family.

Table 3.6-5 lists the estimated average topsoil and subsoil salvage depths for each soil map unit.

In order to minimize the inclusion of materials with *Limiting* soil pH (less than 5.5) within suitable topsoil or subsoil material, blending of low pH materials with suitable soils during the salvage, stockpiling, and placement operations would help mitigate this limiting soil feature.

Table 3.6-4 Estimated Average Topsoil and Subsoil Salvage Depths for Soil Families in the East Smoky Panel Study Area

SOIL FAMILY[1]	ESTIMATED AVERAGE TOPSOIL SALVAGE DEPTH[2] (CM)	ESTIMATED AVERAGE SUBSOIL SALVAGE DEPTH[2] (CM)	ESTIMATED AVERAGE TOPSOIL SALVAGE DEPTH[2] (IN)	ESTIMATED AVERAGE SUBSOIL SALVAGE DEPTH[2] (IN)
Beaverdam	34	100[3]	13	40[3]
Buffork	41	108	16	43
Skelter	37	72	14	28
Swede	44	59	17	23
Tahquats	47	103	18	40
Targhee	39	33	15	13
Zimmer	20	3	8	1
ZZZ	36	50	14	20

[1] Similar soils were included in the estimates for each family.

[2] Actual salvage depths would vary across the landscape and should be monitored during salvage operations.

[3] Although subsoil is present, it would not be salvaged, if feasible, due to high clay content (**Section 3.6.5.1**).

3.6.6 Reclamation

Salvaged topsoil and subsoil can either be directly placed on reclamation surfaces or stockpiled for later placement.

Table 3.6-5 Estimated Average Topsoil and Subsoil Salvage Depths for Soil Map Units Based on Weighted Averages

MAP UNIT SYMBOL	AVERAGE ESTIMATED TOPSOIL SALVAGE DEPTH[1,2] (CM)	AVERAGE ESTIMATED SUBSOIL SALVAGE DEPTH[1,2] (CM)	AVERAGE ESTIMATED TOPSOIL SALVAGE DEPTH[1,2] (IN)	AVERAGE ESTIMATED SUBSOIL SALVAGE DEPTH[1,2] (IN)
Bf	Buffork family silt loam, 18 to 40 percent slopes			
	41	102	16	40[3]
BTS	Beaverdam - Tahquats - Swede families complex, 2 to 18 percent slopes			
	37	88	15	35
Ck	Skelter family silty loam, 3 to 12 percent slopes			
	37	70	15	28
OA	ZZZ family loam complex, 1 to 3 percent slopes			
	36	52	14	20
STB	Swede - Tahquats – Buffork families complex, 4 to 25 percent slopes			
	42	70	16	27
TS	Targhee - Swede families complex, 15 to 60 percent slopes			
	39	50	15	20
ZS	Zimmer loam family, 8 to 35 percent slopes			
	26	21	10	8
Zz	Zimmer family gravelly loam, 35 to 60 percent slopes			
	22	11	9	4
M				
	0	0	0	0
W	Water Bodies			
	0	0	0	0

[1] Estimated average map unit salvage depths are based on weighted averages of components. The estimated soil family average was used for each map unit component.

[2] Estimated average map unit salvage depths are for planning purposes. Actual salvage depths should be expected to vary.

[3] Although subsoil is present, it would not be salvaged, if feasible, due to high clay content (**Section 3.6.5.1**).

3.7 VEGETATION AND WETLANDS

3.7.1 Study Area

The vegetation and wetland resources Study Area includes all Project disturbance areas plus a 0.25-mile buffer extending outward from the edge of proposed disturbance, with slight modifications as a 0.25-mile buffer was not needed near existing/past mine disturbance (**Figure 3.7-1**). The Study Area boundary was developed with the IDT experts and professional judgement.

3.7.2 GIS Vegetation Data Verification

A total of 12 different vegetation cover types were identified in the Study Area using CTNF geographic information system (GIS) vegetation data that was field verified by Stantec (2017b). The vegetative cover types identified are shown in **Table 3.7-1**.

Table 3.7-1 Vegetation Types Mapped in the Study Area

VEGETATION TYPE	TOTAL ACRES	PERCENT OF TOTAL VEGETATION ACRES
Forested Sites		
Aspen	140.0	6
Aspen/Conifer	639.5	26
Aspen Dry	207.8	9
Douglas-fir	61.4	3
Dry Aspen/Conifer	190.0	8
Dry Conifer Mix	41.8	2
Lodgepole Pine	18.4	<1
Mixed Conifer	251.8	10
Non-Forested Sites		
Grass/Forb	176.7	7
Mountain Brush	251.1	10
Riparian Shrub	12.0	<1
Sagebrush	428.3	18
Total	**2,418.8**	**100**

3.7.3 Vegetation Community Mapping and Strata Evaluation

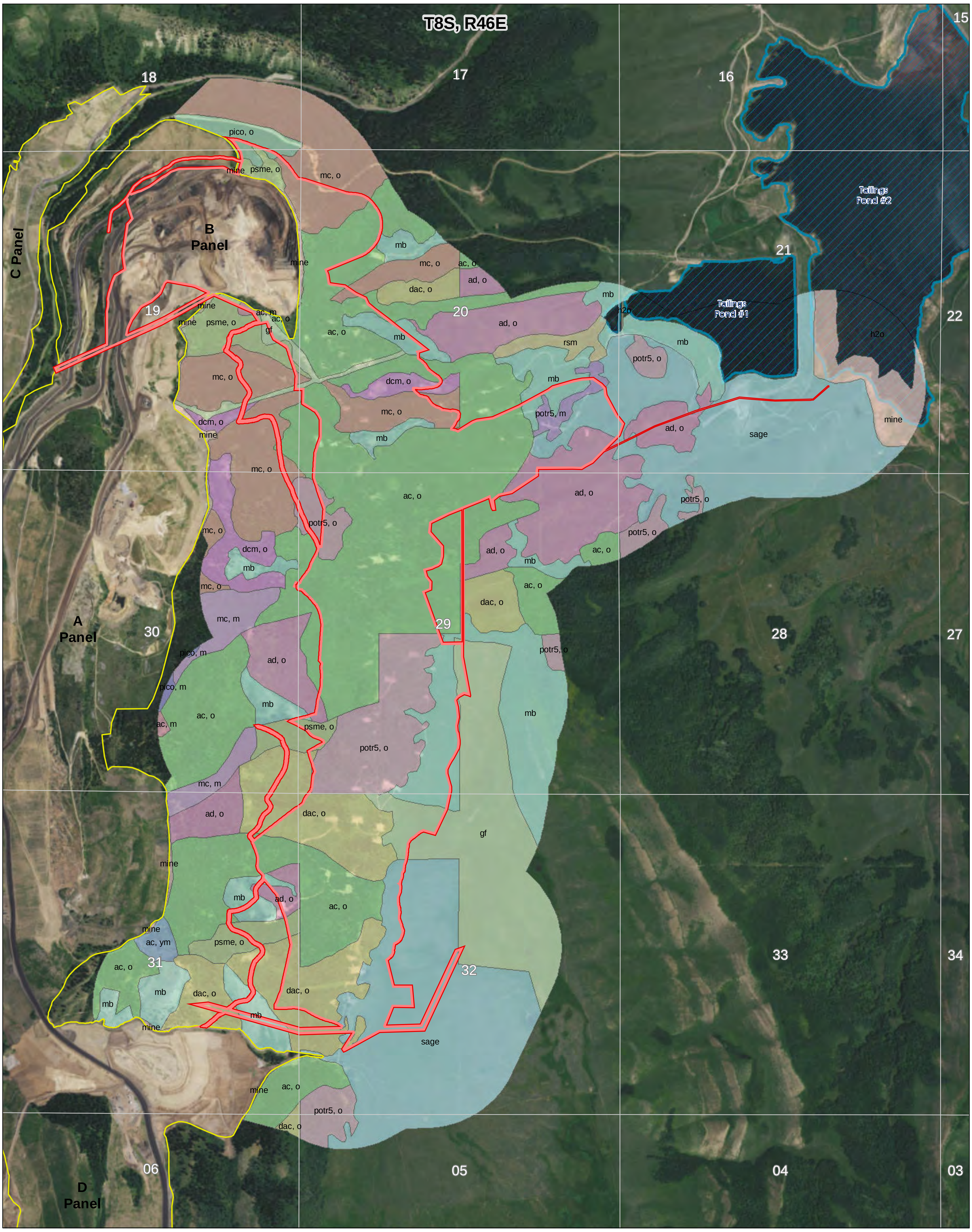
The CTNF GIS vegetation data was supplemented with field data for various vegetation data attributes including: Society of American Foresters forest cover (SAF) type, vegetation type (VT), and the Forest Structural Stage (FSS) (Stantec 2017b). In addition, a combination of vegetation type and structural stage (i.e., o = old, m = mature, and ym = young/mature) was used to stratify the affected vegetation types, as shown on **Figure 3.7-1**. The old (o) and mature (m) strata were evaluated to determine the potential to meet the USFS Intermountain Region (Region 4) old growth definitions, as outlined in Stantec (2017b). A brief description of each of the cover types follows.

3.7.3.1 Aspen

There are about 140 acres of aspen vegetation type (**Photo 3.7-1**) in the Study Area, which represents 12 percent of the vegetated area (**Table 3.7-1**). Aspen (*Populus tremuloides*) is common in both the montane and subalpine zones of the Study Area. On the eastern-facing side of the range, aspen stands occur on all aspects and in drainages and ravines, alternating with north-facing mixed conifer occurring on mid-elevation and high elevation slopes. The dominant understory shrub in aspen communities is mountain snowberry (*Symphoricarpos albus*), although chokecherry (*Prunus virginiana*), mountain box-laurel (*Pachistima myrsinities*), several Ericaceae family shrub members (whortleberry and others), rose (*Rosa* spp.), and currant/gooseberry (*Ribes* spp.) form important understory components as well.

Photo 3.7-1 Typical Aspen Vegetation Type in the Study Area

The aspen vegetation type was stratified into two strata, old aspen and mature aspen. The old aspen stratum represents 93 percent of the aspen vegetation type and the mature aspen represents seven percent.



Legend

Project Area Boundary	Aspen Conifer (ac), ym	Mine (mine)
Existing Disturbance Area	Aspen Dry (ad), o	Mixed Conifer (mc), m
Tailings Ponds	Douglas-fir (psme), o	Mixed Conifer (mc), o
Vegetation Strata	Dry Aspen Conifer (dac), o	Mountain Brush (mb)
Aspen (potr5), m	Dry Conifer Mix (dcm), o	Riparian Shrub (rsm)
Aspen (potr5), o	Grass/Forbs (gf)	Sage (sage)
Aspen Conifer (ac), m	Lodgepole pine (pico), m	Water (h2o)
Aspen Conifer (ac), o	Lodgepole pine (pico), o	

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

0 0.25 0.5
Miles
1:20,000 (at original document size of 11x17)
N

Figure 3.7-1
Vegetation and Structure Stage within the Project Area
East Smoky Panel Mine EIS

3.7.3.2 Aspen-Conifer

There are approximately 640 acres of aspen-conifer vegetation type (**Photo 3.7-2**) in the Study Area, which represents 26 percent of the vegetated area (**Table 3.7-1**). This is the most common vegetation type within the Study Area. In these areas, aspen and conifers grade without sharp, discernable boundaries and are often interspersed among otherwise contiguous aspen or conifer. Dominant canopy species within this cover type include aspen, Douglas-fir (*Pseudotsuga menziesii*), subalpine fir (*Abies lasiocarpa*), and lodgepole pine (*Pinus contorta*). Common understory species include mountain snowberry, meadow-rue (*Thalictrum fendleri*), sticky geranium (*Geranium viscosissimum*), and pinegrass (*Calamagrostis rubescens*). In many aspen stands, conifer encroachment is a natural pattern, which may be occurring at unnatural levels due to fire suppression (BLM 2010d).

The aspen-conifer vegetation type was stratified into two strata, old aspen-conifer and young/mature aspen-conifer. The old aspen-conifer stratum represents 82 percent of the aspen-conifer vegetation type and the young/mature aspen-conifer stratum represents 18 percent.

Photo 3.7-2 Typical Aspen Conifer Vegetation Type in the Study Area

3.7.3.3 Aspen-Dry

There are approximately 208 acres of aspen-dry vegetation type (**Photo 3.7-3**) in the Study Area, which represents nine percent of the vegetated area (**Table 3.7-1**). These stands are dominated by aspen that serves as a climax species or as the long-term stable species for the site. These stands appear to have aspen as a climax species due to the poor site quality; conifer is not capable of growing on these sites except in favorable micro sites (Beck 2011). The aspen-dry vegetation type was stratified into one strata, old aspen-dry.

Photo 3.7-3 Typical Aspen Dry Vegetation Type in the Study Area

3.7.3.4 Douglas-Fir

There are approximately 61 acres of Douglas-fir vegetation type (**Photo 3.7-4**) in the Study Area, which represents three percent of the vegetated area (**Table 3.7-1**). Douglas-fir represents the majority of the basal area within these stands. However, other conifer species may be present but will generally represent less than 33 percent of the basal area as a group (Beck 2011). Some aspen trees may be present but represent less than 15 percent of the basal area (Beck 2011). The Douglas-fir vegetation type was stratified into one strata, old Douglas-fir.

Photo 3.7-4 Typical Douglas-fir Vegetation Type in the Study Area

3.7.3.5 Dry Aspen-Conifer

There are approximately 190 acres of dry aspen-conifer vegetation type (**Photo 3.7-5**) in the Study Area, which represents eight percent of the vegetated area (**Table 3.7-1**). These forest stands rarely have more than 50 percent canopy cover; with aspen and conifer each representing at least 15 percent of the basal area (Beck 2011). The most common conifer species present is Douglas-fir, but lodgepole pine or subalpine fir may also be present. Aspen on these sites tends to be small in stature and growing in patches. The dry aspen-conifer vegetation type was stratified into one strata, old dry aspen-conifer.

Photo 3.7-5 Typical Dry Aspen Conifer Vegetation Type in the Study Area

3.7.3.6 Dry Conifer Mix

There are approximately 42 acres of dry conifer mix vegetation type (**Photo 3.7-6**) in the Study Area, which represents two percent of the vegetated area (**Table 3.7-1**). These stands rarely have more than 50 percent canopy cover due to harsh site conditions, the dominate species is often Douglas-fir, limber pine, lodgepole pine, or sub-alpine fir as a dominate or co-dominate (Beck 2011). Aspen may be present in this type, but will usually be in small patches and represent less than 15 percent of the canopy. The dry conifer mix vegetation type was stratified into one strata, old dry conifer mix.

Photo 3.7-6 Typical Dry Conifer Mix Vegetation Type in the Study Area

3.7.3.7 Lodgepole Pine

There are approximately 18 acres of lodgepole pine vegetation type (**Photo 3.7-7**) in the Study Area, which represents less than one percent of the vegetated area (**Table 3.7-1**). These are stands where lodgepole pine represents the clear majority of the basal area (Beck 2011). Other conifer species may be present but represent less than 33 percent of the total basal area of the stand. Aspen may be present but represents less than 15 percent of the basal area. The lodgepole pine vegetation type was stratified into one strata, old lodgepole pine.

Photo 3.7-7 Typical Lodgepole Pine Vegetation Type in the Study Area

3.7.3.8 Mixed Conifer

There are approximately 252 acres of mixed conifer vegetation type (**Photo 3.7-8**) in the Study Area, which represents 10 percent of the vegetated area (**Table 3.7-1**). This type occurs in the higher elevation areas with northern aspects, where there is sufficient moisture to support conifer species that include subalpine fir, lodgepole pine, and Douglas-fir on the upper reaches of the Study Area (above 7,000 feet), and in shady canyons where snowmelt would linger longer in the spring. The lack of Engelmann spruce (*Picea engelmannii*) occurrences seems related to the upper elevation limits in the Study Area remaining below the spruce zone. Subalpine fir dominates the second and third-growth mixed stands where the slopes are shady and at the highest elevations on northern-northeast aspects. Lodgepole pine dominates in stands that are more open and co-dominates in mid-elevation areas where less moisture occurs. Most of the lodgepole pine sites occupy gentle slopes that are relatively cool and generally dry. Topography is variable, but moderate to steep slopes predominate.

On open aspects, the mixed conifer community is dominated by lodgepole pine, with Douglas-fir, and subalpine fir occasionally interspersed within lodgepole pine stands. Kinnikinnick (*Arctostaphylos uva-ursi*) grows thickly at the edge of both mixed conifer and aspen communities, especially in the old clearcuts. In the mixed conifer stands, the most significant shrubs are snowberry; serviceberry (*Amelanchier alnifolia*); chokeberry (*Prunus virginiana*) on open, exposed slopes; and elderberry (*Sambucus racemosa*). Kinnikinnick and pipsissewa (*Chimaphila umbellata*) become the most dominant understory shrubs in the densest, shadiest mixed conifer stands.

A sweeping high carpet of grouse whortleberry (*Vaccinium scoparium*) typifies the undergrowth in some stands. Small amounts of common yarrow (*Achillea millefolium*), fireweed (*Epilobium angustifolium*), hawkweed (*Hieracium* spp.), Ross' sedge (*Carex rossii*), Wheeler's bluegrass (*Poa nervosa*), spike trisetum (*Trisetum spicatum*), and conspicuous heartleaf arnica (*Arnica cordifolia*) are represented throughout the mixed conifer habitat type. Dwarf blueberry (*Vaccinium caespitosum*) and either mountain box-laurel or creeping Oregon grape (*Mahonia repens*) are often present also, depending on the amount of light and soil. Pinegrass (*Calamagrostis rubescens*) is the most common understory grass in almost all of the stands. In subalpine fir-dominated sites, the undergrowth is principally herbaceous with *Osmorhiza* spp. as a dominant forb. Other most frequently encountered forbs include common yarrow, nettleleaf horsemint (*Agastache urticifolia*), Colorado columbine (*Aquilegia coerulea*), Engelmann's aster (*Eucephalus engelmannii*), sawtooth groundsel ragwort (*Senecio serra*), and meadow-rue. Heartleaf arnica, fireweed, wild strawberry (*Fragaria virginiana*), northern bedstraw (*Galium boreale*), Potentilla spp., wintergreen (*Pyrola secunda*), and Tuber starwort (*Stellaria jamesiana*). In areas that have been disturbed by livestock, Sweet pea (*Lathyrus* spp.), western coneflower (*Rudbeckia occidentalis*), and Tuber starwort are often abundant. Various graminoids are common, such as blue wildrye (*Elymus glaucus*), fringed brome (*Bromus ciliatus*), Wheeler's bluegrass, bluebunch wheatgrass (*Pseudoroegneria spicata*), spike trisetum, and species of *Bromus*, and *Carex*.

Adjacent, warmer sites are usually mixed with aspen-dominated stands having essentially similar undergrowths. Snowberry becomes increasingly important on drier sites, many of which appear to be "stable". The gooseberry species, (*Ribes* spp.), are often present, and vary in importance in the shrub component of the stands depending on slope, aspect, and percent canopy cover of the conifer overstory. Rocky Mountain maple (*Acer glabrum*) occurs infrequently on open, sunny slopes in association with the mixed conifer stands, often in association with Douglas-fir. Undergrowth typically includes small amounts of common yarrow, heartleaf arnica, fireweed, wild strawberry, northern bedstraw, cinquefoil, wintergreen, and Tuber starwort as herbaceous species.

The mixed conifer vegetation type was stratified into two strata, old mixed conifer and mature mixed conifer. The old mixed conifer stratum represents 86 percent of the mixed conifer vegetation type and the mature mixed conifer represents 14 percent.

Photo 3.7-8 Typical Mixed Conifer Vegetation Type in the Study Area

3.7.3.9 Grass/Forb

There are approximately 177 acres of grass/forb vegetation type (**Photo 3.7-9**) in the Study Area, which represents seven percent of the vegetated area (**Table 3.7-1**). This type occurs mainly in the flats of Sage Valley and typically in the lowest elevations of the Study Area. Smooth brome (*Bromus inermis*) is dominant in the flats of Sage Valley.

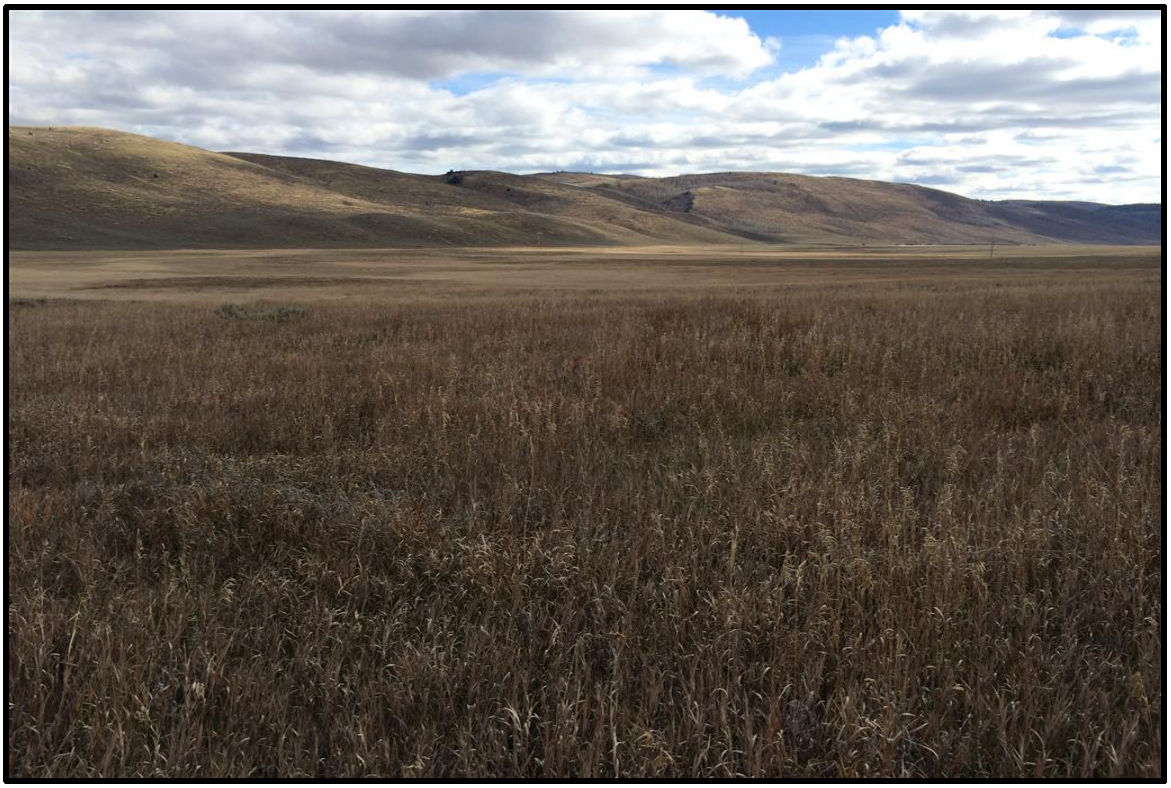


Photo 3.7-9 Typical Grass/Forb Vegetation Type in the Study Area

3.7.3.10 Mountain Brush

There are approximately 251 acres of mountain brush vegetation type (**Photo 3.7-10**) in the Study Area, which represents 10 percent of the vegetated area (**Table 3.7-1**). On southeast-facing, mid-elevation slopes, with favorable soils and moisture, mountain brush communities are composed of snowberry, chokecherry, bitterbrush (*Purshia tridentata*), serviceberry, buckbrush or snowbrush (*Ceanothus velutinus*), mountain box-laurel, ninebark (*Physocarpus malvaceus),* and sagebrush (*Artemisia spp*.). Rocky Mountain maple form both discrete communities as well as in a mosaic with sagebrush communities, replacing sagebrush communities as elevation climbs in the Study Area, forming a less dominant community type that occurs infrequently between the lower sagebrush and higher aspen/mixed conifer communities.

In some areas, the mountain brush species previously listed form transition zones between sagebrush-grasslands and aspen/mixed conifer stands; however, in some of the more mesic sites with presumably better soils, the mountain brush species form distinct, discreet communities between sage and aspen stands. Parsnipflower buckwheat (*Eriogonum heracleoides*) occurs as a minor component in the sagebrush/grass community but dominates the mountain brush herbaceous component. Creeping Oregon grape grows both within the mountain brush community and near edges and within aspen/conifer stands as an understory cover. Perennial grasses including: wildrye (*Elymus spp*.), mountain brome (*Bromus carinatus*), fringed brome, and wheatgrasses (*Pseudoroegneria* and *Pascopyrum* spp.) and basin wildrye (*Leymus cinereus)* exist as the dominant species within the grass-forb stratum of the mountain brush community.

Photo 3.7-10 Typical Mountain Brush Vegetation Type in the Study Area

3.7.3.11 Riparian Shrub

A small riparian shrub community (**Photo 3.7-11**), comprising approximately 12 acres and representing less than one percent of the Study Area, is dominated with low willows, gray alder *(Alnus incana*), and other shrub species and is associated with the Roberts Creek drainage. The small patch of riparian shrub vegetation type is found within the Study Area, but outside and to the east of the area proposed for disturbance.

Photo 3.7-11 Typical Riparian Shrub Vegetation Type Found in the Study Area

3.7.3.12 Sagebrush Vegetation Type

There are approximately 428 acres of sagebrush vegetation type (**Photo 3.7-12**) in the Study Area, which represents 18 percent of the vegetated area (**Table 3.7-1**). Bitterbrush grows interspersed with mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) on more favorable, mesic sites. In general, mountain big sagebrush dominates the upland sagebrush vegetation type, with silver sagebrush *(Artemisia cana ssp. viscidula*) and threetip sagebrush (*Artemisia tripartita*) occurring less frequently. Green rabbitbrush (*Chrysothamnus viscidiflorus*) is another shrub encountered in the sagebrush communities. Herbaceous species found commonly in the sagebrush communities include: mule-ears (*Wyethia amplexicaulis*), sticky geranium, yarrow, lupine (*Lupinus spp*.), groundsel/tall ragwort, and arrowleaf balsamroot (*Balsamorhiza sagittata*). Perennial grasses occur interspersed throughout the sagebrush communities, including wheatgrasses (*Agropyron* spp., *Thinopyrum* spp.), brome (*Bromus* spp.), needlegrasses (*Stipa spp*.), and Idaho fescue, with annual grasses (e.g. *Poa spp*.) forming a minor component.

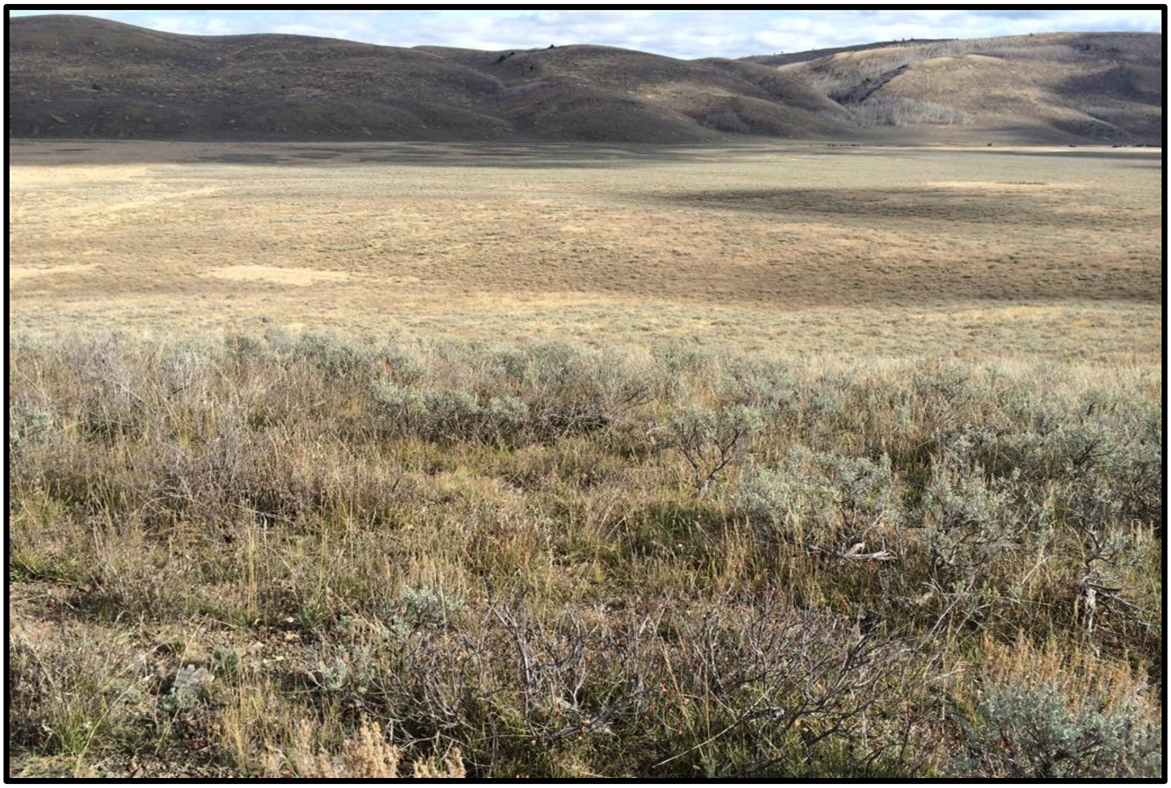


Photo 3.7-12 Typical Sagebrush Vegetation Type in the Study Area

3.7.4 Wetlands

There were no wetlands identified within the areas proposed for disturbance, with the exception of where a proposed dewatering pipeline could be located, adjacent to the existing tailings ponds and associated with the Roberts Creek Diversion. However, since the dewatering pipeline, if needed, would only be laid across the top of wetlands in this area, no delineations or functional assessments were conducted or deemed necessary. Thus, wetlands are not addressed in **Chapter 4**.

3.7.5 Riparian Vegetation

The only area of riparian vegetation was the aforementioned riparian shrub vegetation type. It was located outside of the proposed disturbance area and no riparian habitat would be affected. Thus, riparian vegetation is not addressed in **Chapter 4**.

3.7.6 Threatened, Endangered, and Sensitive Plants

An initial review determined that there are no plant species listed as threatened, endangered, candidate, or proposed under the Endangered Species Act (ESA) that are known to occur in Caribou County (USFWS 2015). However, Ute Ladies'-tresses (*Spiranthes diluvialis*) has the potential to occur in Caribou County (USFWS 2015). While it has the potential to occur along riparian edges, gravel bars, old oxbows, high flow channels, and moist to wet meadows along perennial streams or other stable wetland and seep areas, no such habitat exists within the Study Area. Thus, species-specific surveys were not needed.

There are four plant species listed as sensitive for the CTNF, and another six species are on the CTNF "Forest Watch" list of rare plants. **Table 3.7-2** lists these species, the habitat where each species is known to occur, and their potential to occur in the Study Area.

Table 3.7-2 Forest Service Sensitive and "Forest Watch" Plant Species on the CTNF

SCIENTIFIC NAME	COMMON NAME	KNOWN HABITAT	POTENTIAL TO OCCUR IN STUDY AREA
Forest Service Sensitive Plant Species			
Astragalus jejunus var. jejunus	Starveling milkvetch	Shale of the Twin Creek Limestone Formation (Mancuso and Moseley 1990)	Unlikely
Lesquerella paysonii	Payson's bladderpod	Ridges and high peaks of the Snake River Range above the Snake River; also on Caribou Mountain (Moseley 1996)	Unlikely
Pinus albicaulis	Whitebark pine	Occurs in subalpine and timberline zones associated with limber pine, subalpine fir, and/or lodgepole pine ranging from 7,300 to 10,500 feet in elevation (Fryer 2002)	Unlikely
Penstemon compactus	Cache beardtongue	High elevation limestone substrates, on bedrock, outcrops, or cliff bands ranging from 8,800 to 9,300 feet in elevation (Moseley and Mancuso 1990)	Unlikely
Forest Service Watch Plant Species			
Asplenium septentrionale	Grass-like spleenwort	Generally found in cracks and crevices of rock outcrops and large boulders at elevations of 2,000-10,000 feet within mixed conifer forest (Tetra Tech 2013)	Unlikely
Asplenium tricomanes-ramosum	Green spleenwort	Moist limestone or other basic substrates at high elevations (Moseley and Mancuso 1990)	Very Unlikely
Carex idahoa	Idaho sedge	Low, level wetland transition zones within the Blackfoot River watershed (Tetra Tech 2013)	No
Ericameria discoidea var. winwardii	Winward's goldenbush	Only on barren Twin Creek Limestone outcrops on the Montpelier Ranger District (Tetra Tech 2013)	No
Musineon lineare	Rydberg's musineon	Ledges and crevices on near-vertical outcrops between 8,200 and 9,000 feet in elevation (Moseley and Mancuso 1990; Mancuso 2003)	No
Salicornia rubra	Red glasswort	Low elevation flats; prefers basic, saline soils (Tetra Tech 2013)	No

As shown in **Table 3.7-2**, the potential for any of these plant species to occur within the Study Area was determined to be extremely low. This potential was further evaluated through a review of existing literature and confirmed via consultation with the CTNF botanist. It was determined that habitat for sensitive or "Forest Watch" species did not exist within the Study Area, so no formal surveys were conducted. However, an informal inventory was conducted while other vegetation data were being collected. No special status plant species were observed within the Study Area.

3.7.7 Culturally Significant Plants to the Shoshone – Bannock Tribes

The Culturally Significant Plants Database for the Shoshone – Bannock Tribes (Environmental Waste Management Program [EWMP] 2014) was reviewed and an informal inventory was conducted while other vegetation data were being collected. Thirty-five out of the 238 species listed in the database were observed within the Study Area while conducting detailed forest and vegetation data collection (**Table 3.7-3**).

Table 3.7-3 Culturally Significant Plants to the Shoshone-Bannock Tribes Observed Within the Study Area

PLANT SPECIES
Trees
Aspen – *Populus tremuloides*
Douglas fir – *Pseudotsuga menziesii*
Lodgepole pine – *Pinus contorta*
Maple – *Acer* spp.
Serviceberry – *Amelanchier alnifolia*
Subalpine fir – *Abies lasiocarpa*
Shrubs
Buckbrush – *Ceanothus velutinus*
Chokecherry – *Prunus virginiana*
Elderberry (red) – *Sambucus racemosa*
Honeysuckle – *Lonicera species*
Kinnikinnick – *Arctostaphylos uva-ursi*
Oregon grape – *Berberis repens*
Russet buffalo berry – *Shepherdia Canadensis*
Sagebrush (big) – *Artemisia tridentata*
Snowberry – *Symphoricarpos* spp.
Wax or bear currant – *Ribes cereum*
Wild carrot – *Perideridia* spp.
Wild currant - *Ribes aureum*
Wild raspberry – *Rubus* spp.
Wild rose – *Rosa* spp.
Yarrow – *Achillea millefolium*

PLANT SPECIES
Forbs
Cinquefoil – *Potentilla* spp.
False Solomon seal – *Maianthemum* spp.
Fireweed – *Chamerion angustifolium*
Larkspur – *Delphinium* spp.
Lupines – *Lupinus* spp.
Meadow rue – *Thalictrum* species
Phlox – *Phlox longifolia*
Rocky Mountain Helianthella – *Helianthella uniflora*
Sweet anise – *Osmorhiza occidentalis*
Sweet cicely – *Osmorhiza* spp.
Tansy mustard – *Descurainia pinnata*
Thistle – *Cirsium* spp.
Grasses
Grasses (non-species specific)
Basin wildrye – *Leymus cinereus*

3.7.8 Noxious Weeds

In Idaho, a weed is designated noxious when it is considered by a governmental agency to be injurious to public health, agriculture, recreation, wildlife, or property. Noxious weed regulations are covered by Title 22, Chapter 24, Idaho Code, Noxious Weeds Law. Some general characteristics of noxious weeds are their ability to spread rapidly, reproduce in high numbers, and crowd out native plants. Noxious weeds also tend to be very difficult to control.

The director of the Idaho State Department of Agriculture makes the legal designation of noxious. The director considers the counsel of the Noxious Weed Advisory Board in the designation of noxious species. Currently, the department uses the following criteria for designation of a noxious weed:

- It must be present in but not native to Idaho.
- It must be potentially more harmful than beneficial to Idaho.
- Eradication must be economically and physically feasible.
- The potential adverse impact of the weed must exceed the cost of control.

As described in the Vegetation and Wetland Resources TR (Stantec 2017b), the Idaho noxious weed list currently has 67 species on it, with 12 of those known to occur within Caribou County (**Table 3.7-4**).

Table 3.7-4 Noxious Weeds Documented in Caribou County

COMMON NAME	SCIENTIFIC NAME
Black henbane	*Hyoscyamus niger*
Canada thistle	*Cirsium arvense*
Dalmatian toadflax	*Linaria dalmatica* ssp. *dalmatica*
Houndstongue	*Cynoglossum officinale*
Leafy spurge	*Euphorbia esula*
Musk thistle	*Carduus nutans*
Purple loosestrife	*Lythrum salicaria*
Russian knapweed	*Acroptilon repens*
Scotch cottonthistle	*Onopordum acanthium*
Spotted knapweed	*Centaurea maculosa*
Whitetop (hoary cress)	*Cardaria draba*
Yellow toadflax	*Linaria vulgaris*

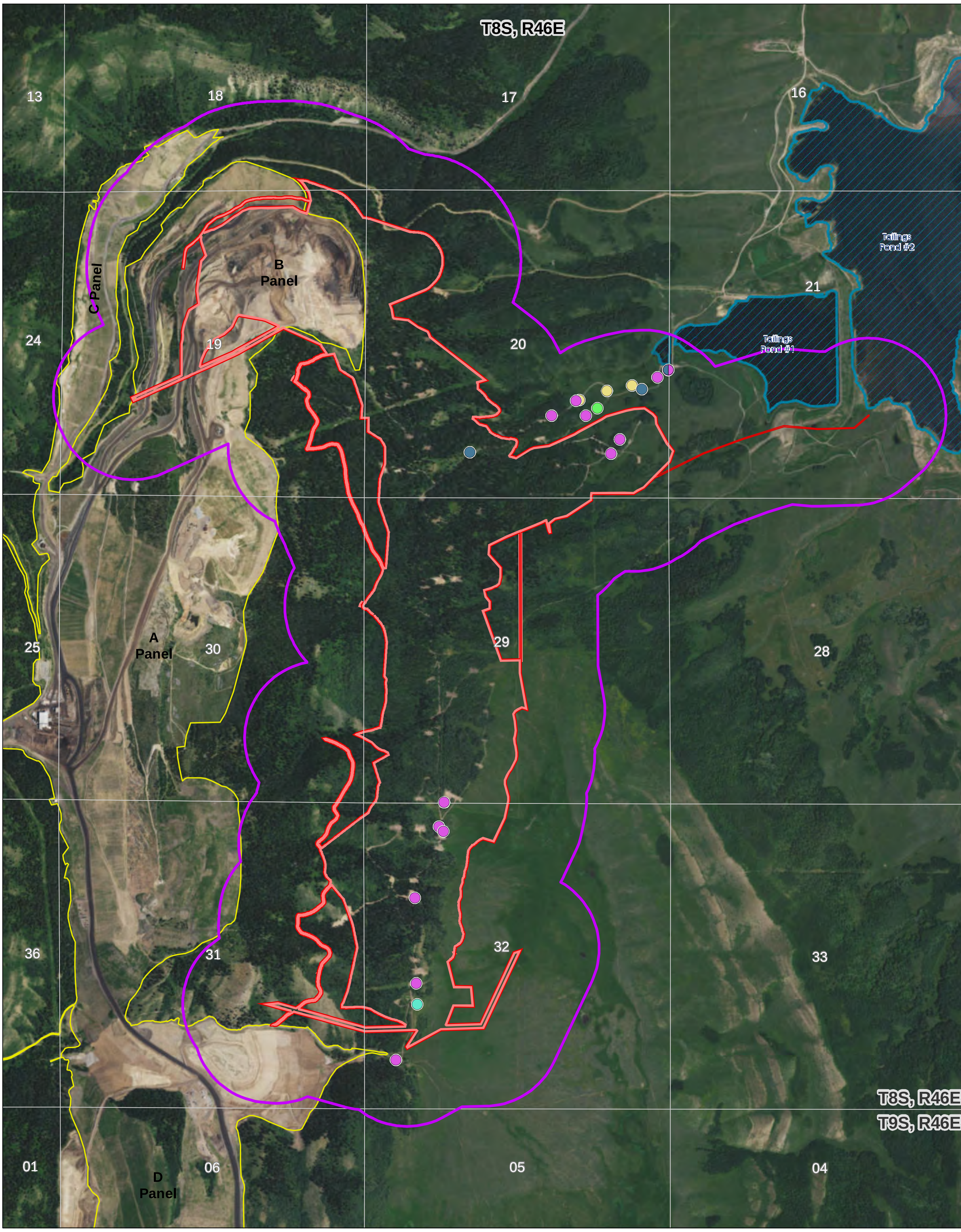
Source: http://www.cariboucounty.us/departments/315/WeedList.aspx

Noxious weeds were noted and populations mapped during other vegetation surveys conducted in the vegetation Study Area. Weed survey efforts were concentrated along existing and new exploration access roads, as the majority of noxious weeds were found along them. Five species were found: Canada thistle, scotch thistle, musk thistle, hoary cress, and spotted knapweed (**Figure 3.7-2**). Musk thistle was the most dominant species along various roads within the Study Area. Although many of the populations had been sprayed, new individuals were still growing. Hoary cress was found in small populations near roadways in damp soils. Spotted knapweed was observed on new disturbances along cut banks. No extensive areas of noxious weed infestations were observed in the Study Area.

Further, there may be other invasive species that have not been designated as noxious. While not all invasive species may be designated as noxious, the NFS uses the same standards and guidelines for both noxious weeds and invasive species, thus the term noxious as used here should be considered to apply to invasive species as well. Invasive species that are not considered noxious weeds were not addressed in the Vegetation TR.

3.7.9 Old Growth

The 2003 CNF Revised Forest Plan has a standard that states that each 5th code HUC shall be at least 20 percent mature and old forested age classes (including old growth). It also states that 15% of the forested acres in each 5th code HUC should be actively managed to attain old growth characteristics. The Study Area is within two 5th code HUCs: Middle Salt River (HUC 1704010502 – approximately 130,560 acres) and the Upper Salt River (HUC 1704010501 – approximately 224,000 acres). Based on a review of the existing CTNF vegetation GIS coverage in these watersheds, over 90% (97% and 94%, respectively) of the forested vegetation is in mature or old age structural classes. Based upon the extremely high percentages of existing forested vegetation within the Study Area that are in mature or old age structural classes, an in-depth old-growth stand evaluation was deemed unnecessary for the entire watershed. Rather, for an initial assessment of the Study Area, the strata sampling data was used to determine if any strata could meet the USFS Intermountain Region (Region 4) old growth definitions.



Legend

- Project Area Boundary
- Existing Disturbance Area
- Tailings Ponds
- Vegetation Study Area

Noxious Weed Location

- Canada Thistle (Cirsium arvense)
- Hoary Cress (Cardaria draba)
- Musk Thistle (Carduus nutans)
- Canada Thistle/Musk Thistle
- Scotch Thistle (Onopodum acanthium)
- Spotted Knapweed (Centaurea stoebe subsp. micanthos)

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Miles
1:21,000 (at original document size of 11x17)
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Figure 3.7-2
Observations of Noxious Weeds in the Vegetation Study Area
East Smoky Panel Mine EIS

For the strata sampling, four randomly located plots were sampled within the 11 identified forest strata listed in **Table 3.7-1** (44 plots) according to methodology described in Stantec (2017b). Each stratum was evaluated by calculating the average trees per acre (TPA) from the plot data using standard equations for variable and fixed radius plots. Although there are various characteristics of old growth forests, average TPA, diameter at breast height (DBH), and average age from each stratum was compared to the "required minimums" described in the Characteristics of Old-Growth Forests in the Intermountain Region (Hamilton 1993 as cited in Stantec 2017b) and shown in **Table 3.7-5**.

Table 3.7-5 Characteristics of Old-growth Forests in the Intermountain Region

FOREST TYPE	MAIN CANOPY – REQUIRED MINIMUMS[1]			VARIATION IN DIAMETER (6-INCH CLASSES)	CANOPY LAYERS (NUMBER)	SNAGS PER ACRE
	DBH	TPA	Age			
Quaking Aspen						
Dry areas	≥12	10	100	≥2	N/A	2
Moist areas	≥12	20	100	≥2	N/A	2
Interior Douglas-fir						
High productivity	≥24	≥15	≥200	≥2	≥2	≥1
Low productivity	≥18	≥10	≥200	≥2	≥2	0-3
Lodgepole pine						
All forest types	≥11	≥25	≥140	≥2	≥2	5
Engelmann spruce-Subalpine fir						
Warm/moist areas	≥24	≥25	≥220	≥2	≥2	≥2
Cold/dry areas	≥15	≥15	≥150	≥2	≥2	2-4
Alpine Transition area	≥12	≥10	≥150	≥2	≥2	Few

Source: Hamilton (1993). [1] I.e., a dry area aspen stand much have at least 10 TPA that are over 12 inches DBH and be over 100 years old to meet minimum requirements as old growth. DBA=Diameter at breast height. TPA=Trees per acre

Data from the forest strata sampling used in the old growth evaluation is available in Stantec (2017b). Although most of the strata did not meet the Region 4 old growth definitions, the "old aspen" stratum had a high potential to have stands that did meet the definitions for old growth aspen. The average in the "old aspen" stratum was 30 TPA for trees greater than 12 inches DBH (average DBH of 12.8 inches), with an average age of 110 years (Region 4 definitions for aspen are 20 TPA for trees greater than 12 inches DBH that average more than 100 years in age). In addition, the "old mixed conifer" strata had some "large" "old" trees, but not enough of them to meet the definitions, but it was possible that the stratum had individual stands that would meet old-growth definitions.

Because the "old aspen" stratum met the Region 4 old-growth definitions and the "old mixed conifer" stratum had the potential for stands that could meet the definitions, additional sampling was conducted in 2017 by CTNF employees trained and familiar with Region 4 old-growth and with USFS stand exam protocols. An experienced forester (over 25-years' experience) walked through stands within the "old aspen" and "old mixed conifer" strata. Although it appeared, based on experience, that none of the stands would meet the Region 4 old-growth definitions, four stands were selected for stand exams (Beck 2017). The stand exams confirmed that none of the stands met the Region 4 old-growth definitions. The stand exams revealed that there are old, even very old trees within the Study Area, but that there are not enough to meet the Region 4 old-growth criteria (Beck 2017). This is mostly due to the mixed severity fire regime historically present in the Study Area; stands with this type of natural disturbance regime rarely would meet Region 4 old-growth definitions (Beck 2017).

3.8 WILDLIFE RESOURCES

This section presents information on the wildlife resources present within the Study Area, which was defined as the Project Area and a 0.5-mile buffer surrounding the Project Area, excluding any active mining areas (**Figure 3.8-1**). The Study Area boundary was developed with the IDT experts and professional judgement. This area was chosen because 0.5 miles away from the Project Area is considered an adequate buffer within where impacts could be extended based upon general wildlife travel distances. The information presented is summarized from the Wildlife Resources TR (Stantec 2016e) and based on: 1) a review of existing data, and 2) wildlife surveys that were conducted in the Study Area in 2014 and 2015. The information presented focuses on occurrence documentation of any species listed as Threatened, Endangered, Proposed, or Candidate (TEPC) by the U.S. Fish and Wildlife Service (USFWS); as well as a description of the quantity and quality of potential habitat for other special status species (species listed as Sensitive by the State, BLM, or USFS), and other wildlife species of interest.

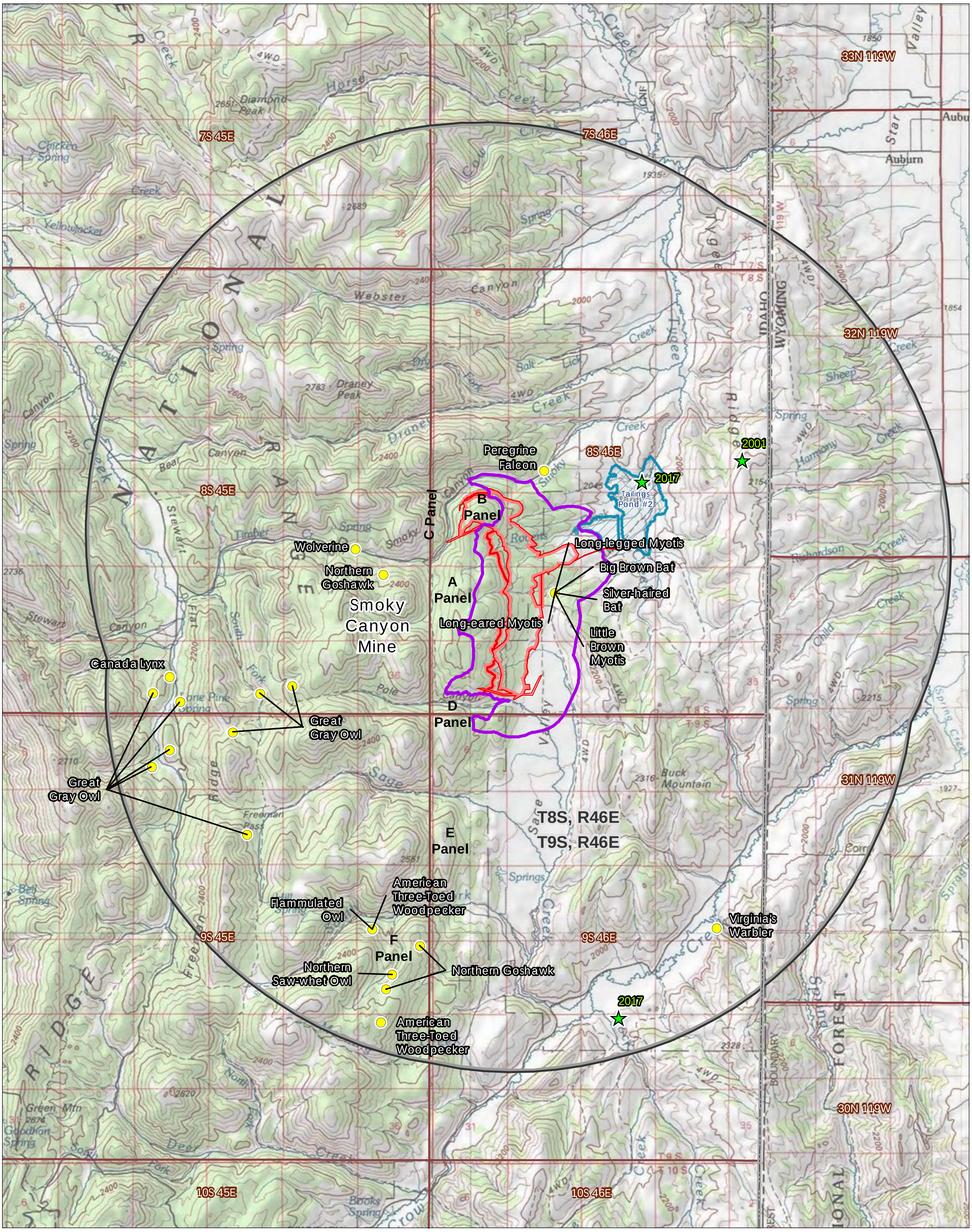
3.8.1 General Habitat and Vegetation

The dominant habitat types within the Study Area are forested and sagebrush communities (Maxim 2000a as cited in Stantec 2016e; ICFWRU 2000; Homer 1998, and **Section 3.7**). Forested areas include Douglas-fir (*Pseudotsuga Menziesii*), lodgepole pine (*Pinus contorta*), and subalpine fir (*Abies lasiocarpa*), as well as quaking aspen (*Populus tremuloides*) and aspen/conifer mixes. Sagebrush habitats are dominated by mountain big sagebrush (*Artemisia tridentata vaseyana*) and grasses. The Study Area also contains mixed brush communities, as well as some limited wetland and meadow areas, associated with Roberts Creek, Sage Valley, and the tailings pond area.

Within the Study Area, there is one approximately two-acre pond created to divert Roberts Creek around the tailings ponds. Immediately outside the Study Area are the two tailings ponds, approximately 70 and 300 acres in size. The tailings ponds are managed by Simplot as to not attract wildlife by reducing shoreline vegetation and habitat (Stantec 2016e).

3.8.2 Special Status Species

Special status species with the potential to occur in the Study Area are listed in **Table 3.8-1** along with their State, federal, BLM, and USFS status and whether they were detected during the wildlife resources baseline study. **Figure 3.8-1** shows the location of any Idaho Fish and Wildlife System (IFWIS) records of special status species observations within five miles of the Study Area.



Legend

- Special Status Species Records
- Sage Grouse Leks (last count date)
- Project Area Boundary
- Tailings Ponds
- 5- Mile Study Area Buffer
- Study Area (includes 1/2-mile buffer, modified to exclude existing disturbance)

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Copyright:© 2013 National Geographic Society, i-cubed
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 3.8-1
Idaho Department of Fish and Game Fish and Wildlife Information System Data
East Smoky Panel Mine EIS

Detailed information on the life history, distribution, and presence within or near the Study Area is presented within subsections following the table, grouped by animal type (e.g., birds, mammals, amphibians). Federal and State rankings are based on the categories described as follows (note that in 2015 Idaho BLM consolidated their special status species list into just two categories for animals; for additional information see BLM Instructional Memorandum No. ID-2015-009, Change 1). Only BLM-sensitive species that have the potential to occur in the Study Area are included.

Idaho

- S1 – Critically Imperiled: at high risk because of extreme rarity (often five or fewer occurrences), rapidly declining numbers, or other factors that make it particularly vulnerable to range-wide extinction or extirpation.
- S2 – Imperiled: at risk because of restricted range, few populations (often 20 or fewer), rapidly declining numbers, or other factors that make it vulnerable to range-wide extinction or extirpation.
- S3 – Vulnerable: at moderate risk because of restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors that make it vulnerable to range-wide extinction or extirpation.
- S4 – Apparently secure: uncommon but not rare; some cause for long–term concern due to declines or other factors.
- S5 – Secure: common, widespread, and abundant.
- SNA – Not Applicable: a conservation status rank is not applicable because the species is not a suitable target for conservation activities.
- B – Breeding: conservation status refers to the breeding population of the species.
- N – Nonbreeding: conservation status refers to the non–breeding population of the species.

USFWS

- E – Endangered: species in danger of extinction throughout all or a significant portion of its range.
- T – Threatened: species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
- XN – Experimental/Nonessential Population: a population (including its offspring) of a listed species designated by rule published in the Federal Register (FR) that is wholly separate geographically from other populations of the same species.
- C – Candidate Species.

BLM

- Type 1 – federally listed Threatened or Endangered Species, Experimental Essential populations, and designated Critical Habitat.
- Type 2 – Idaho BLM Sensitive Species, including USFWS Proposed and Candidate species, ESA species delisted during the past 5 years, and ESA Experimental Non-essential populations.

Table 3.8-1 Special Status Species and their Presence in/near the Study Area

COMMON NAME	SCIENTIFIC NAME	STATUS				OCCURRENCE	
		IDAHO[1]	USFWS	BLM	USFS[2]	STUDY AREA	NEAR THE STUDY AREA (WITHIN 5 MILES)
Birds							
Bald eagle	*Haliaeetus leucocephalus*	S3B S4N		Type 2	S	**PRESENT**	**PRESENT**, winter roost 5 miles south, 1 incidental observation near tailings pond area
Boreal owl	*Aegolius funereus*	S2			S	**PRESENT**	**PRESENT**
Brewer's sparrow	*Spizella breweri*	S3B		Type 2		**PRESENT**	**PRESENT**
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	S3		Type 2	S	Not detected	No records
Flammulated owl	*Otus flammeolus*	S3B		Type 2	S	**PRESENT**	**PRESENT**
Great gray owl	*Strix nebulosa*	S3			S	**PRESENT**	**PRESENT**
Greater sage-grouse	*Centrocercus urophasianus*	S4		Type 2	S	Not detected	**PRESENT** – grouse observed near dairy farm located approximately two miles north of Study Area
Harlequin duck	*Histrionicus*	S1B			S	Not detected	No records
Northern goshawk	*Accipiter gentiles*	S4		Type 2	S	**PRESENT**	**PRESENT**
Olive-sided flycatcher	*Contopus borealis*	S3B		Type 2		Not detected	Assumed **PRESENT**
Peregrine falcon	*Falco peregrines anatum*	S1B			S	Not detected	**PRESENT** – observation made 0.5 miles outside Study Area
Prairie falcon	*Falco mexicanus*	S4B S4N				Not detected	No records
Sagebrush sparrow	*Amphispiza nevadensis*	S3B		Type 2		Not detected	Assumed **PRESENT**
American three-toed woodpecker	*Picoides dorsalis*	S2			S	**PRESENT**	**PRESENT**
Trumpeter swan	*Cygnus buccinator*	S1B S2N		Type 2	S	Not detected	**PRESENT** – confirmed occupied winter habitat 3.5 miles south of Study Area
Willow flycatcher	*Empidonax trailii*	S5B		Type 2		Not detected	Assumed **PRESENT**

COMMON NAME	SCIENTIFIC NAME	STATUS				OCCURRENCE	
		IDAHO[1]	USFWS	BLM	USFS[2]	STUDY AREA	NEAR THE STUDY AREA (WITHIN 5 MILES)
Mammals							
Gray wolf	*Canis lupus*	S4		Type 2	S	**PRESENT**	**PRESENT**
Canada lynx	*Lynx Canadensis*	SNA	T			Not detected	Some records in region, rare
Pygmy rabbit	*Brachylagus idahoensis*	S2		Type 2	S	Not detected	No records
Spotted bat	*Euderma maculatum*	S3			S	Not detected	No records
Townsend's big-eared bat	*Corynorhinus townsendii*	S3		Type 2	S	Not detected	No records
Uinta chipmunk	*Tamias umbrinus*	S1				Not detected	Assumed present
North American wolverine	*Gulo luscus*	S1		Type 2	S	Not detected	Some records in region, rare
Amphibians and Reptiles							
Boreal toad	*Bufo boreas* (southeast Idaho population)	N/A		Type 2	S	Not detected	**PRESENT** – tadpoles observed approximately 4 miles southwest of the Study Area, no adults observed
Columbia spotted frog	*Rana luteiventris*	S4			S	Not detected	Range does not overlap with Study Area
Common garter snake	*Thamnophis sirtalis*	S3				Not detected	Assumed **PRESENT**
Northern leopard frog	*Rana pipens*	S2		Type 2		Not detected	Assumed **PRESENT**

Notes:
1. Idaho Department of Fish and Game ([IDFG] 2013a; 2017a)
2. USFS 2003b

USFS

- S – Sensitive: animal species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

3.8.3 Birds

The Study Area provides habitat for a wide variety of birds and numerous raptors, passerines, and other migratory birds were incidentally observed in the Study Area (**Table 3.8-2**). Migratory bird and raptor surveys were conducted on several occasions in areas within the Study Area and other incidental observations were made in conjunction other surveys and site visits.

Table 3.8-2 Birds Species and/or Their Signs Observed in the Study Area in 2014 and 2015

COMMON NAME	SCIENTIFIC NAME
American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American robin	*Turdus migratorius*
Bald eagle	*Haliaeetus leucocephalus*
Belted kingfisher	*Megaceryle alcyon*
Black-capped chickadee	*Poecile atricapillus*
Black-headed grosbeak	*Pheucticus melanocephalus*
Black-throated gray warbler	*Setophaga nigrescens*
Brewer's sparrow	*Spizella breweri*
Broad-tailed hummingbird	*Selasphorus platycercus*
Brown-headed cowbird	*Molothrus ater*
Canada goose	*Branta canadensis*
Chipping sparrow	*Spizella passerina*
Clark's nutcracker	*Nucifraga columbiana*
Common raven	*Corvus corax*
Common yellowthroat	*Geothlypis trichas*
Cordilleran flycatcher	*Empidonax occidentalis*
Dark-eyed junco	*Junco hyemalis*
Dusky flycatcher	*Empidonax oberholseri*
Franklin's gull	*Leucophaeus pipixcan*
Gadwell	*Anas strepera*
Golden eagle	*Aquila chrysaetos*
Great gray owl	*Strix nebulosa*
Gray jay	*Perisoreus canadensis*
Great-horned owl	*Bubo virginianus*
Hairy woodpecker	*Picoides villosus*

COMMON NAME	SCIENTIFIC NAME
Hammond's flycatcher	*Empidonax hammondii*
Hermit thrush	*Catharus guttatus*
House wren	*Troglodytes aedon*
Mallard	*Anas platyrhynchos*
Mountain chickadee	*Poecile gambeli*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auratus*
Northern goshawk	*Accipter gentilis*
Northern harrier	*Circus cyaneus*
Northern saw-whet owl	*Aegolius acadicus*
Orange-crowned warbler	*Vermivora celata*
Peregrine falcon	*Falco peregrinus*
Pine siskin	*Carduelis pinus*
Red-breasted nuthatch	*Sitta canadensis*
Red-naped sapsucker	*Sphyrapicus nuchalis*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-necked duck	*Aythya collaris*
Ruby-crowned kinglet	*Regulus calendula*
Ruffed grouse	*Bonasa umbellus*
Sandhill crane	*Grus canadensis*
Spotted sandpiper	*Actitis macularius*
Spotted towhee	*Pipilo maculatus*
Sora	*Porzana carolina*
Steller's jay	*Cyanocitta stelleri*
Townsend's solitaire	*Myadestes townsendi*
Tree swallow	*Tachycineta bicolor*
Turkey vulture	*Cathartes aura*
Vesper sparrow	*Pooecetes gramineus*
Warbling vireo	*Vireo gilvus*
Western tanager	*Piranga ludoviciana*
Western wood-pewee	*Contopus sordidulus*
White-crowned sparrow	*Zonotrichia leucophrys*
Wilson's snipe	*Gallinago delicata*
Yellow warbler	*Setophaga petechia*
Yellow-rumped warbler	*Dendroica coronata*

3.8.3.1 Upland Game Birds

Species of upland game birds known to occur in the Study Area include the ruffed grouse and dusky grouse. The greater sage-grouse and Columbian sharp-tailed grouse are discussed in **Section 3.8.3.4**. The ruffed grouse was observed incidentally during surveys for special status species in 2014 and the dusky grouse has the potential to occur. Both species are typically found in or near aspen groves.

3.8.3.2 Migratory Birds

A variety of migratory birds are found on the CTNF, and many species are expected in the Study Area. Migratory birds are protected by the Migratory Bird Treaty Act of 1918 (MBTA), which prohibits the "take" of any migratory bird (16 U.S.C. 703-712). In January 2001, Executive Order 13186 required some federal agencies, including the USFS, to develop a MOU with the USFWS to promote the recommendations of various migratory bird programs and conservation considerations. The USFS developed a MOU with USFWS in 2008 (USFS 2008b) and BLM in 2010 (BLM 2010e). In the USFS MOU, the USFS agreed to work collaboratively with USFWS and other agencies to reduce the take of migratory birds. This includes using the NEPA process to evaluate effects on migratory birds, evaluate and balance long-term benefits of projects against any short- or long-term adverse effects, pursue opportunities to restore or enhance habitats within a project area, and consider approaches for identifying and minimizing incidental take of migratory birds.

Coordinated implementation plans at the regional and state levels can be used to assist federal agencies with implementation of the MOU. In 1995, the Intermountain West Joint Venture (IWJV) adopted an Implementation Plan to provide a framework for implementing the North American Waterfowl Management Plan in Idaho and other states of the Intermountain West; the plan has since been updated (IWJV 2005). Director's Order 146, which indicated that joint ventures should "deliver the full spectrum of bird conservation," was issued on 12 September 2002 by the USFWS.

The Partners in Flight organization began in 1988 as a coordinated, nationwide effort to document and reverse apparent declines in neotropical migratory birds and was later expanded to include all nongame land birds. In 2000, 243 species of breeding birds were documented as occurring in Idaho, including 119 species of neotropical migrants (Ritter 2000). In Idaho riparian, isolated wetlands (i.e., not associated with rivers), sagebrush, and aspen woodlands are high priority habitats for migratory birds (Ritter 2000; IWJV 2005).

Aspen woodlands make up over 50 percent of the vegetation communities within the Study Area, while riparian and isolated wetlands represent less than one percent.

3.8.3.3 Raptor Nests

During a variety of surveys and searches of the Study Area, 13 raptor nests have been identified (**Figure 3.8-2**). Verified stick nests of great gray owl and red-tailed hawk, along with nest cavities for the American kestrel, were discovered. The remaining stick nests were classified as unknown since no raptors were ever observed in these nests.

3.8.3.4 Special Status Species

Bald Eagle

The bald eagle is a Forest-Sensitive species (USFS 2003b). In Idaho, breeding bald eagles are classified as "Vulnerable" (S3) and non-breeding bald eagles are classified as "Apparently Secure" (S4; IDFG 2013a). Bald eagles are a BLM Type 2 species. As reflected in the Federal Register (FR), the bald eagle was removed from the Endangered Species List (as Threatened) on July 9, 2007 in the continental United States (72 FR 37345). At the time of delisting, the USFWS estimated that the bald eagle population in the continental United States increased to 9,789 breeding pairs from 487 breeding pairs in 1963. Bald eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c).

During breeding season, bald eagles nest in tall trees and cliffs near water in areas that support an adequate food supply of fish, waterfowl, rabbits, and carrion. Significant populations of bald eagle winter in Idaho and Wyoming near open water habitats and will use communal roosting sites as shelter (BLM 2003 as cited in Stantec 2016e; USFWS 2009). In Wyoming and Idaho, winter roost sites are found in riparian and upland forests, often on north-facing slopes (Stalmaster 1987 as cited in Stantec 2016e).

In Idaho, there were 188 occupied breeding pairs of bald eagles in 2009 (Stantec 2016e). However, as of 2006, there were no occupied bald eagle nests within the Study Area (Sallabanks 2006). Known nest sites closest to the Study Area include along the Snake River and Palisades Reservoir (north of the Study Area), along the Blackfoot River (west of the Study Area; Sallabanks 2006), and near Thayne, Wyoming (east of the Study Area; USFS 2003b). In addition to nest sites, there are four known winter roost sites within the CTNF; the closest is Crow Creek, which is just to the south of the Study Area. The USFS and others have monitored the Crow Creek wintering eagle populations; counts of bald eagles have ranged from zero to two (USFS 2012a, 2013, 2014; JBR 2013). One bald eagle was observed near the tailings ponds (adjacent to the east side of the Study Area) during surveys (**Table 3.8-1**). However, the tailings ponds do not support suitable fish populations or open water habitat during the winter and nesting or roosting is not expected.

Boreal owl

The boreal owl is a Forest-Sensitive species. In Idaho, boreal owls are classified as "Imperiled" (S2). In the Rocky Mountains, boreal owls are typically found year-round in subalpine forest habitats characterized by subalpine fir or Engelmann spruce (*Picea engelmannii*) (Hayward 1994). In Idaho, boreal owl nesting sites are concentrated in mixed-conifer and aspen forests. Nests are infrequently in spruce-fir forest and none have been found in lodgepole pine forests. Boreal owls may use other habitat types for foraging and during non-breeding seasons. All of the CTNF has been characterized as potential boreal owl habitat (USFS 2003b).

The Study Area contains suitable habitat in mature forest stands and boreal owls may occur year-round. There is one record of a boreal owl from nearby Smoky Canyon in May 1999 (USFS 2003b; IDFG 2014a). Boreal owl surveys were conducted during three efforts in March and April 2014 (Stantec 2016e). Fifteen call stations were surveyed during each effort, as described in the Wildlife Resources TR. Additional owl calling stations were also added during surveys conducted for the Panel B, B2 layback expansion area that occurred within the Study Area for the East Smoky Panel Project in March 2015. No boreal owl responses were detected during any of these surveys.

However, boreal owl vocalizations were detected during northern goshawk listening surveys in April (**Figure 3.8-2**; Stantec 2016e).

Brewer's sparrow

The Brewer's sparrow is a BLM Type 2 species and in Idaho, the species is classified as "Vulnerable" (S3). Brewer's sparrows are sagebrush obligates and are highly associated with sagebrush shrublands that have abundant, scattered shrubs and short grass (Hansley and Beauvais 2004, Ritter 2000). Brewer's sparrows breed in high densities and where they occur, they tend to be the most abundant bird species. In Idaho, Brewer's sparrows select taller shrubs with dense cover as breeding habitat (Paige and Ritter 1999). Brewer's sparrows were observed in the Study Area (**Table 3.8-1**).

Columbian sharp-tailed grouse

The Columbian sharp-tailed grouse is a Forest-Sensitive species. In Idaho, Columbian sharp-tailed grouse are classified as "Vulnerable" (S3). The Columbian sharp-tailed grouse is a BLM Type 2 species. The USFWS found listing not warranted for the sharp-tailed grouse in 2006 (71 FR 7167318).

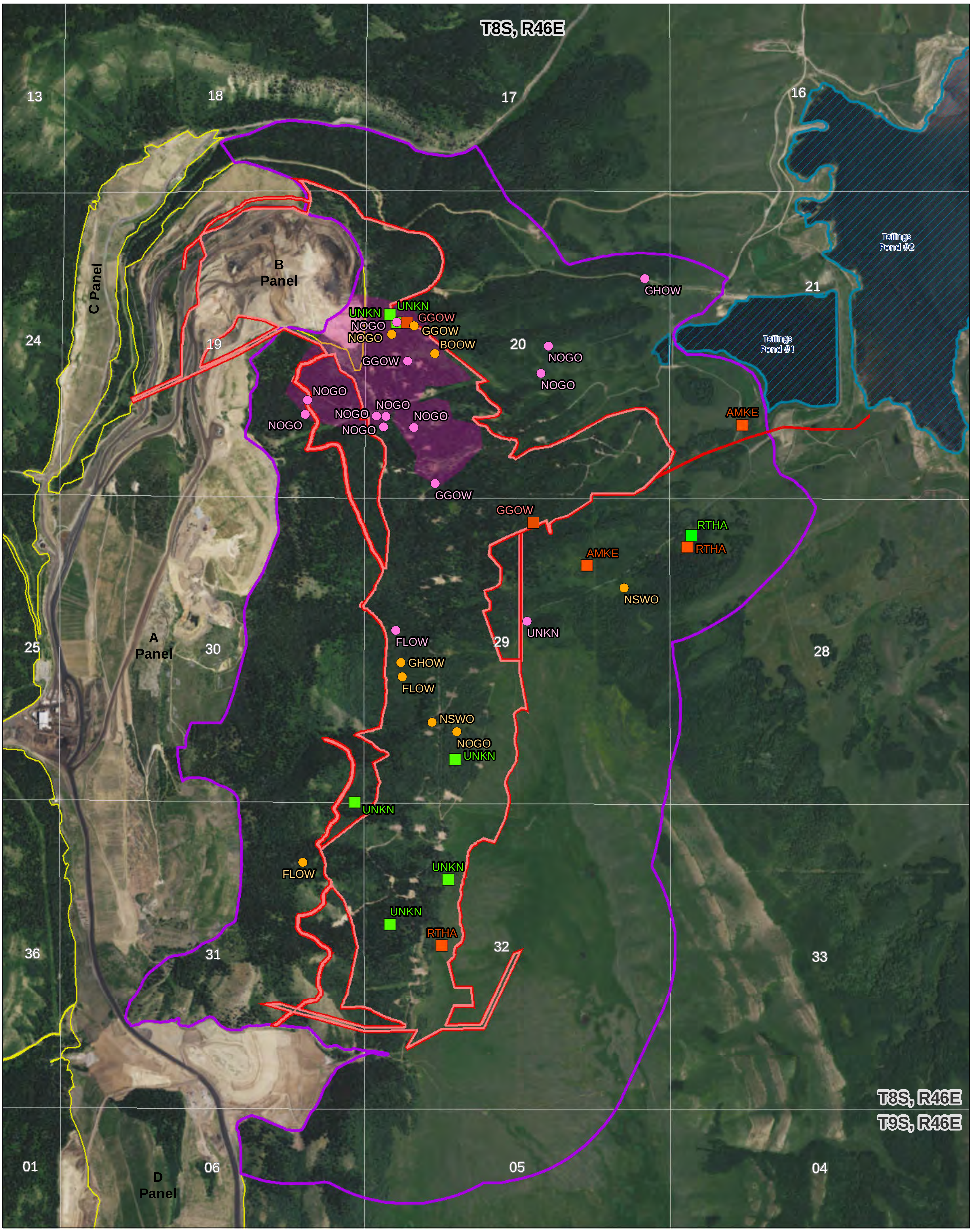
Columbian sharp-tailed grouse occur in habitats generally characterized by dense herbaceous cover and a mixture of shrubs (IDFG 2005a). Habitat requirements in winter are narrower and often within riparian or deciduous hardwood shrub stands. In southeast Idaho, Columbian sharp-tailed grouse are reasonably widespread in shrub and grass habitats adjacent to or in mountainous foothills. No leks have been documented on the CTNF, although several occur adjacent to the forest (USFS 2003b). Elevations on the CTNF are relatively high for suitable spring, summer, and fall habitat for Columbian sharp-tailed grouse. However, suitable winter habitat (i.e., aspen, chokecherry [*Prunus spp.*], serviceberry [*Amelanchier spp.*]) is present.

There are no records of Columbia sharp-tailed grouse within 10 miles of the Study Area (IDFG 2014a). Within the Study Area, Sage Valley may provide suitable winter habitat; however, no records of Columbia sharp-tailed grouse are known and no observations were made within the Study Area (**Table 3.8-1**).

Flammulated owl

The flammulated owl is a Forest-Sensitive species. In Idaho, breeding flammulated owls are classified as "Vulnerable" (S3). The flammulated owl is a BLM Type 2 species. Flammulated owls are small, secretive cavity-nesting owls and feed exclusively on insects (McCallum 1994). Flammulated owls occur in habitats with open forest structure with areas of dense foliage and with high abundance or diversity of insect prey. Suitable nesting habitats contain mature ponderosa pine (*Pinus ponderosa*) and Douglas-fir forests with snags used as nest sites. Flammulated owls occupy warm microclimates within mid-elevation conifer woodland habitats, either in response to prey availability or thermoregulation.

The Study Area contains suitable habitat in mature forest stands and flammulated owls are known to occur in the region of the Study Area (IDFG 2014a; USFS 2003b; JBR 2013). Flammulated owl surveys were conducted during three efforts in April and May 2014 (Stantec 2016e). Fifteen call stations were surveyed during each effort. Flammulated owl call stations were the same locations as the great gray owl and boreal owl survey locations. Flammulated owls were audibly detected at multiple sites. One possible flammulated owl vocalization was detected prior to initiation of broadcast calls on the southern end of the Study Area (**Figure 3.8-2**) in April, with a flammulated owl heard to the far north of the same survey location in May. A flammulated owl was also heard prior to initiation of broadcast calls near the center of the Study Area (**Figure 3.8-2**). It was



Legend

Project Area Boundary

Existing Disturbance Area

Tailings Ponds

Special Status Species Study Area (Disturbance 0.5-mile Buffer modified to exclude existing disturbance)

Extensive Nest Search Area

Raptor Nest

Active

Inactive

Raptor Observation

Seen

Heard

Species Code
AMKE - American Kestrel
BOOW - Boreal Owl
FLOW - Flammulated Owl
GGOW - Great Gray Owl
GHOW - Great Horned Owl
NOGO - Northern Goshawk
NSWO - Northern Saw-whet owl
RTHA - Red-tailed Hawk
UNKN - Unknown Raptor

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Miles
1:21,000 (at original document size of 11x17)
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Figure 3.8-2
Raptor and Owl Observations and Nests in the Study Area
East Smoky Panel Mine EIS

presumed to be the same bird. Flammulated owls were audibly detected during survey efforts in May at in similar locations. No nest sites were ever discovered.

Great gray owl

The great gray owl is a Forest-Sensitive species. In Idaho, great gray owls are classified as "Vulnerable" (S3). Great gray owls occur in mid- to high-elevation conifer forests, nesting in mature forest stands with snags present (Hayward 1994; USFS 2003b). In southeast Idaho and northwestern Wyoming, great gray owls most often use broken tree-tops and old stick nests (i.e., raptor) found in lodgepole pine, Douglas-fir, and aspen forests near clear-cuts or natural meadows (Franklin 1988). Great gray owls will also nest on the top of mistletoes (USFS 2003b). Great gray owls forage for rodents, especially northern pocket gophers (*Thomomys talpoides*), in openings in conifer forests (Franklin 1988; USFS 2003b).

Great gray owls have been recorded in the region of the Study Area (USFS 2003b, Maxim 2004a, IDFG 2014a) and were observed within the Study Area. As was described for boreal owl, great gray owl surveys were conducted during three efforts in March and April 2014 (Stantec 2016e). Fifteen call stations were surveyed during each effort, as described in the Wildlife Resources TR. Additional owl calling stations were also added during surveys conducted for the Panel B, B2 layback expansion area that occurred within the Study Area for the East Smoky Panel Project in March 2015. No great gray owl responses were detected at any of the stations.

Great gray owl vocalizations were detected during northern goshawk listening surveys in April. One great gray owl was visually observed after completion of northern goshawk surveys in April. Two great gray owls were visually observed during northern goshawk broadcast calls in May early in the morning. One great gray owl responded to the broadcast call with soft "call" notes and eventually flew to the north and was joined by a second great gray owl. The pair of owls was again observed in the same location that evening. The region of the observations (locations shown on **Figure 3.8-2**) was intensively searched for nests or signs of nesting for approximately 10 hours by three different biologists. There was suitable nesting habitat (i.e., large open-topped snags, conifer trees with large mistletoe brooms), but no evidence of nestlings, whitewash, pellets, or other indirect signs were found that indicated nesting activity.

In 2015, two nesting pairs of great gray owls were incidentally observed during other surveys. One nest, a previously recorded stick nest (**Figure 3.8-2**) had blown over and a chick was found on the ground with an adult in a nearby tree. The additional active nest was located to the southeast (**Figure 3.8-2**); two adults were observed and chicks were heard in the nest.

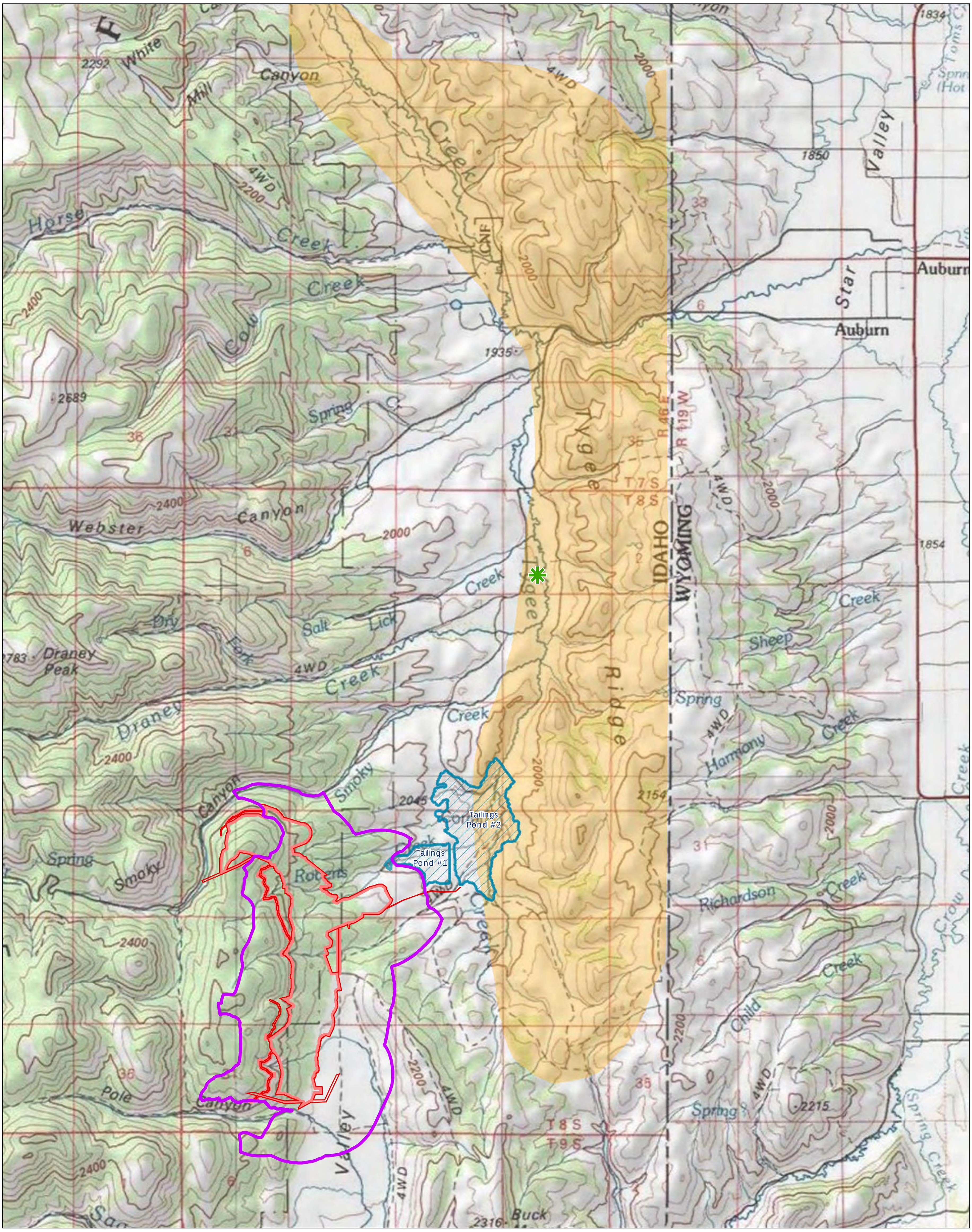
Greater sage-grouse

The greater sage-grouse is a Forest-Sensitive species. In Idaho, greater sage-grouse are classified as "Apparently Secure" (S4). Greater sage-grouse are classified as Type 2 by the BLM. In March 2010, the USFWS designated the greater sage-grouse as a candidate for listing under the ESA. Concerns about long-term declines in greater sage-grouse populations and habitat prompted unprecedented large-scale efforts in Idaho and other western states to conserve the species while continuing predicable levels of land-use activities. In May 2015, the BLM and USFS released their Final Idaho and Southwestern Montana Sub-Regional Greater Sage-Grouse Land Use Plan Amendment and EIS (Greater Sage-grouse Final EIS) (BLM and USFS 2015) for greater sage-grouse management and in September 2015, the BLM released the ARMPA for Idaho and Southwestern Montana (BLM 2015b). The ARMPA incorporates measures to conserve, enhance, and restore greater sage-grouse habitat into existing land use plans. The USFS also released a ROD for Land Management Plan Amendments in September 2015. These amendments covered the CTNF and contained similar amendments to the BLM ARMPA (USFS 2015a). In September 2015, the USFWS determined that the ongoing conservation efforts had significantly reduced threats to the point where the greater sage-grouse was no longer warranted for protection under the ESA.

The ARMPA contains three management decisions relating to non-energy leasable minerals such as phosphate (the ARMPA however does not apply to lands within the Study Area because even though the BLM manages the subsurface mineral rights, there is no mapped greater sage-grouse habitat). The management decisions allow leasing within known phosphate leasing areas to continue subject to standard stipulations as long as the area is not considered a Priority Habitat Management Area (PHMA). Seasonal or daily timing restrictions as well as greater sage-grouse required design features may be required as part of a Condition of Approval for exploration activities or initial mine development (e.g., when new timber removal, shrub clearing, etc. is required). There are no PHMAs within the Study Area. A General Habitat Management Area (GHMA) is located approximately 1/3-mile to the east of the Study Area (**Figure 3.8-3**).

Greater sage-grouse depend on sagebrush, particularly big sagebrush and silver sagebrush (*Artemisia cana*) for food and cover year-round (Connelly et al. 2004). Greater sage-grouse utilize riparian and upland meadows and sagebrush grasslands during summer, sagebrush dominated rangelands with herbaceous cover during breeding (i.e., lekking, nesting, and early brood-rearing), and during the autumn greater sage-grouse use upland meadows, riparian areas, greasewood bottoms, and agricultural fields. Breeding occurs on “leks” or openings surrounded by sagebrush in broad valleys, ridges, benches, and plateaus or mesas (Connelly et al. 2004). Lek sites generally have good visibility for predator detection, acoustical qualities so mating sounds will carry, and an abundance of sagebrush within about 300 to 660 feet used for escape cover. Hens build nests at the base of a live sagebrush plant and remain in sagebrush vegetation with chicks until conditions are too dry, at which point hens with broods move towards wet meadow or riparian areas. Preferred nest habitats are those with live sagebrush along the periphery for escape cover. Early brood-rearing habitat is generally identified as sagebrush habitat surrounding each lek. Greater sage-grouse in southeastern Idaho traveled as far as 50 miles from breeding and nesting habitats to summer ranges (Connelly et al. 1988 as cited in Stantec 2016e).

Within the Study Area, there are no known leks (IDFG 2014a), although anecdotal evidence indicates there may previously have been leks in the area where the existing tailings ponds are now located (Stantec 2016e). A group of greater sage-grouse were observed in 2015 approximately two miles to the northeast of the northern boundary of the Study Area, near the Draney Creek dairy farm (Stantec 2016e) (**Figure 3.8-3**). An IDFG biologist visited the site on April 24, 2015, but greater sage-grouse had left the location approximately two weeks earlier and no lekking was confirmed. It is suspected that the location could be a satellite or temporary (early season) location for a lek located to the east (lek 3C030) that was active in the past but is currently undetermined (confirmed use in 2001, but has not been monitored since (Stantec 2016e). Greater sage-grouse have been documented approximately six miles to the south in Crow Creek and several leks are known approximately 10 miles to the west in Slug Creek (JBR 2013). As of 2018, the leks shown on **Figure 3.8-3** are considered “undetermined” (IDFG 2019). While there are no known leks within the Study Area, greater sage-grouse using leks close to the Study Area may use sagebrush habitats found in the Study Area, including for nesting and as brood habitat (Stantec 2016e). However, greater sage-grouse were not observed in the Study Area.



Legend

- Display Site (2015)
- Project Area Boundary
- Tailings Ponds
- Study Area (includes 1/2 mile buffer, modified to remove existing disturbance)
- Closest General Habitat Management Area (GHMA)*

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
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3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

0 1 2
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* SOURCE: BLM 2015

Figure 3.8-3
Greater Sage-grouse Habitat
East Smoky Panel Mine EIS

Harlequin duck

The harlequin duck is a Forest-Sensitive species. In Idaho, breeding harlequin ducks are classified as "Critically Imperiled" (S1). Harlequin ducks migrate inland from oceans to breed on clear, swift-flowing streams (IDFG 2005a). In Idaho, harlequin ducks feed primarily on benthic macroinvertebrates and use second-order or larger streams containing reaches with an average one to seven percent gradient, riffle habitat, clear water, gravel- to boulder-sized substrate, and forested bank vegetation.

Harlequin ducks are not expected to occur on the CTNF (USFS 2003b) or within the Study Area, as there is no suitable or potential harlequin duck breeding habitat. Existing tailings ponds could be used rarely as resting stops during migration.

Northern goshawk

The northern goshawk is a Forest-Sensitive species. In Idaho, northern goshawks are classified as "Apparently secure" (S4) and are a BLM Type 2 species. Northern goshawks inhabit montane coniferous and deciduous forests, forest edges, and open woodland stands (Groves et al. 1997). In Idaho, northern goshawks nest in coniferous and aspen forests, and spend the winter in riparian or agricultural areas.

Forested areas of the Study Area provide suitable foraging and breeding habitat for northern goshawk. Recent observations of northern goshawks have been made in several locations surrounding the Study Area (IDFG 2014a; JBR 2013; Dobrich 2011, 2012, 2013). Adult northern goshawks and potential northern goshawk nests were observed during survey efforts in the Study Area. Northern goshawk broadcast and acoustical surveys were conducted in 2014 and 2015 throughout the Study Area (Stantec 2016e).

In 2012, CNF biologists analyzed the vegetation on the Forest to determine its suitability and capability to serve as northern goshawk habitat. The analysis mapped areas with suitable forested areas and then eliminated areas of high human activity (developed campgrounds, mining facilities, improved roads, etc.) and unsuitable habitat (perennial ponds/reservoirs). It also removed areas designated by the RFP (USFS 2003a) as Prescription 8.1 (Concentrated Development Areas) and 8.2.2 (Phosphate Mine Areas). Given the habitat conditions and the designation of much of the Study Area as Prescription 8.2.2, most of the area was not considered to be in satisfactory condition (USFS 2012b). However, as discussed below, several goshawks have been found in the Study Area.

Survey results are described in the Wildlife Resources TR (Stantec 2016e) and observed locations shown on **Figure 3.8-2**. In 2014, northern goshawks were observed both visually and audibly on various days during the surveys, some in response to broadcast calls, and two stick nests in aspen trees were discovered within 400 feet of the observation. It did not appear the nests were active (i.e., incubating or brooding adult on nest) at the time of observation. Later, in conjunction with great gray owl nest searching efforts, the region of the northern goshawk observations was extensively searched for approximately 10 hours by three different biologists. There were no signs of nesting activity (e.g., whitewash, incubating bird, prey remains, fresh nesting material) at the nests in the area. The nests in the area of all the 2014 sightings and responses were visited in 2015 and the aspen trees they were located in were found to have blown over since being observed in 2014.

In 2015, a pair of northern goshawks were observed, but no nest guarding behavior was seen and the area was searched but no nest was found.

Olive-sided flycatcher
In Idaho, breeding populations of olive-sided flycatchers are classified as "Vulnerable" (S3). Olive-sided flycatcher is a BLM Type 2 species. Olive-sided flycatchers are found in taiga, subalpine coniferous forests, mixed forests, boreal bogs, muskeg, and borders of lakes and streams, especially in areas burned by wildfires with standing snags (Groves et al. 1997). Females build cup-shaped nests in coniferous or deciduous trees and characteristically hunt from a perch. This species may occur in the Study Area in woodland habitats but was not noted.

Peregrine falcon
The peregrine falcon is a Forest-Sensitive species. In Idaho, peregrine falcons are classified as "Vulnerable" (S3). Peregrine falcons occupy a wide range of habitats and are generally found in open country near rivers, marshes, lakes, and coasts (USFS 2003b). Foraging habitat includes wetland and riparian habitats, meadows and parklands, croplands and orchards, gorges, mountain valleys, and lakes that support populations of small- to medium-sized terrestrial birds, shorebirds, and waterfowl. Cliffs are preferred nesting sites, although reintroduced birds now regularly nest on man-made structures such as towers and high-rise buildings. In Idaho, 26 pairs of peregrine falcon were known to breed in 2012 (Stantec 2016e). The nearest occupied nesting locations are at Grays Lake, Grays Ridge (i.e., Grays Lake South), and Soda Springs.

There is no suitable breeding habitat for peregrine falcons in the Study Area, but waterfowl use of the tailings ponds may attract foraging peregrine falcon. Peregrine falcons have been observed in the region of the Study Area and although none were observed within the Study Area, one peregrine falcon was incidentally observed in July 2014, approximately 0.5 miles northeast of the Study Area near the tailings pond (**Table 3.8-1**).

Prairie falcon
In Idaho, the prairie falcon is classified as "Apparently Secure" (S4). In Idaho, prairie falcons breed in shrub steppe and dry, mountainous habitat, and winter at lower elevations (Groves et al. 1997). Prairie falcons nest primarily on cliffs. This species is known to occur in the region (Sauer et al. 2014 as cited in Stantec 2016) but breeding habitat in the Study Area is limited. No prairie falcons were observed in the Study Area in 2014.

Sagebrush sparrow
The sagebrush sparrow (formerly known as sage sparrow) is a BLM Type 2 species and in Idaho, the sagebrush sparrow is classified as "Vulnerable" (S3). Sagebrush sparrows are highly correlated with big sagebrush and preferred habitats are contiguous and dense (Hansley and Beauvais 2004b as cited in Stantec 2016e, Wiens and Rotenberry 1981 as cited in Stantec 2016e). Sagebrush sparrows typically breed in interior stands of sagebrush, avoiding edges and other fragmented habitats. During migration and winter, sagebrush sparrows will use arid plains, grasslands, and other open habitats (Groves et al. 1997). In the Study Area, there are suitable habitats for the sagebrush sparrow in Sage Valley; however, none have been observed in the Study Area.

American three-toed woodpecker
The American three-toed woodpecker (formerly known as the northern three-toed woodpecker) is a Forest-Sensitive species and in Idaho, American three-toed woodpeckers are classified as "Imperiled" (S2). American three-toed woodpeckers are year-round residents of high-elevation, spruce-fir forests. The highest densities of woodpeckers occur in freshly burned forests (0 to 3 year's post-burn), and generally in areas with a high density of lightly burned trees (IDFG 2005a). Populations have increased in response to spruce bark beetle outbreaks (Hill 2002 as cited in

Stantec 2016e, Koplin 1969). American three-toed woodpeckers nest in cavities in snags and may return to the same territory in succeeding years (Hill 2002 as cited in Stantec 2016e).

Suitable nesting and foraging habitat in spruce and lodgepole pine forests is present in the CTNF and the Study Area. American three-toed woodpeckers were observed in the Study Area during surveys in 2014. American three-toed woodpecker surveys were conducted in April and May 2014 (Stantec 2016e) and responses to broadcast calls were confirmed at various survey points within the Study Area.

Trumpeter swan

The trumpeter swan is a Forest-Sensitive species. In Idaho, breeding trumpeter swans are classified as "Critically Imperiled" (S1) and non-breeding trumpeter swans are classified as "Imperiled" (S2). Trumpeter swans are a BLM Type 2 species.

In Idaho, trumpeter swans breed on marshes, lakes, and beaver ponds and winter along shallow, slow-moving waters (Groves et al. 1997). Trumpeter swans forage on submerged and emergent vegetation and aquatic insects. Trumpeter swans found in the region of the Study Area are part of the Rocky Mountain population or "Tri-state" flock (Montana, Wyoming, and Idaho). In 2012, counts of the breeding population numbered approximately 130 and 210 birds in Wyoming and Idaho, respectively (Olson 2012a). Trumpeter swans winter in the Tri-state in larger numbers; approximately 6,000 trumpeter swans were counted in the winter of 2012 in Idaho and Wyoming (Olson 2012b). Overall, trumpeter swan populations are increasing in the region. Breeding populations in the region of the Study Area are known at Grays Lake, Soda Springs, along the Salt River, and Bear River (Olson 2012a).

The nearest suitable habitat to the Study Area for trumpeter swans is wetland and pond habitats in the Crow Creek drainage (approximately 3.5 miles south of the Study Area). Up to eight trumpeter swans have been documented during winter survey efforts (Dubovsky 2003; USFS 2012, 2013, 2014). The tailings ponds in and near the Study Area may provide suitable habitat during migration; no incidental observations were made during survey efforts in 2014.

Willow flycatcher

In Idaho, breeding populations of willow flycatchers are classified as "Secure" (S5). The willow flycatcher is a BLM Type 2 species. Willow flycatchers are present in the region of the Study Area spring through fall. Willow flycatchers breed in riparian habitat that has a mid-story of willows or alders and an intact lower layer (Ritter 2000, Douglas et al. 1992). In the greater Yellowstone region, willow flycatchers prefer nesting in willows with more dense and tall structure (Olechnowski and Debinski 2008 as cited in Stantec 2016e). This species may occur in the Study Area in riparian habitat, especially along willow thickets surrounding Roberts Creek and the tailings pond; no incidental observations were made during general survey efforts in 2014.

3.8.4 Mammals

3.8.4.1 Big Game

Elk and mule deer are the two most highly visible and common large mammals that occur within the Study Area and are important species for the local economy and public interest. During field studies in 2014, elk, mule deer, and moose and were commonly observed both directly and indirectly in all seasons. Sage Valley and other lower elevation areas on the eastern side of the Study Area are winter habitat (RMEF 2015). However, the Study Area is not believed to support a large population of wintering elk, deer, or moose, as tracking surveys in winter 2014 did not find evidence of yards or congregating animals.

Moose (*Alces alces*) are included in this discussion due to sympatric relationships with elk and deer within the general area and in surrounding habitats of southeast Idaho. In general, big game species (i.e., mule deer, elk, and moose) use most portions of the Study Area year-round. Species-specific findings are discussed in more detail as follows.

Elk

Elk are habitat generalists and grazers, their diet shifts seasonally and they will consume grasses, forbs, and woody vegetation (e.g., willow and aspen). Elk are distributed throughout the Study Area and region. The Diamond Creek Zone (1,659 square miles), which contains the Study Area, is some of the most productive elk habitat in southeastern Idaho (IDFG 2010). However, the open habitat and moderate road densities contribute to the relatively high vulnerability of elk in this Zone. In 2013, the elk population was estimated at 2,352 animals (IDFG 2014b).

In the region, elk most often use southerly and western aspects with slopes less than 20 degrees as winter range. General winter and summer range habitat has been mapped in the Study Area (RMEF 2015; BLM and USFS 2007). According to the RMEF (2015) data, the entire Study Area is general summer habitat. Approximately 43 percent of the Study Area — Sage Valley and other lower elevation areas on the eastern side of the Study Area — is winter habitat. Most of the winter habitat is outside proposed disturbance areas; however, approximately 130 acres of proposed disturbance would be within winter habitat. In addition, there is critical summer habitat adjacent to the Study Area to the west. Although elk migrate to the Bear Lake Plateau area (south of the Study Area) in winter, many elk populations do not make long-range movements between seasonal ranges. A common destination for elk in winter is the Soda Hills area (Stantec 2016e). Kuck (1984) found that in the Deer Creek drainage (approximately five miles south of the Study Area), summer and winter use areas are typically adjacent and movements often overlap seasonally. The IDFG does not collect or have any specific information on big game migration corridors within or adjacent to the Smoky Canyon Mine area (Stantec 2016e).

IDFG has reports of a herd of 45 elk in Sage Valley and believes the herd to be substantially larger than that, with a lot of calves being produced in the aspen patches along the edges of the valley (Stantec 2016e). Elk were observed in the Study Area during surveys in spring and summer.

Mule Deer

Mule deer are the most abundant and widely distributed big game animal in Idaho (Groves et al. 1997). Typical mule deer habitat consists of coniferous forests, shrub steppe, grasslands with shrubs, and chaparral. They are primarily browsers, and much of their diet is shrubs and trees, especially in the winter (USFS 2003b).

Winter range is a critical component of mule deer habitat. Mule deer are highly susceptible to high mortality during periods of prolonged deep snow and low temperatures. The condition of a deer at the start of winter depends on the quality of the habitat it occupies during the rest of the year. The winter strategy is to minimize energy loss (becoming sedentary and using thermal cover) and to eat enough to prolong fat reserves (USFS 2003b). An apparent change in the winter distribution of mule deer has occurred primarily in Unit 76. During the 1950s and 1960s, deer use of the Soda Front (Wood Canyon south to Montpelier) was extensive, while use of the Bear Lake Plateau (Unit 72) was minimal. Currently, the Bear Lake Plateau and the Soda Hills Area represent the two most significant winter ranges for mule deer in Unit 76 (IDFG 2011).

Generally, summer and winter areas for mule deer are usually 10 to 20 miles distant, in higher-elevation aspen and conifer communities. Roads fragment habitats and migration corridors and can alter seasonal migrations, which reduces the overall suitability of mule deer habitat (IDFG 2008). The most common destination for mule deer moving through the Study Area and Project Area is the Bear Lake Plateau, the largest winter range in the area (Stantec 2016e). In addition, a small group of mule deer winter in the Crow Creek area northeast to Buck Mountain, northeast of the Project Area (Stantec 2016e). However, the IDFG does not collect or have any specific information on big game migration corridors within or adjacent to the Smoky Canyon Mine area (Stantec 2016e).

The most recent survey for mule deer populations in the area was conducted in 2006 by IDFG for Management Unit 76 and resulted in a population estimate of 3,363 mule deer (IDFG 2011). The general buck to doe ratio objective is 15 bucks per 100 does. The current ratio is 12 bucks per 100 does (IDFG 2011).

Mule deer have been observed in the Study Area during summer and the Project Area occurs within mule deer summer range.

Moose

In Idaho, moose prefer shrubby, mixed coniferous and deciduous forests with nearby riparian areas for foraging. In winter, moose rely on hardwood conifer forests for cover (Groves et al. 1997). Moose in southeast Idaho do not concentrate in specific wintering areas but are widely dispersed in aspen and conifer communities year-round (Kuck 1984). In the Crow Creek drainage, moose used forest habitat types heavily, with most observations occurring in aspen at elevations between 7,000 and 7,500 feet. Most moose were found using northern and east aspects with slopes of 20 degrees or less. Moose have been observed in the Study Area during all seasons.

3.8.4.2 Carnivores

In 2014, general carnivore and winter tracking surveys were conducted in March and early April. A variety of carnivore tracks were detected during the surveys and included: coyote, red fox, gray wolf, weasel, striped skunk (*Mephitis mephitis*), and mountain lion. Red squirrel and snowshoe hare were also detected during the surveys.

Four trail cameras were also deployed throughout the carnivore tracking survey and detected red fox, coyote, and striped skunk. Non-carnivore species detected during surveys on the trail cameras included snowshoe hare, red squirrel, mule deer, moose, and elk. American badger (*Taxidea taxus*) was observed in 2015 during other surveys.

General carnivore surveys previously conducted within the region of the Study Area (Maxim 2000b as cited in Stantec 2016e; 2004a) documented coyote, American badger, bobcat, red fox, and black bear (*Ursus americanus*).

The four-predator species of special interest, American marten, fisher, Canada lynx, and North American wolverine were not detected during surveys in 2014. American marten and fisher are described below; as special status species, Canada lynx and North American wolverine are described in **Section 3.8.4.2**.

Fisher
In 2011, the USFWS determined that fisher in the Idaho, Montana, and Wyoming belonged to the United States Northern Rocky Mountains Distinct Population Segment (DPS). On October 5, 2017, the USFWS published a 12-month finding in the Federal Register that the Northern Rocky Mountain fisher distinct population segment is not warranted for listing as either an endangered or threatened species under the Endangered Species Act (82 FR 46634). In Idaho, fishers are classified as “Secure” (G5, IDFG 2013a).

Fishers inhabit most forest types in northern regions with abundant prey. In the west, fisher range extends south into Idaho, Montana, and the Rocky Mountains of Wyoming. In Wyoming, suitable fisher habitat is limited to the northwestern portion of the state (Wyoming Natural Diversity Database 2010 as cited by Wyoming Game and Fish Department [WGFD] 2010). In Idaho, fishers are known to occur in northern and central mountains portions of the state.

The Study Area is outside the current known range of fisher and no observations of fisher were made during survey efforts in the Study Area in 2014.

American Marten
The American marten is classified as widespread and secure (S5, IDFG 2013a).

American marten are found in dense deciduous, mixed, or (especially) coniferous forests. In Idaho, martens use a variety of forest types, with the greatest activity in mature spruce-fir forests (USFS 2003b). American marten have been documented in the northern portion of the CTNF. In 1995, 50 American marten were transplanted into the Bear River Range approximately 50 miles southwest of the Study Area. Although this species was not observed in the Study Area during survey efforts in 2014, USFS biologists observed marten tracks approximately 0.5 miles west of the existing Smoky Canyon Mine and approximately 1.1 miles west of the Study Area on March 19, 2016 (Stantec 2016e). This provides indication that the Study Area may provide suitable habitat for American marten.

3.8.4.3 Bats

One Anabat II detector was deployed on three different nights in June 2014 at three locations in the Study Area: the tailings pond, near a drainage in a forest opening, and a forest clearing, respectively. A total of 56 call sequences were recorded (**Table 3.8-3**). Three bat species were identified: big brown bat, hoary bat, and silver-haired bat. The tailings pond location (i.e., open water habitat) had the majority (96 percent) of recorded call sequences. Seventeen (30 percent) of the call sequences were assigned to the unknown myotis, high-frequency, or low-frequency guild.

Table 3.8-3 Bat Survey Observations

SPECIES / GUILD	SURVEY NIGHT AND HABITAT TYPE			
	06/10/2014 TAILINGS POND	06/11/2014 FORESTED DRAINAGE	06/12/2014 FOREST OPENING	TOTAL
Big brown bat	1			1
Hoary bat	3			3
Silver-haired bat	11			11
Big brown/silver-haired bat	22			22
Unknown myotis species	3			3
Unknown high-frequency	2	2		4
Unknown low-frequency	12			12
Total	54	2		56

Fourteen species of cave- and tree-roosting bats are known to occur in Idaho (Perkins and Peterson 1997). Forested habitats throughout the Study Area and region provide suitable habitats for foraging bats and roosting sites for tree-roosting bats such as silver-haired bats (*Lasionycteris noctivagans*) and hoary bats (*Lasiurus cinereus*). Roost sites may include tree cavities, snags, or hollow areas under exfoliating bark or in living trees (Idaho Museum of Natural History [IMNH] 2011).

Previous surveys conducted in the region of the Study Area (Maxim 2004a, 2000b as cited in Stantec 2016e) documented six species of bats: big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*), long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), silver-haired bat, and hoary bat. The most frequently detected of these species (i.e., long-eared myotis, long-legged myotis, and silver-haired bat) are associated with forested areas. Within the Study Area, there are no adits or caves that provide suitable roosting sites for cave-roosting bat species.

3.8.4.4 Special Status Species

Gray wolf

As of May 5, 2011, gray wolves in Idaho were delisted from the ESA (FR 76(87) [May 5, 2011]:25590-25592) and are now managed by the IDFG. In Idaho, they are classified as "Apparently secure" (S4) and are a BLM Type 2 species.

Gray wolves frequently travel and hunt in packs that vary in size, depending on resources and individual wolf characteristics (Mech 1989). Home ranges vary across regions of the Rocky Mountains from approximately 230 to 1,500 square miles (Oakleaf 2002 as cited by Meaney and Beauvais 2004). In the northern Rocky Mountains, gray wolf habitat is best characterized by the amount of forested cover and density of elk populations (Oakleaf et al. 2006). Gray wolves prey on a variety of mammals, including mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), bighorn sheep (*Ovis canadensis*), mountain goat (*Oreamnos americanus*), and beaver (*Castor canadensis*). In Wyoming (populations excluding Yellowstone National Park) in 2015, the gray wolf annual populations were 382 individuals in 48 packs and average pack size was 8.0 animals (USFWS et al. 2016). The nearest identified packs of gray wolves in Wyoming are the Dog Creek, Daniel, and Big Piney packs, all within approximately 50 miles from the Study Area. In southeastern Idaho, two gray wolf packs have been confirmed, the Tex Creek and Pine Creek packs, each approximately 40 miles away from the Study Area (IDFG and Nez Perce Tribe 2014).

Canada lynx

The Canada lynx is listed as a Threatened species under the ESA (FR 65(58) [March 24, 2000]: 16052-16086). In 2009, approximately 9,500 square miles of critical habitat was designated for Canada lynx in the Greater Yellowstone area within Wyoming. The Study Area is approximately three miles to the northwest of mapped critical habitat.

The Northern Rocky Mountain/Cascades Region (38 million acres), which includes parts of the CTNF, contains the majority of Canada lynx occurrences in the United States. Canada lynx habitat across their western mountain range is characterized by Douglas fir, spruce (*Picea* spp.)/fir, and fir-hemlock (*Tsuga* spp.) forests between approximately 5,000 and 6,500 feet (Aubrey et al. 2000). Over their entire range, Canada lynx occur predominantly where snowshoe hares are abundant, especially early successional stands with high stem densities. In southern boreal forests, red squirrels and other alternative prey are important constituents of the diet, as snowshoe hare densities are lower (Apps 2000; Aubrey et al. 2000). Relatively large home ranges appear to be characteristic of lynx in southern boreal forests (Aubrey et al. 2000).

In the past 30 years, there are few records of Canada lynx in the region of the Study Area. Within a 5-mile buffer around the Study Area, there is only one reported Canada lynx observation. The observation was reported near Diamond Creek and was observed sometime between 1950 and 1960 (IDFG 2014a). In 2005, a female Canada Lynx with two young was observed approximately 15 miles northwest of the Study Area in a reclaimed mine area (IDFG 2013b). However, annual sampling in the CTNF since 1990s, as well as specific surveys conducted in 2013 in the area where the female lynx was observed, resulted in no detections of Canada lynx (BLM 2013b, USFS 2003c). Discussions between USFS, USFWS, and BLM concluded that the female lynx observed in 2005 was likely from a lynx reintroduction program in Colorado — several lynx reintroduced to Colorado returned northward — that passed through the CTNF (BLM 2013b).

Canada lynx are known to occur in northwestern Wyoming including the Wyoming Range, approximately 15 miles to the east of the Study Area (BLM 2005 in Stantec 2016e). The Montpelier and Soda Springs Ranger districts, including the Study Area, have been identified as potential linkage habitat between the "core" Canada lynx habitat in Bridger-Teton National Forest and "peripheral" habitat in the Ashley National Forest in Utah (USFS 2003b). Two linkages are identified by the USFS (2003c, Appendix D-7, Map 1) approximately 10 miles south of the Study Area. One of the linkages is a broad area of relatively undisturbed land linking the Bridger-Teton National Forest and the CTNF. The other linkage is the shortest distance between two portions of the CTNF (across disturbed land and U.S. Highway 30). No Canada lynx were observed in the Study Area during surveys.

Pygmy rabbit

The pygmy rabbit is a Forest-Sensitive species (USFS 2003b). In Idaho, pygmy rabbits are classified as "Imperiled" (S2; IDFG 2013a) and are a BLM Type 2 species. Pygmy rabbits in Idaho are not part of the Columbia Basin DPS that is listed on the ESA. The USFWS conducted a status review of pygmy rabbits in 2010 and found that listing was not warranted (FR 75(189) [September 30, 2010]:60516-60561).

Pygmy rabbits are limited to habitat characterized by deep, sandy soils and tall (often greater than six feet), dense big sagebrush, which provides both food and cover (Katzner 1994 as cited in

Stantec 2016e, Gabler et al. 2001). Burrows are usually located on slopes at the base of sagebrush plants. Within the CTNF, there is no occupied habitat (USFS 2003b) and in Wyoming, predicted habitat is outside the region of the Study Area (Wyoming Natural Diversity Database 2010 as cited by WGFD 2011). There is no suitable habitat for pygmy rabbit in the Study Area and none were observed in the Study Area.

Spotted bat

Spotted bats are a Forest-Sensitive species (USFS 2003b). In Idaho, spotted bats are classified as "Vulnerable" (S3; IDFG 2013a).

Spotted bats are rare and their distribution is highly fragmented. The limiting factor to their occurrence is most likely suitable roost sites (i.e., rock and cliff crevices) and human disturbance (IDFG 2005a). Spotted bats usually occur in deep, narrow canyons, and roost in cracks or crevices within the rocky outcrops and cliffs. In Idaho, the spotted bat occurs mainly in the southwest corner of the state and habitat contains vegetation dominant with sagebrush, juniper, mountain mahogany, and cottonwood (Perkins and Peterson 1997; IDFG 2005a).

In 2003, one spotted bat was recorded in south-central Idaho, west of Almo (Rodhouse et al. 2009). Survey efforts within the CTNF have not documented the presence of spotted bats (USFS 2003b). Suitable roosting habitat is not present within or near the Study Area and spotted bats were not detected during previous survey efforts in the region (Maxim 2004a, 2000b as cited in Stantec 2016e) or within the Study Area.

Townsend's big-eared bat

The Townsend's big-eared bat is a Forest-Sensitive species (USFS 2003b). In Idaho, Townsend's big-eared bats are classified as "Vulnerable" (S3; IDFG 2013a) and are a BLM Type 2 species.

Townsend's big-eared bats occur in much of western North America, in a variety of habitats from desert shrub to deciduous and coniferous forest, and over a wide range of elevations (Pierson et al. 1999). The species' distribution is strongly correlated with the availability of caves or cave-like roosting habitat such as abandoned mines.

Past surveys within the CTNF have documented Townsend's big-eared bats in the Bear River Range, Pruess Range, Portneuf Range, and Elkhorn Mountains (USFS 2003b). Surveys conducted in the Montpelier Ranger District of the CTNF found mines with active summer and wintering populations of Townsend's big-eared bats. No suitable maternity or hibernacula habitat is present in the Study Area as the Study Area does not contain caves. However, snags in the Study Area may be suitable for habitat for roosting. Townsend's big-eared bats were not observed or detected during previous survey efforts in the region (Maxim 2004a, 2000b as cited in Stantec 2016e) or within the Study Area.

Uinta chipmunk

In Idaho, Uinta chipmunks are classified as "Critically Imperiled" (S1; IDFG 2013a).

The Uinta chipmunk is associated with montane coniferous forests above 6,560 feet AMSL, often near logs and brush in open areas, and at forest edges (Groves et al. 1997). In Idaho, the species has been found in areas with Douglas-fir, Engelmann spruce, or aspen; with an understory of sagebrush and various forbs and grasses. Uinta chipmunks were not observed in the Study Area but are assumed to occur in the Study Area within suitable habitat.

North American wolverine

The North American wolverine in Idaho are classified as "Critically Imperiled" (S1; IDFG 2017a) and are a BLM Type 2 species. On December 14, 2010, the USFWS found the petition to list the wolverine as Threatened or Endangered "not warranted" (FR 75 (239) [December 14, 2010]: 78030-70861). On February 4, 2013, the USFWS published a proposed rule to list the distinct population segment (DPS) of the North American wolverine occurring in the contiguous United States as a threatened species under the ESA (78 FR 7864). On August 12, 2014, the USFWS withdrew its proposal to list this species as Threatened (79 FR 47522). However, on April 4, 2016, the District Court for District of Montana vacated the withdrawal and remanded the decision to the USFWS for further consideration. The court's action effectively returned the status of the wolverine back to a proposed species under the ESA (81 FR 71670). On October 19, 2016, the USFWS announced reopening of the comment period on the February 4, 2013, proposed rule, and initiation of a new status review of the North American wolverine (81 FR 71670).

The North American wolverine occurs within a wide variety of boreal forests, tundra, and mountain habitats, although they are usually associated with remote montane-forests (Banci 1994). Idaho and Wyoming are the southern extent of the North American wolverine's Rocky Mountain range (FR 73 (48) [March 11, 2008]: 12929-12941). The North American wolverine has home ranges up to 600 square miles and daily movements in search of food may cover 25 miles. In Idaho, North American wolverines use habitats with steep slopes often greater than 8,000 feet with preferred habitats being north-facing (Copeland et al. 2007). Persistent, stable snow greater than five feet deep in these areas appears to be a requirement for denning. In 2018, the CTNF undertook a detailed analysis of potential natal denning sites on the CNF. It determined that no potential natal denning sites occur in or near the Study Area (USFS 2018).

In the region of the Study Area, several recent occurrences of wolverine have been reported. In 2005, wolverine tracks were observed approximately 15 miles northwest of the Study Area near the Ballard Mine (Greystone 2006 as cited by BLM 2011). In February 2008, North American wolverine tracks were observed in Smoky Canyon to the west of the Study Area (IDFG 2014a). In winter 2014, wolverine sightings were confirmed near the Utah/Wyoming border and in the Uinta Mountains (Maffly 2014). North American wolverine may rarely travel through the Study Area to forage or during dispersal movements; no observations of North American wolverine were documented during winter tracking surveys of the Study Area in 2014.

3.8.5 Amphibians and Reptiles

Reptiles and amphibians are present year-round in the Study Area in both upland and aquatic (i.e., wetland, stream) habitats. Past studies (Shive et al. 2000) have documented tiger salamander (*Ambystoma tigrinum*), boreal chorus frog (*Pseudacris maculata*), rubber boa (*Charina bottae*), and western terrestrial garter snake (*Thamnophis elegans*) within the Study Area. Boreal toad tadpoles were observed approximately four miles southwest of the Study Area in 2003 (Maxim 2004b), but toads were not found during follow up surveys.

Visual Encounter Surveys (VES) were conducted in June 2014 at three reaches along Roberts Creek and three reaches around the tailings pond. Thirty-five boreal chorus frog egg masses were observed, but no frogs were detected (see Appendix C of the Wildlife Resources TR [Stantec 2016e]). Night audible surveys were also conducted in June 2014, at one site on the tailings pond and one site on Pole Canyon Creek, respectively. No amphibians were audibly detected (see Appendix C of the Wildlife Resources TR [Stantec 2016e]). The surveys were conducted according to the appropriate methodology (see Appendix A of the Wildlife Resources TR [Stantec 2016e]); however, based on site-conditions, the surveys were conducted too late in the season to detect breeding amphibians. Boreal chorus frogs were heard in the tailings pond and Sage Valley in April, but at the time of the survey, few areas in the Study Area met the conditions to be considered amphibian habitat.

Amphibian surveys were conducted again in May 2015 to improve the probability of detecting breeding adults. VES were conducted at three reaches along Roberts Creek and three around the Roberts Creek diversion pond; three reaches along the Roberts Creek diversion; one seasonal pond located west of the tailings pond; four ponds in Sage Valley; and two reaches of Pole Creek. Results are presented in Appendix C of the Wildlife Resources TR (Stantec 2016e), along with habitat data and notes. Fourteen boreal chorus frog egg masses were observed in the Roberts Creek diversion pond, with no adults detected. No amphibians were detected in the diversion canal or Roberts Creek, despite the presence of what appeared to be suitable habitat and the presence of boreal chorus frogs in the adjacent tailings ponds (boreal chorus frogs could be heard calling from the littoral zone of the tailings pond throughout the surveys). Boreal chorus frog adults and egg masses were observed or detected via audible surveys in the small seasonal pond southwest of the tailings pond and in the Sage Valley ponds. No amphibians were detected along Pole Canyon Creek, which was fast flowing and mostly lacking suitable amphibian habitat. No species other than boreal chorus frog were detected in May within the Study Area. Follow up surveys in July focused on the Sage Valley ponds; two of the ponds had dried up and no amphibians were detected at the two ponds that still had water.

3.8.5.1 Special Status Species

Columbia Spotted Frog

The Columbia spotted frog is a Forest-Sensitive species (USFS 2003b). In Idaho, Columbia spotted frogs are classified as “Apparently Secure” (S4; IDFG 2013a).

Columbia spotted frogs require specific habitat components; water-flooded burrows for hibernation, pooled water for breeding, shallow pond margins for foraging, and corridors containing water and vegetative cover for migrating between breeding and hibernation sites (IDFG 2005b).

Suitable habitat is present on the CTNF within montane wetland habitat however the Study Area is outside the range of the Columbia spotted frog (IDFG 2005b) and none were observed during surveys.

Northern Leopard Frog

The northern leopard frog is a BLM Type 2 species. In Idaho, northern leopard frogs are classified as “Imperiled” (S2; IDFG 2013a).

Northern leopard frogs are associated with a variety of wetland habitats, including marshes, pond margins, and slow-moving sections of streams and rivers (Maxim 2004b). In southern Idaho, northern leopard frog populations have been reported in the Snake River and tributaries, the Portneuf River, Bear River, and Marsh Valley in the southeast. In south-central Idaho, the northern leopard frog is an abundant species and is present in Dry Valley Creek (IDFG 2014a). Although northern leopard frogs were not observed in the Study Area, they have been observed in the nearby Dry and Slug Creek valleys (JBR 2012) and may exist in suitable habitats.

Common Garter Snake
In Idaho, the common garter snake is classified as "Vulnerable" (S3; IDFG 2013a).

Garter snakes are found in a variety of habitats such as grasslands, shrublands, woodlands, and open areas in forests. In Idaho, they are generally associated with marshes and wet areas (Groves et al. 1997). This species was not observed in the Study Area but may exist in suitable habitats.

Boreal Toad
The boreal toad is a Forest-Sensitive species and a BLM Type 2 species.

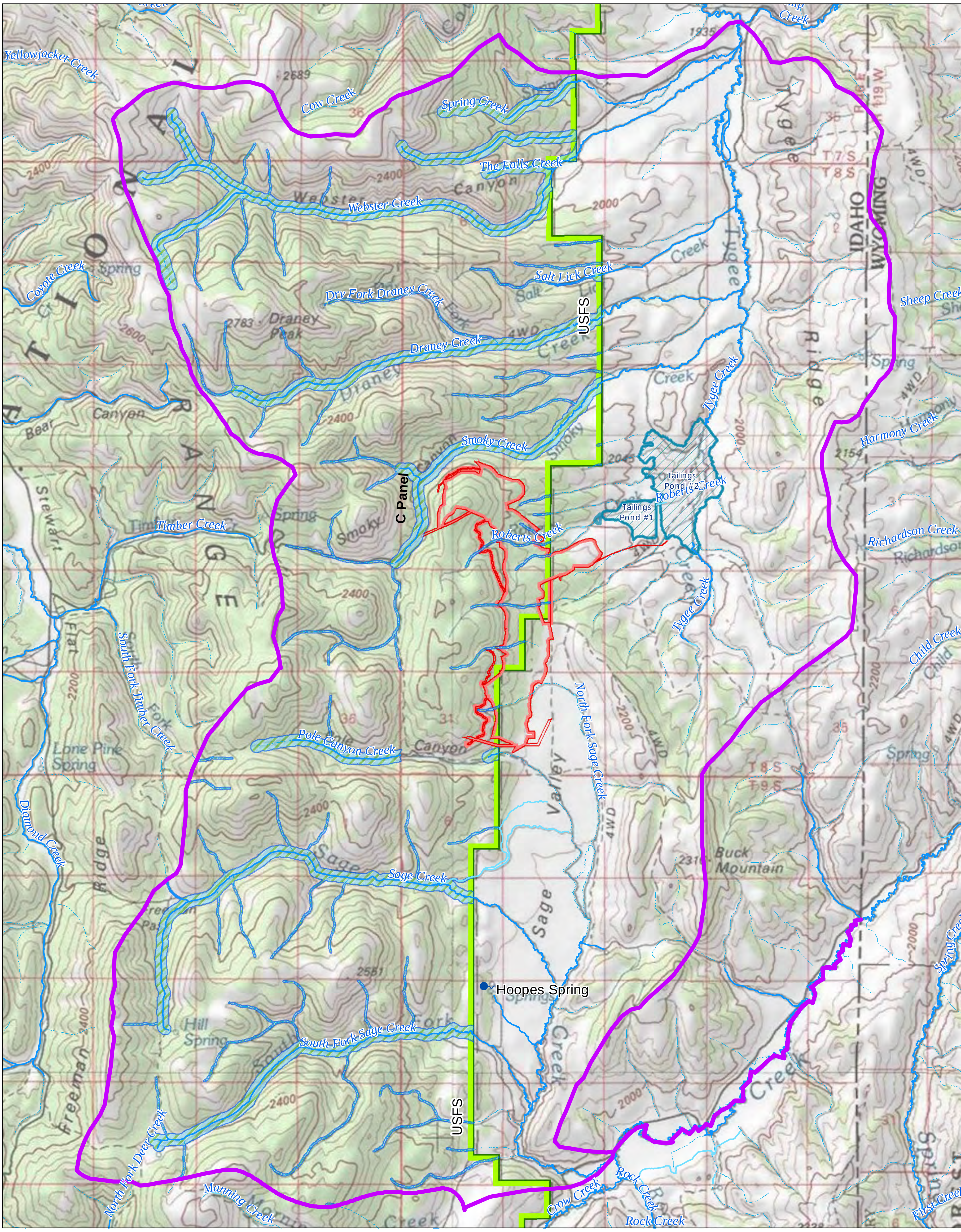
The boreal toad is a subspecies of western toad (*Anaxyrus boreas*) and shares most, if not all, of their traits. Five boreal toad subspecies have been documented through mitochondrial deoxyribonucleic acid (DNA) analyses, with one of the five groups identified as occurring in Caribou County, Idaho (Hogrefe et al. 2005). Boreal toads are found in a variety of habitats such as desert springs and streams, meadows and woodlands, and in and around ponds, lakes, reservoirs, and slow-moving waterways (Keinath and McGee 2005; Groves et al. 1997). Breeding areas are typically shallow water areas at the edges of ponds, or lakes, stream or river edges with slow-moving water, or other flooded or ponded areas. After breeding, boreal toads move to more terrestrial habitats. During the winter, boreal toads hibernate in habitats that may be up to 1.5 miles from aquatic breeding habitat (Keinath and McGee 2005). Boreal toads occupy relatively high elevation habitats compared to other western amphibians, ranging from 5,000 to 10,000 feet AMSL. Occupied wetlands are surrounded by a variety of upland vegetation communities, including sagebrush and grasslands, pinyon-juniper, mountain shrubs, and coniferous forest (Hogrefe et al. 2005).

Boreal toad tadpoles were observed near South Fork Sage Creek, approximately four miles southwest of the Study Area, in June 2003 (Maxim 2004b). However, follow up surveys did not find any boreal toads. This species was not observed in the Study Area during surveys but may occur within wet meadows or another wetland habitat year-round.

3.9 FISHERIES AND AQUATICS

The Study Area (**Figure 3.9-1**) for fisheries and aquatic resources includes streams within the topographically defined watersheds associated with the Tygee Creek and Sage Creek drainage basins, along with a reach of Crow Creek from its confluence with Sage Creek downstream to the Wyoming border. The Study Area boundary was developed with the IDT experts and professional judgement. Streams within the Tygee Creek drainage include Roberts Creek, Tygee Creek, Smoky Creek, Draney Creek, Salt Lick Creek, Webster Canyon Creek, and Spring Creek. Streams in the Sage Creek drainage include Pole Canyon Creek, North Fork Sage Creek, Hoopes Spring, South Fork Sage Creek, and Sage Creek. Streams in the northern portion of the Tygee Creek drainage (Draney Creek, Salt Lick Creek, Webster Canyon Creek, and Spring Creek) were originally included in the Study Area in the event that groundwater impacts to a series of springs that appear to be the source of surface water in these drainages were predicted. Although the impact potential to those streams has been discounted based upon further groundwater interaction studies and evaluation, they remain within the Study Area to provide a more complete coverage of the baseline condition within the Tygee Creek watershed.

The various monitoring programs, studies, and reports that have been reviewed to describe the baseline condition are described in detail in the Fisheries and Aquatics Resources TR (Stantec 2017c) and summarized below.



Legend

Project Area Boundary	Spring/Seep
Tailings Ponds	Stream/River
Surface Ownership Boundary	Intermittent Stream
Fisheries and Aquatics Baseline Study Area	Other Waterway
	Aquatic Influence Zones (AIZ) within the Fisheries & Aquatics Study Area

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Copyright:© 2013 National Geographic Society, i-cubed
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

0 1 2
Miles
1:63,000 (at original document size of 11x17)
N

Figure 3.9-1
Fisheries and Aquatics Study Area
East Smoky Panel Mine EIS

Monitoring programs and studies associated with past EISs and/or various Smoky Canyon Mine compliance obligations include:

- Baseline aquatic ecological data collected prior to mining (Mariah 1980);
- Long-term monitoring data collected twice yearly from 1981 to 2005 (contained in annual reports submitted by TRC Environmental Corporation, formerly TRC Mariah Associates Inc.) and biennially from 2005 to the present (contained in annual reports submitted by TRC Environmental Corporation from 2005 to 2009, and annual reports submitted by Formation Environmental since 2010);
- Baseline data collected in 2000 (Chadwick 2001) in support of the Final Supplemental EIS for the Smoky Canyon Mine, Panels B&C (BLM and USFS 2002a), and the associated technical report (JBR 2000);
- Data collected in 2004 as part of the studies to support the Smoky Canyon Mine SI (NewFields 2005);
- Data collected in 2003 for the Final Baseline Fisheries and Aquatic Resources Technical Report for the Manning and Deer Creek Phosphate Lease Areas (Panels F and G; Maxim 2004b);
- Data collected in 2010 as part of the studies to support the RI and Feasibility Study for the Smoky Canyon Mine (Formation Environmental 2014);
- Data collected between 2006 and 2008 to support development of a SSSC (Formation Environmental 2016b);
- Data collected as part of mitigation monitoring for the Manning and Deer Creek Phosphate Lease Area (Panels F and G; Formation Environmental 2016b); and,
- Data collected voluntarily by Simplot (i.e., not required under any monitoring plans or compliance obligations) to maintain data continuity at several long-term monitoring locations (Formation Environmental 2016b).

Data and reports from State and Federal agencies include:

- IDEQ Beneficial Use Reconnaissance Program (BURP) data;
- IDEQ's 2014 Integrated Report (IDEQ 2017a);
- The Salt River Subbasin Assessment and TMDL (IDEQ 2017b);
- USFS data collected on Draney Creek in 2000, 2003, and 2010 (USFS 2000a, 2003d, and 2010);
- USFS data collected on Webster Creek in 2000 (USFS 2000b); and,
- The Idaho Fish and Wildlife Information System (IFWIS) Database (IDFG 2014a).

3.9.1 Aquatic Influence Zones

AIZs apply to the habitats on NFS land associated with aquatic areas (lakes, reservoirs, ponds, streams, wetlands, springs, bogs, etc.) under Management Prescription 2.8.3 of the RFP (USFS 2003a). AIZs apply to protect, restore, and maintain health of these areas. AIZ attributes must be maintained in areas developed for minerals. Therefore, the overlapping Management Prescription

8.2.1, which is currently directing management decisions as described in **Section 1.5.1**, does not preclude management direction in these AIZs.

The delineation of AIZs depends upon water source type (perennial, intermittent, wetland, etc.). The guidelines from USFS (2003a) are detailed in the Fisheries and Aquatic Resource TR (Stantec 2017c). They guide the AIZ width determination using criteria related to markers including the stream channel's inner gorge, riparian vegetation, tree height, 100-year floodplain, or a minimum slope distance when the other criteria are less. Different criteria are applicable depending upon whether the water source is one of the following:

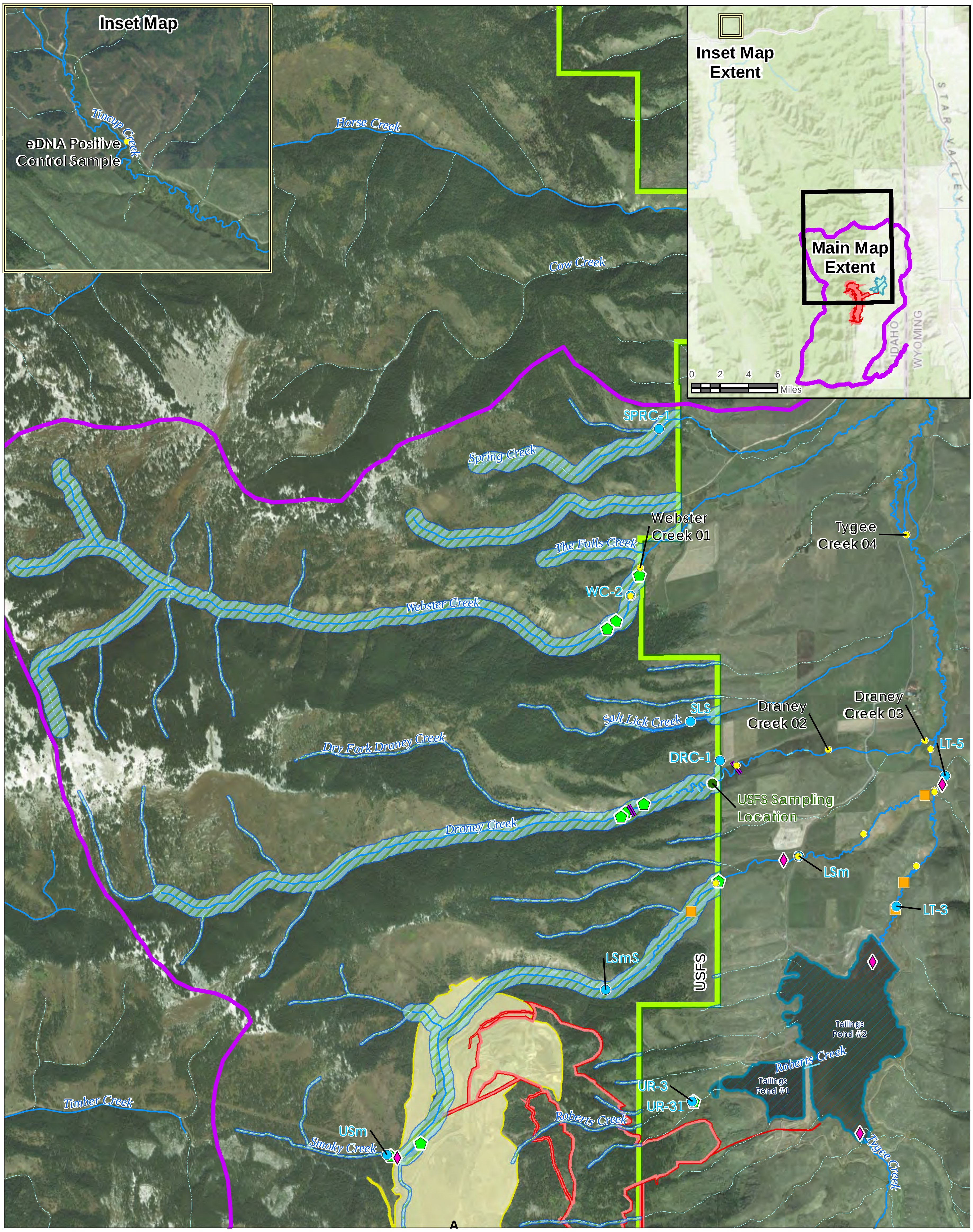
- a fish-bearing stream,
- a non-fish-bearing but permanently flowing stream,
- a pond, lake, reservoir, or wetland greater than one acre, or
- a seasonally flowing or intermittent stream or wetland less than one acre.

AIZs in and near the Study Area (only apply on NFS land) are shown on **Figures 3.9-1**, **3.9-2a**, **3.9-2b**, and **3.9-2c**. In total, there are 249 acres of AIZs in the Study Area. For Pole Canyon Creek, much of the stream is in a pipe under a large-cross valley ODA. As a result, AIZs only apply to the stream reaches upstream and downstream of the ODA. Downstream of the ODA, the stream is perennial below the diversion outlet because the pipe does not allow the water to naturally infiltrate below the ODA any longer. However, the diversion outlet is on private land and AIZs do not apply to the stream downstream of the outlet. In addition, surface flow from Pole Canyon Creek rarely reaches Sage Creek except in high flow years during run-off conditions. A small perennial seep emanates from the toe of the ODA. Although flow from the seep rarely reaches the perennial flow in the downstream diversion structure, the seep is perennial and to be conservative an AIZ for perennial streams is applied from the toe of the ODA to the USFS boundary. There are also AIZs identified along Smoky Creek within areas already disturbed by Panels B and C mining activities.

3.9.2 Aquatic Habitat

Various descriptors of habitat quality have been collected over the years within and near the Study Area, at various times and at various stream locations (**Figures 3.9-2a**, **3.9-2b**, and **3.9-2c**).

- Physical habitat was assessed on most streams within the Study Area in 2004 using IDEQ Beneficial Use Reconnaissance Program (BURP) protocols as part of the SI. Although this data is older, it is presented in **Table 3.9-1** because it encompasses most streams in the Study Area and provides the basic descriptions of many streams.
- In 2015, physical habitat was assessed on Spring Creek, Webster Creek, Draney Creek, and Roberts Creek (these streams were not included in the SI). The 2015 assessment followed a modified BURP protocol that collected only the data required to derive IDEQ's Stream Habitat Index (SHI). It also included an assessment of channel stability using the Stream Reach Index/Channel Stability Evaluation (SRI/CSE) procedure. The 2015 data is presented in **Table 3.9-2**.



Legend

- Project Area Boundary
- Tailings Ponds
- Existing Disturbance Area
- Surface Ownership Boundary
- Fisheries and Aquatics Baseline Study Area
- Aquatic Influence Zones (AIZ) within the Fisheries & Aquatics Study Area
- Stream/River
- Intermittent Stream
- Other Waterway
- 1980 Baseline Sampling Location
- e-DNA Sampling Location
- Aquatic Resource Sampling Location
- USFS Sampling Location
- 2000 Baseline Sampling Location
- BURP Location
- Draney Creek Diversion

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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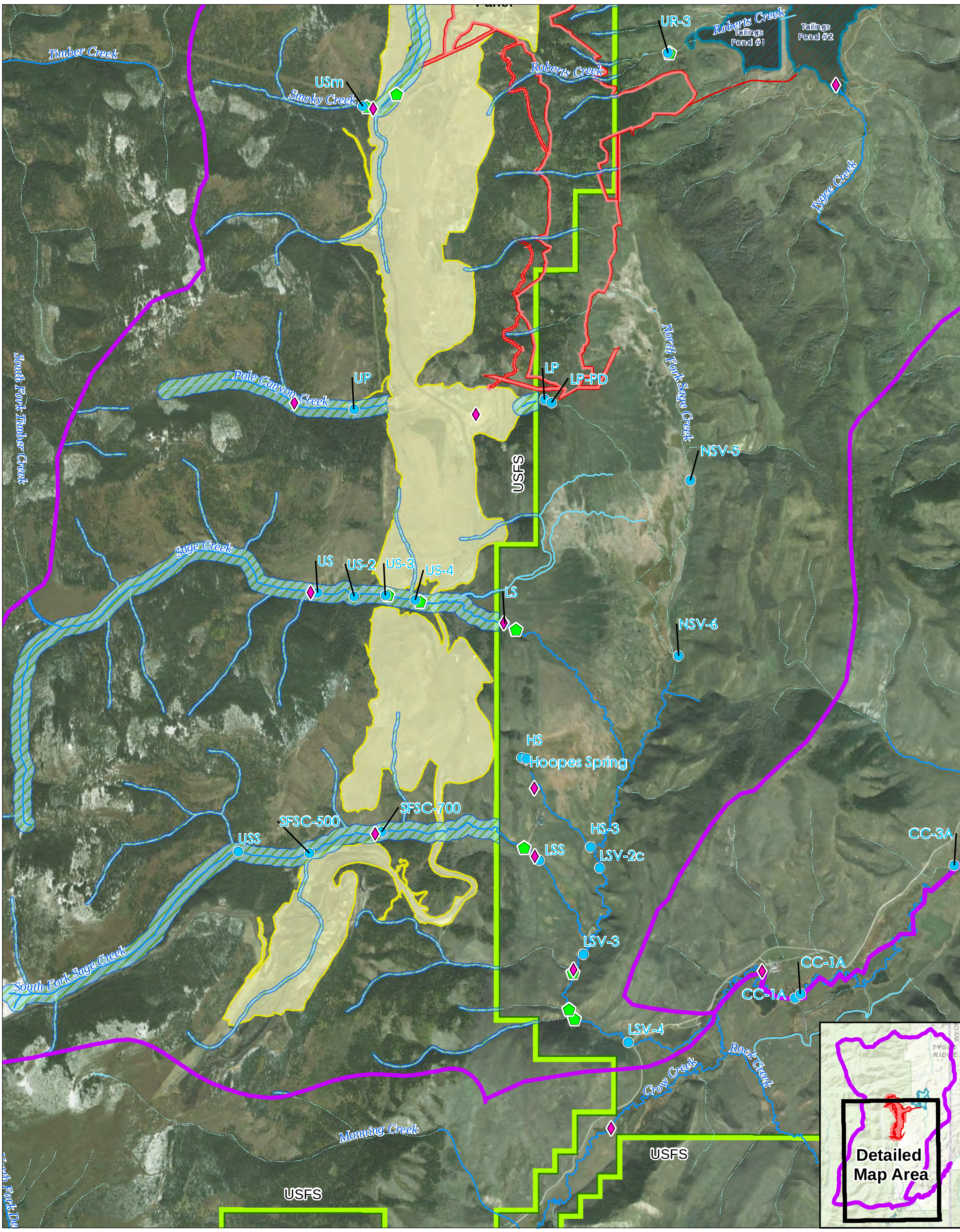
Figure 3.9-2a
Aquatic Influence Zones and Sampling Locations: North End of Study Area
East Smoky Panel Mine EIS



Legend

- Project Area Boundary
- Tailings Ponds
- Existing Disturbance Area
- Surface Ownership Boundary
- Fisheries and Aquatics Baseline Study Area
- Aquatic Influence Zones (AIZ) within the Fisheries & Aquatics Study Area
- Stream/River
- Intermittent Stream
- Other Waterway
- 1980 Baseline Sampling Location
- Aquatic Resource Sampling Location
- BURP Location

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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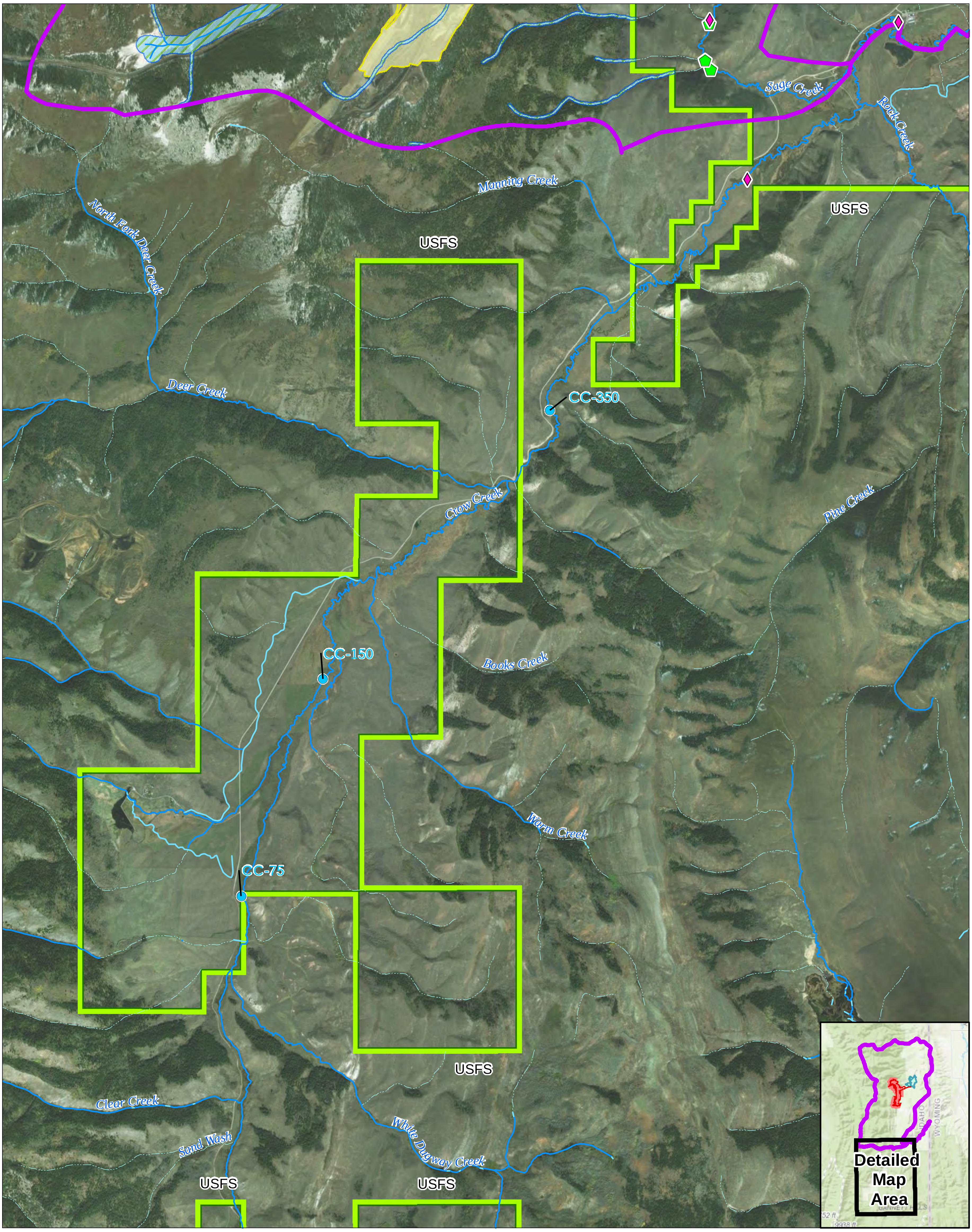
Figure 3.9-2b
Aquatic Influence Zones and Sampling Locations: South End of Study Area
East Smoky Panel Mine EIS



Legend

- Existing Disturbance Area
- Surface Ownership Boundary
- Fisheries and Aquatics Baseline Study Area
- Aquatic Influence Zones (AIZ) within the Fisheries & Aquatics Study Area
- Stream/River
- Intermittent Stream
- Other Waterway
- 1980 Baseline Sampling Location
- Aquatic Resource Sampling Location
- BURP Location

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 3.9-2c
Aquatic Influence Zones and Sampling Locations: Outside of Study Area
East Smoky Panel Mine EIS

Table 3.9-1 2004 Habitat Quality Data

		SMOKY CREEK		TYGEE CREEK	ROBERTS CREEK	POLE CANYON CREEK		SAGE CREEK				S. FK. SAGE CREEK		HOOPES SPRING
		USm	LSm	LT-5	UR-3	UP	LP	LSV-4	LS	US	US-4	USS	LSS	HS
Discharge (cfs)		0.19	0.89	0.69	0.11	0.43	0.19	11.6	2.5	5.72	-	0.36	5.4	1.5
Cross-section depth (feet)		-	0.31	0.48	-	0.14	-	0.48	0.48	0.41	-	0.15	0.49	0.63
Ave. width (feet)		2.0	1.5-2.0	2.0	1.5-2.0	2.5-3.0	1.5	22	3.5-4.0	3.5-4.0	4.5	2.5-3.0	11	4
Reach length (feet)		300	350	300	300	300	300	660	470	300	300	300	333	300
Rosgen stream type		E	E	B	E	A	G	C	G/B	A	A	A	B	B
Sinuosity		1.8	<1.5	1.9	<1.5	<1.0	<1.0	2	1.5	<1.5	<1	<1	1.3	1.3
Substrate		cobble/ boulder	sand/gravel/ macrophytes	sand/ cobble	sand/gravel/ macrophytes	cobble/ cobble	gravel/ sand/ silt	cobble/ gravel	cobble/ gravel	cobble/ boulder	cobble/ boulder	cobble/ boulder	gravel/ cobble	gravel/ sand
Stream bank conditions		stable/ covered	stable/ covered	unstable/ uncovered	stable/ covered	stable/ covered	unstable/ covered	unstable/ covered	unstable/ covered	stable/ covered	stable/ covered	stable/ covered	stable/ covered	stable/ covered
Bank stability		stable	stable	unstable	stable	stable	unstable	unstable	unstable	stable	stable	stable	stable	stable
Stream bank cover		vegetated	vegetated	uncovered	-	vegetated	vegetated	vegetated	vegetated	vegetated	vegetated	vegetated	vegetated	vegetated
Canopy closure (%)	Left	10	30	0	0	100	90	2	<5	30	100	80	2	0
	Middle	10	30	0	0	50	90	0	0	20	50	80	0	0
	Right	10	30	0	0	100	90	2	5	40	100	80	1	0
% large woody debris (LWD)		20-30	0	0	0	70-80	20	<5	<1	60-70	50	70	0	0
# pools		2	4	2	4	12	1	10	4	8	12	12	2	2
Pool variability		-	-	-	-	-	-	16	-	-	-	-	-	-
Predominant habitat		riffle/run	run	glide/pool	run	riffle/run	riffle/run	glide/pool	riffle/run	riffle/run	riffle/run	riffle/run	riffle/run	riffle/run
Embeddedness score		3	3	6	3	16	5	18	16	18	10	13	18	16
Pool substrate character		-	-	6	-	-	-	18	-	-	-	-	-	-
Channel shape		5	11	5	11	16	2	18	6	12	18	10	15	7
Disruptive pressure		5	8	2	8	10	5	9	5	10	9	8	5	9
Zone of influence		6	6	2	6	8	2	10	2	9	8	6	2	8
Instream cover		LWD/ overhead veg	macrophytes	macrophytes	macrophytes	vegetated/ LWD/ substrate	LWD	vegetated/un dercut banks	substrate only	LWD/ substrate	LWD/ substrate	LWD/ boulders/ canopy	vegetated /undercut banks	Heavy macrophytes

	SMOKY CREEK		TYGEE CREEK	ROBERTS CREEK	POLE CANYON CREEK		SAGE CREEK				S. FK. SAGE CREEK		HOOPES SPRING
	USm	LSm	LT-5	UR-3	UP	LP	LSV-4	LS	US	US-4	USS	LSS	HS
Bank angle (degrees)	40-50	70-80	40-50	90	>140	10-20	>140	50-60	110-120	>140	90-100	>140	120-130
Instream cover score	5	6	2	6	18	5	18	10	17	18	20	11	15
% undercut banks	<10	<5	0	<5	50	<1	60	<5	30	40	30	20	<5
Notes	large amount of fines deposition from flume to culvert under haul road	heavy macrophyte growth in channel, channel almost undefined	several high cut banks eroding	heavy macrophyte growth in channel	2-3x volume of flows present at UP as opposed to LP – good to high quality habitat, pools are plunge/step pools over LWD and boulders	low flow volume, substrate heavily embedded, deeply entrenched, lack of scour velocity flows	some erosion, bank slumping evident	some high banks	high quality habitat, plunge pools present, but small holding areas, several large beaver ponds downstream	stream bank cover consisted of LWD and vegetation, good quality habitat, some embeddedness due to detention pond blowout	width difficult to determine due to heavy vegetative cover – LWD abundant – many downed trees	-	some erosion near mouth of flume

Source: NewFields (2005)

Table 3.9-2 2015 SHI/SHI2 Data, Scores, and Condition Categories

HABITAT VARIABLE	SPRING CREEK SPRC-1	WEBSTER CREEK WC-2	DRANEY CREEK DRC-1	ROBERTS CREEK UR-3
Discharge (cfs)	4.88	1.8	1.08	0.25
Ave. width (feet)	14.1	4.4	4.0	1.6
Reach length (feet)	328	328	328	328
Channel shape	100	45	88	100
Gradient (%)	2-4	<2	<2	1-2
% Fines	9.7	9.0	20	22
# Wolman classes	6	6	5	6
% Bank vegetation	100	95	88	100
Mean width undercut bank (feet)	0.30	0.00	0.00	0.00
% Canopy cover	56	34	31	100
# Large organic debris	19	2	0	0
# pools	0	2	5	0
Habitat Distribution				
% Riffle	100	90	75	100
% Pool	0	10	25	0
Substrate – % each size class (mm)				
silt/clay/fine sand (0-2.5)	9.70	9.09	20.38	21.57
fine pebble (2.5-6)	0.00	0.61	0.00	3.92
pebble (6-15)	3.03	6.06	6.37	44.44
coarse pebble (15-31)	9.09	20.00	22.29	20.26
very coarse pebble (31-64)	29.70	33.33	36.31	7.19
small cobble (64-128)	37.58	30.91	14.65	2.61
large cobble (128-256)	10.91	0.00	0.00	0.00
small boulder (256-512)	0.00	0.00	0.00	0.00
medium boulder (512-1024)	0.00	0.00	0.00	0.00
large boulder (>1024)	0.00	0.	0.00	0.00
Total SHI Score[1]	**71**	**58**	**46**	**70**
SHI Condition Category[2]	**3**	**2**	**1**	**3**
SHI2 Condition Category[2]	**3**	**2**	**1**	**3**

Source: Formation Environmental (2016b)

[1] Maximum possible SHI or SHI2 score = 100

[2] SHI Condition categories (Northern and Middle Rockies Ecoregion): 1 <58 = <10th percentile of reference, 2 58-65 = 10th–25th percentile, 3 >66 = >25th percentile. SHI2 Condition categories for (Foothill Site Class): 1 <53 = <10th percentile of reference, 2 53-68 = 10th–25th percentile, 3 >68 = >25th percentile

- Substrate embeddedness has been monitored in the Study Area as part of the long-term monitoring. From 1990–2002, it was assessed annually at 10 sites on five streams: Smoky Creek (USm and LSm), Tygee Creek (UT-1 and LT), Pole Canyon Creek (UP and LP), Sage Creek (US and LS), and South Fork Sage Creek (USS and LSS). These sites were also monitored from 2005–2009; however, monitoring occurred during the summer rather than in the fall and TRC (2008) did not consider the data comparable to the fall data. As a result, the data has not been included in subsequent annual reports and is not included here. Beginning in fall 2010, monitoring was reduced to biannual sampling at six locations on five streams. Embeddedness data is qualitative and may have limited utility; however, because a long-term data record is available for these six locations, it is presented in **Table 3.9-3** to describe trends over time.
- Data used other than the 2004, 2015, and long-term embeddedness data includes detailed data collected on Smoky Creek in 2000 (Chadwick 2001); IDEQ BURP data; IDEQ streambank erosion inventory (SEI) and McNeil core data for Draney Creek, Smoky Creek, Tygee Creek, and Crow Creek; data on South Fork Sage Creek from 2003 (Maxim 2004b); data from the Panels F and G monitoring (Formation Environmental 2016b); and data from the SSSC development (Formation Environmental 2016b).

Table 3.9-3 Substrate Embeddedness Ratings

STREAM	LOCATION	FALL 1990-2002[1]		FALL 2010	FALL 2011	FALL 2013	FALL 2015
		MIN	MAX				
Smoky Creek	LSmS	Dry[2]	2	1	1	2-3	2
	LSm	1	2	1	3	2	2
Tygee Creek	LT-3	1	2	1	2	4	4
Pole Creek	LP/LP-PD[3]	1	2	2	2	2	3
Sage Creek	LS	1	5	5	5	4	4
South Fork Sage Creek	LSS	3	5	4	5	4-5	4
Rating	**Rating Description**						
5	<5% of surface covered by fine sediment						
4	5-25% of surface covered by fine sediment						
3	25-50% of surface covered by fine sediment						
2	50-75% of surface covered by fine sediment						
1	>75% of surface covered by fine sediment						

Source: Formation Environmental 2016c, 2014, and 2012

[1] As summarized in Formation Environmental (2016d), data from 2003-2009 is not included.

[2] LSmS was not sampled until Spring 2001 and was dry in Fall 2001.

[3] Data prior to Fall 2010 is from LP, but the site was moved downstream after construction of the diversion in 2008 and subsequent data is from LP-PD.

3.9.2.1 Stream Habitat Index (SHI) and Stream Habitat Index 2 (SHI2)

SHI

The SHI, described in Grafe (2002), includes 10 habitat measures indicative of water quality conditions. Five of the metrics are quantitatively measured and five are qualitatively estimated. The metrics are: instream cover; large organic debris (or large woody debris; LWD); percent fines (< 2 millimeters); embeddedness; Wolman size classes; channel shape; percent bank cover; percent canopy cover; disruptive pressures; and zone of influence. A sum of the numeric scores assigned to each metric value produces an overall SHI score from 0 to 100, which is then compared to reference conditions and assigned a condition rating. Condition ratings are assigned based on the 25th and 10th percentiles of reference conditions for three ecoregions.

The Study Area is in the Northern and Middle Rockies ecoregion, with the following conditions ratings:

1 <58 = <10th percentile of reference

2 58-65 = 10th–25th percentile

3 66 = >25th percentile

SHI2

IDEQ revised its assessment guidance in 2016 (IDEQ 2016) and made changes to some of its multimetric indices. The metrics, indices, and scoring of the SHI did not change, but site classification and the condition rating thresholds did. The SHI2 uses a new unified site classification for habitat, macroinvertebrate, and fish indices. Three site classes were developed based on the benthic macroinvertebrate assemblages in reference streams, and then confirmed for habitat and fish. The Study Area is in the Foothill Site Class. Habitat condition rating thresholds for the foothill site class are based on the 50th and 10th percentiles of reference:

1 <53 = <10th percentile of reference

2 53-68 = 10th–50th percentile

3 >68 = >50th percentile

IDEQ has made a policy decision to use SHI2 for data collected from 2013 forward (Van Every 2017). Since most data described in this report is older than 2013, all years are compared to the SHI condition rating thresholds for consistency. However, to comply with the IDEQ decision making, data collected since 2013 is compared to both the SHI and SHI2 condition rating thresholds.

3.9.2.2 Spring Creek

Spring Creek is entirely fed by a small spring complex located a short distance upstream of the USFS boundary. It flows onto private land where it is used for fish production and recreational fishing on the Salt River Trout Ranch. On NFS land, it is larger than most of the other nearby headwater streams, with a mean width of approximately 14 feet. As shown in **Table 3.9-2**, it has well vegetated banks and generally a low percentage of fine sediment in the substrate. This is at least partially due to it being spring-fed (i.e., flow is constant, allowing bank vegetation to become well established). There were, however, no pools noted in the survey reach, which affected the overall SHI/SHI2 score (Formation Environmental 2016c). Even with the lack of pools, the total

SHI score was 71, which is assigned a condition rating of 3 under both SHI and SHI2. Overall SRI/CSE rating was good (Stantec 2017c).

3.9.2.3 Webster Creek

Webster Creek is a small, spring-fed stream with a channel width that is typically between three and six feet (**Table 3.9-2**). Upstream of the USFS boundary, multiple large beaver ponds provide good habitat for fish; however, trampled and unstable stream banks were noted in the same reach by USFS (2000a). Downstream of the USFS boundary, Webster Creek flows through pastureland that is heavily grazed, with very little streamside vegetation and obvious unstable banks. During visual surveys of the downstream portions, there did not appear to be any water diversions that limit upstream fish movement. The beaver dams near and above the USFS boundary may pose a partial barrier to fish passage; however, observations suggest that side channels with sufficient flow exist to allow movement around and through the pond complexes (Stantec 2017c). On NFS land upstream of the reach sampled in 2015, there is a diversion that conveys a sizeable portion of water to irrigators below the USFS boundary (USFS 2000a), but it is unknown if it presents a barrier to fish passage.

In 2015, habitat at WC-2 received an overall SHI/SHI2 score of 58 and a condition rating of 2 under both the SHI and SHI2 thresholds. It scored poorly for LWD, instream cover, canopy cover, and channel shape (Stantec 2017c). However, it had the lowest percentage of fine sediment of all the streams surveyed to the north of Smoky Creek in 2015, with a substrate composed primarily of coarse/very coarse pebble (size from 15-64 mm; 53 percent) and small cobble (31 percent). SHI scores from Idaho BURP sampling in 1998 and 2004 were 71 and 50, respectively. SHI/SHI2 score in 2013 was 48. The 1998 location was downstream from the site sampled in 2015 (WC-2), and the 2004 and 2013 locations were upstream of WC-2. The 2004 and 2013 locations were within and immediately upstream of beaver pond complexes and contained much higher percentages of fine sediments and lower percentages of covered and stable banks than the site sampled in 1998, which was downstream of the beaver dam complexes. Overall SRI/CSE rating in 2015 was good (Stantec 2017c).

3.9.2.4 Draney Creek

Draney Creek is a small, low flow stream with an average width of approximately four feet. The lower portions (between where it crosses the Stump–Tygee road and its confluence with Tygee Creek) flow through grazed pasture in an artificial channel where there is little riparian vegetation or fish habitat. Upstream of the road crossing, there are large beaver dam complexes mixed in with short undammed stream reaches. The largest beaver dam complex is upstream of the USFS boundary in an area of extremely thick willows (USFS 2010). This area may provide good fish habitat but is difficult to assess due to the lack of a confined channel. Above the willow/beaver pond area, the stream may at times be intermittent due to an upstream irrigation diversion, which is discussed in the following paragraph and shown on **Figure 3.9-2a**. Because of the limitations present for sampling near the beaver ponds and the intermittent reaches above the beaver ponds, the baseline surveys conducted in 2015 were conducted on private land below the USFS boundary.

There are two diversions and a culvert that may present barriers to upstream fish movement in Draney Creek, at least during periods of the year. These barriers are described in Stantec (2017c). In addition to the two diversions and culverts, there is a channelized portion of the stream channel just upstream of the confluence with Tygee Creek, and the two large beaver dam complexes both upstream and downstream of the downstream diversion discussed above. The channelized portion provides poor fish habitat but does not appear to impede upstream movement. Similarly, while the beaver dam complexes have the potential to impede upstream movement, they are located in broader portions of the Draney Creek canyon bottom and are spread out with lots of side channels (i.e., beaver dams do not span the entire creek). As a result, they do not appear to prevent upstream fish movement.

Of the streams north of Smoky Creek that were sampled in 2015, Draney Creek received the lowest SHI/SHI2 score (46) and a condition rating of 1 under both SHI and SHI2 thresholds. The low score is due to a high percentage of fine sediment (approximately 20 percent) and limited canopy cover. Draney Creek also had the poorest SRI/CSE score, but still received a rating of good (Stantec 2017c). Upstream of the reach sampled in 2015, the USFS (2010) also noted high amounts of fine sediment and unstable banks. BURP data from 1998 and 2003 had SHI scores and ratings similar to the 2015 score and rating (52 and 58, respectively, both a SHI condition rating of 1). Both the 1998 and 2004 sample locations had high amounts of fines (35 and 52 percent, respectively) and poor scores for embeddedness and bank stability.

Draney Creek was listed as impaired in Idaho's 2014 Integrated Report (IDEQ 2017a) due to the inability to meet its presumed beneficial uses of cold water aquatic life, secondary contact recreation, and salmonid spawning, as well as for physical habitat alterations. The pollutants identified were sediment and bacteria (*E. coli*). The SEI conducted in 2012 by IDEQ indicated that stream bank stability is 61 percent (below the 80 percent considered normal) and likely the primary contributing factor to the high amounts of fine sediment already noted above. McNeil core sampling data from 2012 also indicated levels of subsurface fines (62.5 percent < 6.25 millimeters, 22.2 percent < 0.85 millimeters) greater than IDEQ targets (27 percent < 6.25 millimeters, 10 percent < 0.85 millimeters). Sampling for *E. coli* in 2014 indicated that water quality standards for secondary contact recreation were being met, but that more data should be collected (IDEQ 2015c).

3.9.2.5 Smoky Creek

Smoky Creek is a small stream with an average width of approximately three feet and a mean depth of 0.5 feet or less (Chadwick 2001, Mariah 1980). Approximately one mile downstream where the stream enters the mine area, it typically goes dry or has very low flow in late summer and fall. Flow reappears at Lower Smoky Spring (LSmS), which provides the perennial base flow to lower Smoky Creek (Formation Environmental 2014). Downstream of LSmS are a series of beaver dams that cover the channel and much of the valley between the mine access road and the slope on the south side of the valley (Chadwick 2001). Downstream of the beaver dams, the stream meanders through open pasture. There are several diversions in the lower pasture, as least one of which appears capable of diverting the entire flow of Smoky Creek, leaving much of the natural channel dry (Chadwick 2001).

The most extensive habitat data for Smoky Creek comes from Chadwick (2001), which divided the stream into three reaches: reach 1 was from the Tygee Creek confluence upstream to the USFS boundary (≈2.2 miles); reach 2 was from the USFS boundary upstream to the series of beaver dams (≈0.8 miles); and reach 3 was from the upstream end of the beaver ponds (the ponds were not included in reach 2 or 3) to the point where the stream turns west into upper Smoky Canyon near the mine entrance (2.2 miles). Habitat in reaches 1 and 2 was inventoried using the USFS R1/R4 procedure (Overton et al. 1997). Habitat was not inventoried in reach 3 as much of the reach was dry or had minimal flow.

A summary of habitat parameters collected for reaches 1 and 2 by Chadwick (2001) is presented in **Table 3.9-4**. The lower reach, reach 1, had mostly stable banks, but the substrate was dominated by a larger percentage of fines (silt and sand) than reach 2. In contrast, much of reach 2 was deeply incised with unstable banks, but with a much lower percentage of surface fines. Chadwick (2001) hypothesized that the sediment being introduced from the eroded stream banks was being transported downstream into reach 1 (Chadwick 2001).

The embeddedness ratings (**Table 3.9-3**) indicate that there are typically high amounts of fine sediment at the LSm location, which is consistent with the high percentage of fines noted within this reach (reach 1) by Chadwick (2001). The LSm location was moved upstream approximately 400 feet in 2011 due to constraints on private property (Formation Environmental 2016c). The new location has a wider channel with more diverse substrate, which may explain slightly higher scores in 2013 and 2015. The long-term embeddedness data also shows high amounts of fine sediment at LSmS (Formation Environmental 2016c). The stream channel at LSmS is narrow with low flow and is adjacent to the main access road, all of which may contribute to the high amounts of sediment at this location (NewFields 2005).

Table 3.9-4 Summary of Habitat Parameters Measured on Smoky Creek in 2000

PARAMETER	REACH 1 (MOUTH TO CTNF BOUNDARY)	REACH 2 (CTNF BOUNDARY TO BEAVER PONDS)
Reach length (miles)	2.2	0.8
Mean width (feet)	3.0	3.6
Mean depth (feet)	0.5	0.3
Stable bank (%)	84.7	4.3
Undercut bank (%)	43.0	4.9
Gradient	1.4	2.2
Habitat types (% total)		
Low gradient riffle	19.3	69.4
Run	76.5	26.1
Pools	3.9	4.5
Other	0.3	0.0
% Surface fines	53.0	8.6
Substrate type (% total)		
Fines	51.7	15.0
Gravel	43.3	67.5
Cobble	5.0	17.5
Boulder	0.0	0.0
Bedrock	0.0	0.0

Source: Modified from Chadwick (2001)

Smoky Creek was listed as impaired in Idaho's 2014 Integrated Report (IDEQ 2017a) due to the inability to meet its presumed beneficial uses of cold water aquatic life, secondary contact recreation, and salmonid spawning, as well as physical habitat alterations. The pollutants identified were sediment and bacteria (*E. coli*). The SEI conducted in 2012 by IDEQ indicated that stream bank stability is 10 percent. This is well below the 80 percent considered normal and is the primary contributing factor to the high amounts of fine sediment noted above. No suitable spawning habitat was found in 2012 using McNeil core sampling.

3.9.2.6 Tygee Creek

Tygee Creek is a small stream that flows north from the area containing the existing tailings ponds. The reach of Tygee Creek between Smoky Creek and the tailings ponds is a low gradient, meandering stream in mostly open meadow that is grazed by cattle (Chadwick 2001, Mariah 1980). The channel is narrow and relatively deep, with glide/pool habitat the dominant habitat type (**Table 3.9-1**). Streambanks are generally unstable and suffer from severe undercut erosion (Formation Environmental 2016c). Downstream where Smoky Creek enters, the stream becomes wider, but continues to flow through grazed pasture until its confluence with Stump Creek.

Tygee Creek generally has a gravel substrate, but with high percentages of fine sediment. Sediment was sampled on Tygee Creek approximately 350 m downstream from the dam in 2000 using a McNeil sampler by personnel from Maxim (with data reported in Chadwick 2001). Three replicate samples were taken from a riffle and results were 40 percent fines, 51 percent gravel, and 9 percent cobble (Chadwick 2001). The long-term embeddedness data (**Table 3.9-3**) shows that while embeddedness has historically been high at the LT-3 site, relatively high rankings for embeddedness (5-25 percent of the gravel particles covered by fine sediment) have been achieved in 2013 and 2015. However, this may be due to the fact that during assessments, the majority of areas with fine sediments were inundated with aquatic macrophytes (Formation Environmental 2016c). Because embeddedness is assessed visually, assessments have, therefore, occurred in areas without vegetation where the substrate is visible and there are lower amounts of fine sediment.

Tygee Creek was listed as impaired in Idaho's 2014 Integrated Report (IDEQ 2017a) due to the inability to meet its presumed beneficial uses of cold water aquatic life and salmonid spawning, as well as for physical habitat alteration. Sediment issues, as described above, were confirmed by the SEI conducted in 2012, which indicated that stream bank stability is 55 percent (below the 80 percent considered normal; IDEQ 2015c).

3.9.2.7 Roberts Creek

Roberts Creek is a very small spring-fed stream that flows from the area just east of the existing mine down to the tailings ponds. At the tailings ponds, it is impounded behind a small dike and then routed in an artificial channel around the ponds to its confluence with Tygee Creek. The reach upstream of the impoundment is low gradient, with very few meanders, and is dominated by narrow run type habitat. Banks are generally well vegetated and stable (**Table 3.9-1**). The reach surveyed in 2015 had a substrate dominated by pebble (44 percent) and coarse pebble (20 percent), but with high amounts of surface fines (22 percent) (**Table 3.9-2**).

SHI/SHI2 score in 2015 was 70 with a condition rating of 3 under both SHI and SHI2 thresholds. Habitat measures that scored well were percent bank vegetation, canopy cover, disruptive pressure, and zone of influence. Measures that scored poorly were large organic debris (the stream is in an open meadow and willows, with no potential for large organic debris recruitments) and substrate (both percent fines and number of Wolman classes). SHI score (48) from the 2002 BURP location was lower than in 2015. The 2002 BURP location was near the 2015 sample location; however, IDEQ (2015c) noted that the 2002 sample was taken from a marshy location and is not representative of the entire reach. IDEQ (2015c) recommended that Roberts Creek be removed from Idaho's list of impaired streams in the next integrated report.

3.9.2.8 North Fork Sage Creek

North Fork Sage Creek is a very narrow stream that flows along the eastern edge of Sage Valley. The stream starts near several small ponds on the northern end of the valley and appears to be intermittent in this upper reach. Further south, flow is augmented by flow from several springs and appears to be perennial. Fish habitat has not been assessed in North Fork Sage Creek. North Fork Sage Creek was listed as impaired in Idaho's 2014 Integrated Report (IDEQ 2017a) due to selenium.

3.9.2.9 Pole Canyon Creek

Pole Canyon Creek is a small stream that passes between Panels A and D of the existing mine. It has been heavily impacted by the Pole Canyon ODA that covers a portion of Pole Canyon Creek's lower drainage, just upstream of its entry into Sage Valley. During construction of the ODA, coarse materials were dumped in the narrow canyon bottom first to form a "French drain" that would allow the stream to pass through the overburden. Several failures of the fill material occurred throughout the years, which likely resulted in the addition of fine-grained materials to the coarse overburden in the drainage bottom (NewFields 2005).

Various studies, such as the SI, identified contamination of groundwater and surface water due to water contacting material in the ODA (NewFields 2005). Various agreements (summarized in Formation Environmental 2014) led to construction of several projects designed to improve water quality in lower Pole Canyon Creek. These included: 1) a pipeline that diverts a portion of Pole Canyon Creek around the ODA so that it no longer comes in contact with the overburden; 2) an infiltration basin that directs any flow not captured by the pipeline into the Wells Formation aquifer upstream of the ODA; and 3) a channel along the hillslope to the north of the ODA intended to prevent water from running onto the ODA and contacting the overburden (Formation Environmental 2014). The pipeline and infiltration basin were completed in 2007 and the channel along the hillslope was completed in 2008. Installation of a Dinwoody cover to prevent water from infiltrating the ODA was begun in 2015 (Formation Environmental 2014).

Following construction of the diversion pipeline, the monitoring site on Pole Canyon Creek (LP) was moved downstream of the diversion outlet (LP-PD). As a result, some of the data in **Table 3.9-1** represents portions of the channel that are now dry. Upstream of the ODA, Pole Canyon Creek is relatively small (average width = 2.5–3.0 feet), with good quality habitat (i.e., clean substrate, stable banks, plunge pools, etc.). Downstream of the diversion, the stream is smaller (average width = 1.5 feet) due to flow lost to the infiltration basin and is impacted by additional water diversions (Formation Environmental 2016d). Impacts are evident in the long-term embeddedness data (**Table 3.9-3**), which shows that historically 50-75 percent of the substrate has been covered with fine sediment. There was less fine sediment reported in 2015. However, Formation Environmental (2016d) noted little overall change in their qualitative assessment in 2015; the channel was deeply incised and narrow, with very low flow and heavily eroded streambanks. Lower Pole Canyon Creek is diverted downstream of LP-PD, where flows only occasionally reach North Fork Sage Creek during periods of high spring runoff, which limits fishery potential at the site.

3.9.2.10 Hoopes Spring

Hoopes Spring is a large spring complex located between Sage Creek and South Fork Sage Creek that flows across the southern end of Sage Valley and into lower Sage Creek. Downstream reaches were called Middle Fork Sage Creek in early reports (Mariah 1980). Several sites have been sampled over the years, with the most common being HS and HS-3. HS is located near the source area and HS-3 is located further downstream where the many spring sources coalesce into a channel prior to joining Sage Creek. Habitat at HS was quantified in 2004 as shown in **Table 3.9-1**. At that site, it is a shallow, narrow stream with well covered and vegetated banks. Downstream, at HS-3, the stream becomes wider with more pool/glide habitat (Formation Environmental 2016b). SHI scores and conditions ratings from 2006–2015 have ranged from 32-45 at HS-3, which is a condition rating of 1. Mean summer flow for the same period at HS-3 is 6.73 cfs. As discussed in **Section 3.9.5**, water from Hoopes Spring is the primary source of selenium to Sage Creek and Crow Creek.

3.9.2.11 Sage Creek

Sage Creek begins in heavily vegetated forest land in an area with considerable beaver activity (Mariah 1980). It then flows through the active mine area and down into Sage Valley. As shown in **Table 3.9-1**, it has an average width of 3.5-4.0 feet at the US location, along with stable banks and a cobble/boulder substrate. There are pools present as well as large beaver dams. The LS location is downstream of the mine haul road crossing with disturbances noted at the site (Formation Environmental 2016d). The stream at this location is wider than upstream and relatively shallow, with high sinuosity (Formation Environmental 2016d). Despite the disturbance near the site, embeddedness has been lower than on many of the other streams, ranging from <5 percent to between 5-25 percent (**Table 3.9-3**). Formation Environmental (2016d) reports an abundance of medium to large cobbles.

SHI index scores at BURP sites within the active mining area were 79 and 71 in 1996 and 2001, respectively, with condition ratings of 3. These scores indicate good habitat present at these locations. Downstream of the active mining area, at the 2006 BURP location near the LS monitoring location, SHI score was 41, with a condition rating of 1. The lack of cover influenced the lower condition rating. However, IDEQ revisited the site in 2014 to conduct a SEI and pebble count. The data showed stable banks (96 percent) along a longer stream reach than was evaluated in 2006 and low amounts of fine sediment. IDEQ (2015) recommended that Sage Creek be resampled prior to considering removal from the list of impaired waters (currently listed upstream of the confluence with the North Fork Sage Creek due to combined biota/habitat bioassessments).

Further downstream, particularly near the confluence with Crow Creek, the stream channel and habitats change. It becomes much wider (22 feet at the LSV-4 location in 2004), with more glide/pool habitat. Some erosion and unstable banks were noted in 2004. SHI scores at the 1995 and 2001 BURP locations were 55 and 59, respectively, both with a condition rating of 2. SHI/SHI2 score at the 2013 BURP location was 50, which receives a condition rating of 1 under both SHI and SHI2 thresholds. The 2013 BURP location was located midway between the other two BURP locations. Although these scores are lower than the upstream locations, reflecting a decline in habitat conditions in a downstream direction, they have been relatively stable over time, indicating stable conditions. The reach of Sage Creek from the confluence with the North Fork Sage Creek down to Crow Creek is listed as impaired due to selenium (IDEQ 2017a).

3.9.2.12 South Fork Sage Creek

As summarized in Formation Environmental (2016c), South Fork Sage Creek originates on NFS land west of the existing mine, flows east along the southern boundary of Panel E and into Sage Valley where it joins Sage Creek. Upper sections may be intermittent, with the South Fork Sage Creek Spring complex located approximately 500 feet upstream of LSS providing most of the flow to the lower portion of the stream. Habitat conditions in 2004 at both the upstream and downstream locations were good, with abundant LWD at the USS location and stable, vegetated banks at both locations. Maxim (2004b) also noted stable banks and gravel substrates at two sites assessed on South Fork Sage Creek in 2003. LWD was noted at both of the Maxim (2004b) sites, particularly the upstream location, which is consistent with the 2004 data. Embeddedness ratings have been between four and five since 2010, which is within the historic range and lower than most other stream locations (**Table 3.9-3**).

SHI score at the 2006 BURP location, located near LSS, was 54 with a condition rating of 1. Based on the 2006 BURP score, South Fork Sage Creek was listed as impaired due to combined biota/habitat bioassessments (IDEQ 2017a). However, a site visit in 2014 revealed that the 2006 assessment was conducted in a reach of stream between two fences where cows were concentrated (IDEQ 2017a). The 2012 SEI documented good bank stability (83 percent) and low amounts of surface fines in a longer, more representative reach (IDEQ 2015c). IDEQ (2015c) recommended a BURP resample in a more representative reach (it remains listed for combined biota/habitat bioassessments, as well as selenium).

3.9.2.13 Crow Creek

Habitat in Crow Creek was characterized by Maxim (2004b) as having a predominantly gravel substrate, with a stable riffle-pool pattern. Crow Creek was listed as impaired for *E. coli*, but the listing was in error (IDEQ applied data from a lower 4th order segment) and IDEQ (2015c) recommended that it be delisted.

Habitat conditions have been assessed as part of the SSSC (2007 and 2008), and Panels F and G monitoring (2009, 2010, 2011, and 2014). **Table 3.9-5** shows SHI/SHI2 and SRI scores from these assessments. SHI/SHI2 scores were generally low at all sites, typically within condition category 1 or 2. The lowest scores were at CC-350 in all years except 2007. SHI scores at most sites were highest in 2011, with scores higher only in 2014 at CC-350 and CC-1A. CC-1A, which is downstream of Sage Creek, had SHI scores similar to sites above mining related disturbance (CC-75 and CC-150, **Figure 3.9-2c**). SRI/CSE scores were similar between sites, with most sites scoring in the good stability range (39-76) in most years. CC-350 scored in the fair range (77-114) in most years.

Table 3.9-5 Summary of SHI and SRI/CSE Scores for Crow Creek, 2007–2011, & 2014

SITE	YEAR	SHI/SHI2 SCORE[1]	CONDITION CATEGORY[2]		SRI/CSE SCORE[3]	DATA SOURCE
			SHI	SHI2		
CC-75	Fall 2007	50	1		89	SSSC
	Fall 2008	56	1		70	SSSC
	Fall 2009	58	2		72	Panels F & G
	Fall 2010	55	1			Panels F & G
	Fall 2011	70	3		68	Panels F & G
	Fall 2014	60		2	65	Panels F & G
CC-150	Fall 2007	47	1		75	SSSC
	Fall 2008	56	1		76	SSSC
	Fall 2009	61	2		56	Panels F & G
	Fall 2010	59	2			Panels F & G
	Fall 2011	65	2		62	Panels F & G
	Fall 2014	60		2	54	Panels F & G
CC-350	Fall 2007	47	1		90	SSSC
	Fall 2008	39	1		103	SSSC
	Fall 2009	58	2		92	Panels F & G
	Fall 2010	46	1			Panels F & G
	Fall 2011	55	1		79	Panels F & G
	Fall 2014	58		2	69	Panels F & G
CC-1A	Fall 2007	50	1		76	SSSC
	Fall 2008	51	1		83	SSSC
	Fall 2009	60	2		66	Panels F & G
	Fall 2010	52	1			Panels F & G
	Fall 2011	60	2		68	Panels F & G
	Fall 2014	65		2	59	Panels F & G

Source: Formation Environmental (2016b)

[1] Maximum possible SHI or SHI2 score = 100

[2] SHI Condition categories (Northern and Middle Rockies Ecoregion): 1 <58 = <10th percentile of reference, 2 58-65 = 10th–25th percentile, 3 >66 = >25th percentile. SHI2 Condition categories for (Foothill Site Class): 1 <53 = <10th percentile of reference, 2 53-68 = 10th–25th percentile, 3 >68 = >25th percentile

[3] Overall Score Ranges: <38 Excellent, 39-76 Good, 77-114 Fair, >115 Poor

3.9.3 Macroinvertebrates

Biological monitoring of benthic macroinvertebrate populations in the Study Area began in 1979. The sampling program varied in subsequent years in regard to site locations and sampling season, though sample methodology has been consistent. Since 2011, six sites on five streams have been sampled biannually. The aquatics and fisheries TR (Stantec 2017c) discusses program and methodology details. Metrics analyzed and reported have also varied, but since 2010 have included those associated with the Stream Macroinvertebrate Index (SMI and SMI2), which are described below in **Section 3.9.3.1**.

Formation Environmental's (2016d) annual report for Simplot provides results for the most recent 2015 samples, as well as comparison to long-term data. Other data sources include IDEQ BURP data (sites on Webster Creek, Draney Creek, Smoky Creek, Tygee Creek, Roberts Creek, Sage Creek, and South Fork Sage Creek); Maxim (2004b); the SI; the RI; and the data collected on Crow Creek for development of the SSSC, the Panels F and G mitigation monitoring, and the voluntary monitoring (Formation Environmental 2016b).

Table 3.9-6 presents SMI metric scores at the long-term monitoring sites. Data on taxa richness, diversity, density, and evenness for the same sites is contained in Stantec (2017c). Stantec (2017c) also includes SMI2 scores for Sage Creek and South Fork Sage Creek in 2013 and 2015. SMI2 scores were calculated for these sites only, as other sites lacked the habitat data to calculate the adjusted metrics of the SMI2. **Tables 3.9-7** and **3.9-8** present SMI scores and condition ratings for Sage Creek and Crow Creek. Additional SMI scores and ratings can be found in Stantec (2017c).

3.9.3.1 Stream Macroinvertebrate Index (SMI) and Stream Macroinvertebrate Index 2 (SMI2)

The SMI and SMI2 were both developed by IDEQ, with the SMI2 being the most recent revision (IDEQ 2016). The indices are similar, but the metrics and rating categories vary as described below. IDEQ policy is to use the SMI2 for data collected from 2013 forward (Van Every 2017). Since most data described in this report is older than 2013, all data is compared to the SMI for consistency. Data collected since 2013 that has sufficient habitat data to calculate the metrics is also compared to the SMI2.

SMI

Development of the SMI included sampling streams known to be minimally affected by anthropogenic factors (i.e., streams that include high-quality habitats and good water quality). The index is organized such that an overall higher score, which ranges from 0 to 100 and is derived as a sum of the various metrics, indicates a stream is in good condition. A low score indicates the stream has been degraded relative to its potential score. The SMI includes nine metrics: total taxa richness; taxa richness for Ephemeroptera, Plecoptera, and Trichoptera (EPT); percent composition of Plecoptera; Hilsenhoff's Biotic Index (HBI), the percent dominance of the five most common taxa in the sample; percent composition of organisms in the "scrapers" feeding group, and; percent composition of organisms in the "clinger" feeding group. The indications provided by each of these metrics are described in Grafe (2002) and summarized in Stantec (2017c).

Table 3.9-6 Comparison of SMI Metrics at Long-term Monitoring Sites – 2010–2013, & 2015

	LSmS				LSm				LT-3				LP-PD				LS				LSS			
	2010	2011	2013	2015	2010	2011	2013	2015	2010	2011	2013	2015	2010	2011	2013	2015	2010	2011	2013	2015	2010	2011	2013	2015
Total Taxa Richness 100*(Total Taxa)/95th	43	51	43	43	51	59	49	59	59	51	59	57	62	65	41	51	62	54	70	57	70	59	68	59
Ephemeroptera Richness 100*(Ephemeroptera Taxa)/95th	30	40	30	30	20	50	20	30	20	10	30	50	60	60	30	50	60	60	70	70	60	60	50	60
Plecoptera Richness 100*(Plecoptera Taxa)/95th	50	38	38	38	25	38	38	50	25	13	13	0	50	63	25	25	38	25	38	38	38	38	25	25
Tricoptera Richness 100*(Tricoptera Taxa)/95th	0	22	33	33	33	33	56	44	44	56	67	67	56	56	22	33	33	67	44	22	56	67	78	78
Percent Plecoptera 100*(%Plecoptera Taxa)/95th	29	34	100	31	19	7	57	63	1	4	11	0	31	24	25	18	82	22	100	100	33	18	24	46
Hilsenhoff's Biotic Index (HBI) 100*(10-HBI)/(10-5th)	71	66	84	95	58	64	78	79	36	44	63	52	86	92	63	83	76	74	75	78	100	100	92	100
% 5 Dominant Taxa 100*(100-%5dom Taxa)/(10-5th)	65	25	46	28	46	23	67	66	6	26	29	31	40	45	24	80	35	31	40	35	45	23	53	46
Scraper Taxa 100*(Scraper Taxa)/95th	50	63	38	50	13	50	25	38	63	50	75	100	63	63	38	50	38	63	75	75	75	63	88	75
Clinger Taxa 100*(Clinger Taxa)/95th	42	53	42	53	42	68	53	68	53	47	63	68	68	68	37	58	58	63	84	74	84	79	84	84
SMI Score (Range 0-100)	42	44	50	45	34	44	49	55	34	33	46	47	57	59	34	50	54	51	66	61	62	56	62	64
Condition Rating	1	1	1	1	1	1	1	2	1	1	1	1	2	3	1	1	2	2	3	3	3	2	3	3

Source: Formation Environmental (2016d, 2014, 2012)

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Formation Environmental (2012, 2014, and 2016d) has used a SMI rating category system derived from examples in Grafe (2002), rated 1–3, based on the 25th percentile and the 10th percentile as shown below:

1 33-50 = minimum–10th percentile

2 51-58 = 10th –25th percentile

3 >59 = > 25th percentile

SMI2

As described for the SHI2 in **Section 3.9.2.1**, three site classes were developed based on benthic macroinvertebrate assemblages in reference streams. The Study Area is in the Foothill Site Class. The SMI2 includes six metrics for the Foothill Site Class: EPT taxa richness; percent composition of non-insect taxa; percent composition of EPT (excluding Hydropsychidae); percent composition of organisms in the "scrapers" feeding group; percent composition of tolerant taxa, and percent composition of sprawler taxa. A summary of the indications provided by each of these metrics is presented in Stantec (2017c). EPT taxa richness, percent non-insect taxa, and percent sprawler taxa are adjusted metrics. EPT taxa richness and percent non-insect taxa are adjusted for the proportion of fines in the substrate and percent sprawler taxa and adjusted for the percent of pool habitat in the sampled reach.

Condition rating thresholds for the Foothill Site Class are based on the 50th and 10th percentiles of reference:

1 <53 = <10th percentile of reference

2 53-61 = 10th–50th percentile

3 >61 = >50th percentile

3.9.3.2 Spring Creek

As part of the baseline data collection conducted in 2015, macroinvertebrates were sampled in Spring Creek to measure selenium concentrations in tissue. However, macroinvertebrates were not sampled quantitatively or assessed for community composition. Taxa data from the benthic tissue samples is contained in the Fisheries and Aquatics TR (Stantec 2017c).

3.9.3.3 Webster Creek

As part of the baseline data collection conducted in 2015, macroinvertebrates were sampled in Webster Creek to measure selenium concentrations in tissue. However, macroinvertebrates were not sampled quantitatively or assessed for community composition. Taxa data from the benthic tissue samples is contained in the Fisheries and Aquatics TR (Stantec 2017c).

Macroinvertebrates were sampled at BURP sites in 1998, 2004, and 2013. The 1998 location was downstream from the site sampled in 2015 (WC-2), and the 2004 and 2013 locations were upstream of WC-2. SMI scores were 65 and 66, in 1998 and 2004, respectively. SMI2 score in 2013 was 66. SMI/SMI2 condition ratings were 3 for all sites/years. Based on these sites, Webster Creek appears to provide good conditions for healthy macroinvertebrate populations and the conditions appear relatively stable over time.

3.9.3.4 Draney Creek

As part of the baseline data collection conducted in 2015, macroinvertebrates were sampled in Draney Creek to measure selenium concentrations in tissue. However, macroinvertebrates were not sampled quantitatively or assessed for community composition. Taxa data from the benthic tissue samples is contained in the Fisheries and Aquatics TR (Stantec 2017c).

Macroinvertebrates were sampled at one of the three BURP sites on Draney Creek. In 1998, the SMI score was 44, with a condition rating of 1. Given the habitat conditions, the likely limiting factor for macroinvertebrates is sediment.

3.9.3.5 Smoky Creek

Total SMI scores have been consistently low for LSmS and LSm from 2010–2015, with condition ratings greater than the minimum but less than the 10th percentile of reference conditions. It is likely that both sites are limited by high percentages of fine sediment, which reduces interstitial spaces necessary for macroinvertebrates. LSmS is also limited by the small amount of flow at the site, and the small narrow channel it forms, both limiting the macroinvertebrate habitat available (Formation Environmental 2012). Although SMI scores are consistently low, there is no clear upward or downward trend. Long-term richness, diversity, density, and evenness metrics are variable, but there is no clear upward or downward trend, which indicates conditions are relatively stable over time at both sites (Stantec 2017c).

When comparing the LSmS and LSm, there is no clear trend between total SMI scores (i.e., one site does not have consistently higher total scores than the other). There is also no clear trend between sites in the majority of the individual metrics. The exceptions are percent Plecoptera, HBI, percent 5 dominant taxa, and scraper taxa. Scores for these metrics have been higher at LSmS from 2010–2015. While these metrics differ somewhat in their indication, their SMI scores are all expected to be lower at a site where there are more disturbances and a more unstable substrate. The more open nature of the stream at LSm may contribute to low scores for these metrics at LSm.

SMI scores at the three BURP locations sampled in 1997 (two sites) and 2002 had scores of 50, 51, and 55, respectively. The 1997 sites are near USm and have scores similar to those recorded at that site in 2010 (Stantec 2017c). The 2002 site is upstream of LSm and it is unclear how that site compares to conditions at LSm. The macroinvertebrate data collected by Chadwick (2001) had higher taxa richness, diversity, and density than data that has been collected as part of the long-term monitoring. However, the data was also collected from different sites and it is unclear how comparable it is. Further, Chadwick (2001) noted that there were no apparent effects to macroinvertebrates from the high sediment levels noted in their other studies. They attribute this to their sampling method, which concentrated samples in riffles areas with coarse gravel/cobble substrates.

3.9.3.6 Tygee Creek

Total SMI score and condition rating has consistently been low at LT-3, reflecting overall poor conditions for macroinvertebrates at this site. However, there is no clear temporal trend in any of the SMI metrics, or in taxa richness, density, or evenness. Diversity has increased at the site since 2010, with diversity in 2015 higher than in all previous years. Metrics that consistently score low at this location are Plecoptera richness and percent Plecoptera. Macroinvertebrates were also sampled in 2010 at location LT-5 as part of the RI. Total SMI score was 27, which is less than the minimum threshold.

3.9.3.7 Roberts Creek

Less data is available for Roberts Creek than for some of the other streams in the Study Area. The most recent community data is from 2010 and indicates conditions are between the 10th and 25th percentile of reference conditions, with a SMI score of 52 (Stantec 2017c). SMI score from the 2002 BURP location (which was in essentially the same location as the 2010 sample) is similar, with a score of 56. Although two samples are insufficient to establish a conclusive trend, conditions at least appear to be relatively stable at that location. Macroinvertebrates were sampled in 2015, but only for tissue analysis.

3.9.3.8 North Fork Sage Creek

North Fork Sage Creek has been sampled only once, in 2010 as part of the RI (Stantec 2017c). SMI score was 13, which is less than the minimum threshold. Macroinvertebrate habitat in North Fork Sage Creek is extremely limited by lack of flow and high sediment.

3.9.3.9 Pole Canyon Creek

Total SMI scores at the LP-PD location have declined between 2011 and 2013, with an increase to near 2011 levels in 2015. In addition, most individual SMI metrics have declined since 2011, with a rebound for some in 2015. The higher scores for most metrics in 2011 may have been due to increased water that year from a wet spring and high runoff. Formation Environmental (2016d) suggests that communities at the LP-PD site are impacted by one or more factors, including water quantity, lack of habitat, and residual contaminated sediment from the water quality issues that were present prior to construction of the diversion.

3.9.3.10 Hoopes Spring

Macroinvertebrate populations at Hoopes Spring have been monitored infrequently. SMI scores for the HS location from 2006, 2007, and 2008 were 38, 29, and 27, respectively. Condition rating in 2006 was 1, and the other two years were below the minimum threshold. It should be noted that the channel at HS was almost completely clogged with aquatic macrophytes making sampling there difficult (Covington 2017). SMI scores for the HS-3 location for 2006, 2007, and 2008 were 39, 44, and 40, respectively, with a condition rating of 1. The most recent monitoring at HS-3 in 2010 resulted in a similar SMI score (41) and condition rating (1). This is indicative of poor conditions, which could be due to poor habitat (see **Section 3.9.2**) as well as selenium contamination (**Section 3.9.5**).

3.9.3.11 Sage Creek

Macroinvertebrate communities have been well sampled in Sage Creek (**Tables 3.9-6** and **3.9-7**). In the portion of the stream nearest the mine, essentially from the LS location and upstream, SMI scores have typically been good with condition ratings of 2 and 3 at most locations. The exception was US-4, which had a SMI of 44 and a condition rating of 1 in 2010. In contrast, the BURP sample taken near this location in 2001 had a SMI of 71 and a condition rating of 3. However, it was reported that US-4 was at the upper end of a beaver pond area in 2010 (Covington 2016). The fine sediment accumulation due to ponding likely led to the lower score at US-4 both temporally and spatially (i.e., relative to the other nearby sites sampled in 2010).

Although metrics like taxa richness, diversity and evenness appear to be relatively static at the long-term LS location over time, total SMI/SMI2 scores, and scores for many of the individual SMI metrics, have increased in the last two years sampled. The total SMI score has also increased relative to the 2006 BURP SMI score. This may indicate an improvement in conditions at the location, with what appears to be a relatively healthy benthic community (Formation Environmental 2016d).

Downstream of the LS location, between South Fork Sage Creek and Crow Creek the SMI scores have varied widely between 33 (below the minimum threshold) in 2013 at the BURP location near LSV-3 and 65 (condition rating 3) at the BURP location between LSV-4 and LSV-3 (Stantec 2017c). Sampling at LSV-2C and LSV-4 indicates conditions generally at the 10th percentile of reference conditions (**Table 3.9-7**). The poorer conditions downstream may be due in part to higher sediment loads, as well as water quality concerns (i.e., selenium).

Table 3.9-7 SMI Scores and Ratings at Lower Sage Creek Monitoring Locations

LOCATION	SCORE/ RATING	FALL 2006	FALL 2007	FALL 2008	FALL 2009	FALL 2010	FALL 2011	FALL 2014
LSV-2C	SMI	47	51	39	38	49	34	37
	Condition Rating	2	2	1	1	1	1	1
LSV-4	SMI	47	NS	NS	NS	51	34	43
	Condition Rating	1				2	1	1

Source: SSSC, Panels F & G Monitoring, Voluntary Monitoring (Formation Environmental 2016d)
NS = Not Sampled

3.9.3.12 South Fork Sage Creek

The LSS location on South Fork Sage Creek has had higher scores for nearly all metrics than most other locations within the Study Area, with SMI condition ratings of 3 in most years. Only the 2006 BURP data, 2011 data, and 2013 data had SMI/SMI 2 ratings of 2 rather than 3. The 2013 SMI2 rating was on the threshold between a rating of 2 and 3 and the overall score was similar to other years. Other than a dip in 2011, there is no clear trend in the SMI metric data or in the longer-term taxa richness, diversity, density, and evenness data. Data from Maxim (2004b) reported taxa richness numbers at both locations they sampled similar to the richness seen at LSS with the long-term monitoring. Diversity, however, was much lower at both Maxim (2004b) sites. Maxim (2004b) hypothesized that low scores were due to historic land use practices.

3.9.3.13 Crow Creek

Macroinvertebrate populations have been monitored routinely at several locations (**Table 3.9-8**). Maxim (2004b) also sampled two Crow Creek sites in 2003, but for only a subset of metrics included in the SMI. Maxim site locations are shown on **Figure 3.9-2b**.

SMI scores and condition ratings have been variable at all sites. Taxa richness has also been relatively low and similar to richness at the Maxim (2004b) locations (Stantec 2017c). Low SMI scores and low taxa richness indicates that Crow Creek macroinvertebrate populations in these reaches are limited, most likely by sediment, but that conditions have remained relatively stable over the years sampled, with no clear upward or downward trend.

Table 3.9-8 SMI Scores and Ratings at Crow Creek Monitoring Locations

LOCATION	SCORE/ RATING	FALL 2006	FALL 2007	FALL 2008	FALL 2009	FALL 2010	FALL 2011	FALL 2014
CC-75	SMI	56	59	48	65	56	44	51
	Condition Rating	2	3	1	3	2	1	2
CC-150	SMI	54	51	39	52	47	40	54
	Condition Rating	2	3	1	2	1	1	2
CC-350	SMI	51	52	48	54	51	42	60
	Condition Rating	2	2	1	2	2	1	3
CC-1A	SMI	45	40	41	53	32	41	36
	Condition Rating	1	1	1	1	1	1	1
CC-3A	SMI	63	46	40	NS	NS	NS	36
	Condition Rating	3	1	1				1

Source: SSSC, Panels F & G Monitoring, Voluntary Monitoring (Formation Environmental 2016d) NS = Not Sampled

3.9.4 Fish Populations

The Tygee Creek and Sage Creek watersheds provide habitat for several fish species. The fish species documented in the various streams within these watersheds are shown in **Table 3.9-9**. Yellowstone cutthroat trout (YCT) and sculpin are found throughout both watersheds. However, non-native brown trout are the predominant salmonid species in the Sage Creek watershed, particularly in the lower reaches of Sage Creek (Formation Environmental 2014). The most diverse fish assemblage is present in Crow Creek, where brown trout are also the predominant salmonid species. However, the greatest trout biomass is usually found in Sage Creek (Formation Environmental 2014). No fish have been captured during sampling in Pole Canyon Creek (Mariah 1980, NewFields 2005, Formation Environmental 2014). These streams have very low flow and poor habitat as discussed in **Section 3.9.2**.

In terms of sculpin, both mottled sculpin and Paiute sculpin have been found in the Study Area. Many studies (Mariah 1980, Chadwick 2001, and Maxim 2004b) did not differentiate between the two species and only listed sculpins as *Cottus* spp. As a result, **Table 3.9-9** lists sculpins not identified to species, mottled sculpins, and Paiute sculpins. However, NewFields and later Formation Environmental, have identified sculpin to species, and have found that most sculpins in the area tend to be Paiute sculpin (Formation Environmental 2014).

Table 3.9-9 Fish Species Documented in the Study Area in One or More Studies from 1979-2017

SPECIES	OCCURRENCE IN THE STUDY AREA											
	SPRING CREEK	WEBSTER CREEK	DRANEY CREEK	SMOKY CREEK	TYGEE CREEK	ROBERTS CREEK	N. FK. SAGE CREEK	POLE CANYON CREEK	HOOPES SPRING	SAGE CREEK	S. FK. SAGE CREEK	CROW CREEK
Special Status Species (Native)												
Northern leatherside chub *Lepidomeda copei*		X	X	X	X							X
Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri*			X	X	X		X		X	X	X	X
Non-Special Status Species (Native)												
Longnose dace *Rhinichthys cataractae*				X	X	X						X
Mottled sculpin *Cottus bairdi*												X
Mountain sucker *Catostomus platyrhynchus*												X
Mountain whitefish *Prosopium williamsoni*										X		X
Paiute sculpin *Cottus beldingi*	X	X	X	X	X				X	X	X	X
Redside shiner *Richardsonius balteatus*					X							X
Sculpin *Cottus* spp.				X	X					X	X	X

SPECIES	OCCURRENCE IN THE STUDY AREA											
	SPRING CREEK	WEBSTER CREEK	DRANEY CREEK	SMOKY CREEK	TYGEE CREEK	ROBERTS CREEK	N. FK. SAGE CREEK	POLE CANYON CREEK	HOOPES SPRING	SAGE CREEK	S. FK. SAGE CREEK	CROW CREEK
Speckled dace *Rhinichthys osculus*												X
Utah chub *Gila atraria*					X							
Utah sucker *Catostomus ardens*												X
Non-native Species												
Brook trout *Salvelinus fontinalis*		X	X	X	X					X		X
Brown trout *Salmo trutta*	X								X	X	X	X
Rainbow trout *Oncorhynchus mykiss*											X	
Hybrids (rainbow/cutthroat)												X

Source: IDFG 2014a, Mariah 1980, Chadwick 2001, Maxim 2004b, NewFields 2005, Formation Environmental 2014, Formation Environmental 2016c, RMRS 2016, Covington 2017

3.9.4.1 Special Status Species

Northern Leatherside Chub

The northern leatherside chub is a small minnow native to northern Utah and Nevada, southern and eastern Idaho, and western Wyoming. It inhabits small to medium sized streams with low velocities and cool water (IDFG 2005a, WGFD 2011). Habitat needs are poorly understood, but deep pools with some form of cover (i.e., vegetation, woody debris, undercut banks) are thought to be important (WGFD 2011). On the CTNF, the species is often associated with beaver ponds (Stantec 2017c). It has a relatively broad diet, with insects comprising a large portion (USFWS 2011). Spawning typically occurs over gravel and cobble substrates in spring during high water, but some populations in Wyoming are thought to have a prolonged spawning period from April through August (Baxter and Stone 1995, as cited in WGFD 2011).

Historically, there was interconnectivity between populations, but populations have recently become isolated due to natural and anthropogenic habitat loss (Blakney et al. 2014). As a result, the species is currently distributed in fragmented, somewhat isolated pockets (i.e., with populations that may only inhabit a short reach of stream and be separated by large distances from the next nearest population) in portions of the Bear, Snake, and Green River drainages (Blakney et al. 2014).

Northern leatherside chub were documented in upper Tygee Creek in 2000 (Chadwick 2001) and 2004 (NewFields 2005). In 2000, 29 northern leatherside chub were collected in the vicinity of LT-3. The species was the most abundant species collected, with similar numbers of redside shiner sampled (n=28), but very few individuals of other species (Chadwick 2001). In 2005, three northern leatherside chub were collected from lower Tygee Creek at LT-5 (NewFields 2005). In addition, a single fish was collected in 2008 from the CC-350 location on Crow Creek (Formation Environmental 2014). However, sampling by the University of Idaho on both Tygee Creek and Crow Creek in 2010 and 2011 did not find any northern leatherside chub in either of these streams (Keeley et al. 2012).

Because the northern leatherside chub is patchily distributed, it can easily be missed using traditional electrofishing, which can have poor capture efficiency for non-game fish species (Reynolds et al. 2003). Because recent studies indicate that environmental DNA (eDNA) techniques may be a more powerful tool in detecting rare or sparsely distributed aquatic species (Jerde et al. 2011, Wilcox et al. 2016), eDNA techniques were used in 2015 to verify presence/absence of northern leatherside chub in Tygee Creek and its tributaries. Nine locations were sampled as shown on **Figure 3.9-2a** and described in Stantec (2017c).

The results of the analysis were positive detections in all four streams sampled (Tygee Creek, Smoky Creek, Draney Creek, and Webster Creek), although not at every sample location (Stantec 2017c). Crow Creek and streams in the Sage Creek drainage have not been sampled for northern leatherside chub using eDNA. Other than the single individuals sampled in Crow Creek, northern leatherside chub have not been collected from any streams in the Sage Creek drainage, despite rather extensive sampling. However, the species often inhabits areas with beaver ponds, and these areas are often not sampled via electrofishing. As a result, it is possible that the species could be present in portions of these streams that have not been sampled.

Yellowstone cutthroat trout

YCT is one of several subspecies of cutthroat trout native to the Rocky Mountain region. The historic range of YCT is the upper Snake River drainage (upstream of Shoshone Falls) and the Yellowstone River drainage upstream of (and including) the Tongue River (Endicott et al. 2016). Hybridization is the greatest cause for the decline of YCT (Kruse et al. 2000), with introduced rainbow trout the primary threat. Both migratory and resident YCT populations are present in the Salt River system and tributary streams. Migratory fish move upstream from Palisades Reservoir from March through May and spawn in the Salt River tributary streams. Resident populations live and spawn in tributary streams year-round. Spawning occurs from mid-May through early July. Young YCT emerge from eggs from July through September (BLM 2000).

Within the Study Area, YCT are present in most streams capable of supporting them (Roberts Creek and Pole Canyon Creek are too small and either support no fish populations, or extremely limited populations). The exceptions are Spring Creek and Webster Creek, which have populations of non-native brown and brook trout, but no YCT. Within the Tygee Creek drainage, they are typically present in low numbers, but are the dominant salmonid species in Draney Creek, Smoky Creek, and Tygee Creek. However, YCT populations in Draney Creek are threatened by land use and non-native fish, while populations in Smoky Creek and Tygee Creek are limited by poor habitat. The highest densities of YCT within the Study Area are in Sage Creek, although brown trout are more common than YCT in the lower reaches near Crow Creek.

3.9.4.2 Spring Creek

In 2015, only two species of fish were collected in Spring Creek, Paiute sculpin and non-native brown trout. There were 20 brown trout collected with a mean length of 124 millimeters (range from 72–236 millimeters) and a mean weight of 27 grams (range from 2.8–116.4 grams). The brown trout likely originated from the trout ranch (escaped upstream from the ponds). However, the range in length indicates that multiple age classes are present in the reach sampled and the fish are likely part of a self-sustaining resident population. There were 46 sculpin collected.

3.9.4.3 Webster Creek

Fish populations in Webster Creek on NFS lands are composed primarily of non-native brook trout. In 2000, the USFS surveyed a 2-mile portion of Webster Creek upstream of the USFS boundary. They collected only non-native brook trout and sculpin. The brook trout population was composed of all age classes (length ranged from 50–240 millimeters), with three adults over 200 millimeters in length (USFS 2000b). In the reach sampled using multiple passes (five reaches were sampled, four 40-meter reaches were sampled qualitatively, and one 100-meter reach was sampled quantitatively), four brook trout were collected on the first pass, with no fish collected on the second pass, and two brook trout on the third pass.

Sampling in 2015 collected 10 brook trout from a 100-meter reach with a mean length of 204 millimeters (range from 145–246 millimeters) and mean weight of 100 grams (range from 32.3–183.1 grams). Although the data is insufficient to establish population trends (nor were the reaches in the same locations), it appears that a healthy population of brook trout is present in Webster Creek. No YCT were sampled in either event. The sculpin numbers were low in both 2000 (two collected) and 2015 (one collected). Based on the eDNA samples collected in 2015, northern leatherside chub are present in Webster Creek, with positive detection at both sample locations.

3.9.4.4 Draney Creek

Draney Creek supports populations of YCT, brook trout, and Paiute sculpin. Based on the eDNA data collected in 2015, northern leatherside chub are also present, with positive detection at all three locations sampled. The dominant fish species present varies by reach and the populations are influenced by water diversions and barriers to fish passage. In 2000, the USFS sampled two 40-meter reaches within the first 0.5 miles of stream upstream of the USFS boundary. They collected 18 of what they determined to be pure YCT, with multiple age classes present (USFS 2000b). However, a follow up survey in 2003 spot-shocked along approximately 200 meters of stream immediately upstream of the USFS but did not collect any fish. They determined that the habitat conditions were marginal or inadequate for fish populations. A third survey in 2010 sampled a 100-meter reach in the same location as the previous surveys and collected seven YCT. There were multiple age classes (length range was 70–155 millimeters).

The reach sampled in these three events is between the earthen dike and the uppermost water diversion, which are both discussed in **Section 3.9.2.3**. These structures limit upstream movement of fish and reduce streamflow relative to natural conditions. These factors, as well as the generally poor habitat, likely limit the fisheries potential of this reach.

Downstream of the earthen dike, YCT were more abundant in the 100-meter reach sampled in 2015. There were 24 YCT collected, with a mean length of 102 millimeters (range from 42–284 millimeters) and a mean weight of 13 grams (range from 8–73.2 grams). Brook trout were also present, with 14 collected. Mean length for the brook trout was 97 millimeters (range 52–193 millimeters). Paiute sculpin were also collected. This data indicates that YCT are more abundant below the passage barrier and with multiple age classes present appear to be resident fish. However, the sympatric brook trout populations also appear to be composed of resident fish, with multiple age classes present.

The reach sampled in 2015 had its downstream endpoint near a small culvert. Additional spot shocking below the culvert to obtain fish other than YCT for fish tissue analysis collected predominantly brook trout. Because the sample reach upstream of the culvert was dominated by YCT, it appears that the culvert may at least partially limit upstream movement of fish.

Although YCT are present in multiple reaches, and appear to be self-sustaining, YCT populations in Draney Creek are limited by the diversions, barriers, non-native fish, and poor habitat.

3.9.4.5 Smoky Creek

Fish populations in Smoky Creek are composed primarily of YCT, brook trout, sculpin, and longnose dace. Based on the eDNA analysis, northern leatherside chub are also present, with positive detection at all four locations sampled on Smoky Creek. No fish have been captured in the upper reaches of Smoky Creek (upstream of LSmS) on the two occasions it has been sampled (2004 and 2010) and fish populations appear limited to perennial reaches of the stream downstream of LSmS.

Near LSm, numbers of YCT and brook trout were similar in July 1979, but the numbers of brook trout were greater in both September 1979 and in 2000. No fish were captured in 2004, and only four fish (two sculpin and two YCT) were captured in 2010 (**Table 3.9-10**). It is unclear why fewer fish have been captured in more recent years, although habitat conditions are generally poor near LSm, as noted in **Section 3.9.2.1**, with better habitat upstream near the 2000 sample location. However, Chadwick (2001) also sampled downstream of LSm, near the confluence with Tygee

Creek, and collected similar numbers of cutthroat trout as their upstream reach. As a result, it is unknown if low fish numbers in 2000 and 2010 are due to the limited habitat conditions at LSm, or an overall decline in fish abundance.

Table 3.9-10 Fish Abundance for Smoky Creek Near LSm

SPECIES	ABUNDANCE (1ST PASS)					POPULATION ESTIMATE[1]				
	JUL-79[2]	SEP-79[2]	2000[3]	2004	2010	JUL-79[2]	SEP-79[2]	2000[3]	2004	2010
Yellowstone Cutthroat Trout	12	4	10	0	2	16	6	17	–	–
Brook Trout	12	18	44	0	0	15	21	54	–	–
Longnose dace	0	0	0	0	0	0	0	0	–	–
Sculpin	0	0	1	0	2	0	0	1	–	–

[1] If available – multiple passes not conducted in 2004 and 2010

[2] Location was the same as LSm

[3] Location was upstream of LSm by approximately ¾-mile

For comparability, abundance is shown for 1st electrofishing pass only

3.9.4.6 Tygee Creek

Tygee Creek is similar to Smoky Creek and Draney Creek, in that it supports a small population of YCT. However, as mentioned in **Section 3.9.4.1**, it is also one of two locations within the Study Area where northern leatherside chub have been documented prior to the eDNA surveys. Mariah (1980) noted three YCT in its most upstream reach near the tailings pond, and one YCT at a reach located downstream near Webster Creek. Speckled dace and sculpin were also captured. Chadwick (2001) noted a more diverse assemblage in their spot shocking near LT-3, with YCT (n=5), brook trout (n=2), redside shiner (n=28), northern leatherside chub (n=29), Utah chub (n=3), longnose dace (n=6), and sculpin (n=13) collected. The YCT collected were relatively large, with a mean length of 222 mm (Chadwick 2001).

Lower numbers of YCT, as well as fewer native fish species, have been sampled in more recent years at LT-5. In 2004, the fish collected were YCT (n=1), sculpin (n=14), longnose dace (n=2), and northern leatherside chub (n=3). The single YCT collected was an adult (270 mm). In 2010, the fish collected were YCT (n=11), Utah sucker (n=1), and Paiute sculpin (n=89). The mean length for the YCT collected in 2010 was 180 mm with a range from 126–263 mm. The variable numbers of YCT collected at the site and lack of younger fish indicate that YCT in upper Tygee may be moving into the reach from other areas. Self-sustaining populations may be limited by the poor habitat present.

It is unclear why northern leatherside chub numbers were so high in 2000, with relatively few collected since. However, the eDNA sampling and analysis indicate that they are still present in the upper Tygee Creek, with positive detection at the three most upstream sample locations. Northern leatherside chub DNA was not detected at the lowest sample locations, where the main road crosses the stream.

3.9.4.7 Roberts Creek

Roberts Creek has been sampled at UR-3 in 2004, 2010, and 2015. Only one fish has been collected, a single longnose dace in 2005. Fish habitat in Roberts Creek is extremely limited by the small size of the stream and low flow. Fish are present in the downstream impoundment and diversion (redside shiner were captured in the diversion during amphibian surveys and small fish were observed jumping in the impoundment) and may move up into the stream at times. However, spot shocking near the impoundment in 2015 did not produce any fish.

3.9.4.8 North Fork Sage Creek

Prior to 2017, fish had not been collected on North Fork Sage Creek, with sampling in 2004 and 2010. In 2017, four YCT were collected from North Fork Sage Creek. The fish were in good overall condition, but appeared lethargic, possibly due to low dissolved oxygen (Covington 2017). It is possible these fish moved up from Sage Creek, and then became stranded by low flow. In general, the small size, lack of flow, and poor habitat likely preclude fish populations from becoming established.

3.9.4.9 Pole Canyon Creek

Similar to North Fork Sage Creek, fish have not been collected or observed in Pole Canyon Creek. This includes during sampling prior to mine development (Mariah 1980) and in 2004 and 2010.

3.9.4.10 Hoopes Spring

Fish populations in Hoopes Spring are composed of YCT, brown trout, and sculpin. Mariah (1980) noted these three species at their 1979 sample location (approximately 3 miles upstream of the Sage Creek confluence), although numbers were highly variable. Since 2006, the highest population estimates for brown trout at HS-3 were in 2007 and 2012, with lower numbers in 2013, 2014, and 2015 (**Table 3.9-11**). However, it should be noted that the confidence intervals are also large in 2007 and 2012. Conversely, there have been greater numbers of YCT since 2008, with the highest numbers in 2015. Decreases in brown trout in recent years could be due to a combination of factors. As discussed in **Section 3.9.4.11**, lower than normal flows and shorter snowmelt runoff durations in recent years has likely reduced recruitment in other nearby streams. However, it may also be due to increases in selenium at the site (**Section 3.9.5**).

Table 3.9-11 Trout Population Estimates at HS-3 for 2006-2008, 2010, 2012-2015

SPECIES	FALL 2006	FALL 2007	FALL 2008	FALL 2010	FALL 2012	FALL 2013	FALL 2014	FALL 2015
Yellowstone Cutthroat Trout								
Estimated Number	0	0	7	9	19	18	2	23
95% Confidence Intervals			±1	±2	±7	±122	±0	±62
Number/km			64	82	173	164	18	210

SPECIES	FALL 2006	FALL 2007	FALL 2008	FALL 2010	FALL 2012	FALL 2013	FALL 2014	FALL 2015
Brown Trout								
Estimated Number	51	193	61	89	168	17	17	5
95% Confidence Intervals	±6	±369	±25	±27	±130	±2	±5	±1
Number/km	465	1759	556	811	1531	155	155	45.6
Sculpin								
Estimated Number	1,384	405	1,421				520	774
95% Confidence Intervals	±61	±30	±500				±200	±213
Number/km	12,614	3,691	12,951				4,739	7,054

Source: Formation Environmental (2016b).

Population estimates from 2009-2014 only include trout >75 mm in length. Population estimates based on 3-pass depletion

3.9.4.11 Sage Creek

Fish populations in Sage Creek from Sage Valley upstream are composed almost exclusively of YCT (**Table 3.9-12**). Mariah (1980) sampled two locations in 1979, one near US-3, and one near LS. Both showed populations of YCT, with brook trout reported near US-3 and brown trout near LS. Four locations were sampled in 2004, and all showed populations of YCT. The three locations sampled in 2010 all showed populations of YCT, with brown trout also collected at LS. In 2004 and 2010, a variety of age classes have been present at all locations, indicating resident populations. Numbers were lower in 2004 relative to 1979 (at comparable locations) but rebounded in 2010. Mean length and weights for YCT were lower in 2010 than in 2014, with higher numbers of young fish in 2010.

Near the confluence with Crow Creek (LSV-4), fish community composition changes, with brown trout dominant, although YCT are present in lower numbers. YCT have also been found at locations slightly further upstream (i.e., LSV-3 and LSV-2C) in low numbers (Formation Environmental 2014). **Table 3.9-13** shows brown and cutthroat trout population estimates for LSV-4 from data collected by Formation Environmental since 2006 (Formation Environmental 2016d). The highest numbers of both brown trout and cutthroat trout at LSV-4 were sampled in 2010, with lower numbers of both species in 2013, 2014, and 2015. This may be due to a combination of changing habitat quality and water quantity and quality (Covington 2017). Specifically, beaver dam activity downstream of the sampling reaches has altered two large pools that provided good habitat and previously contributed to high numbers. In addition, lower than normal flows and shorter snowmelt runoff durations in recent years has also likely reduced recruitment.

A similar trend (i.e., lower trout numbers since 2013) has been seen in other nearby streams. Dry Creek, Giraffe Creek, and Preuss Creek are located 9-10 miles south of the Study Area in the Thomas Fork drainage, which is a tributary to the Bear River. Trout populations in these streams are composed entirely of Bonneville cutthroat trout (BCT). **Figure 3.9-3** compares trout density in Sage Creek at LSV-4 (brown trout and YCT) to BCT density in Dry Creek, Giraffe Creek, and Preuss Creek. The spike in trout density seen on Sage Creek in 2010 was not mirrored by BCT populations in Dry Creek or Preuss Creek (Giraffe Creek was not sampled in 2010). However, all streams show a similar decrease in trout density since 2012. The similarity in trends between these streams provides some indication that there are factors other than beaver activity and water quality concerns affecting fish populations in the Study Area vicinity, such as lower than normal flows and shorter runoff durations.

Table 3.9-12 Fish Abundance for Sage Creek Sample Locations

SPECIES	ABUNDANCE (1ST PASS)				MEAN LENGTH (MM)		MEAN WEIGHT (G)	
	JULY-79	SEP-79	2004	2010	2004	2010	2004	2010
US								
Yellowstone Cutthroat Trout	NS	NS	1	19	180	207	68	113
US-3								
Yellowstone Cutthroat Trout	9	8	4	NS	240	NS	148	NS
Brook Trout	2	2	0	0	–	–	–	–
US-4								
Yellowstone Cutthroat Trout	NS	NS	4	8	230	166	118	56
LS								
Yellowstone Cutthroat Trout	7	15	1	33	180	143	68	44
Brown Trout	3	5	0	1	–	287	–	237.5
LSV-4								
Brown Trout	20	15	11	12	231	293	187	221
Sculpin	0	0	29	54	–	–	–	–
Mountain Whitefish	1	8	0	5	–	–	–	–

Source: Mariah (1980), NewFields (2005), Formation Environmental (2014)
NS=Not sampled
For comparability, abundance is shown for 1st electrofishing pass only

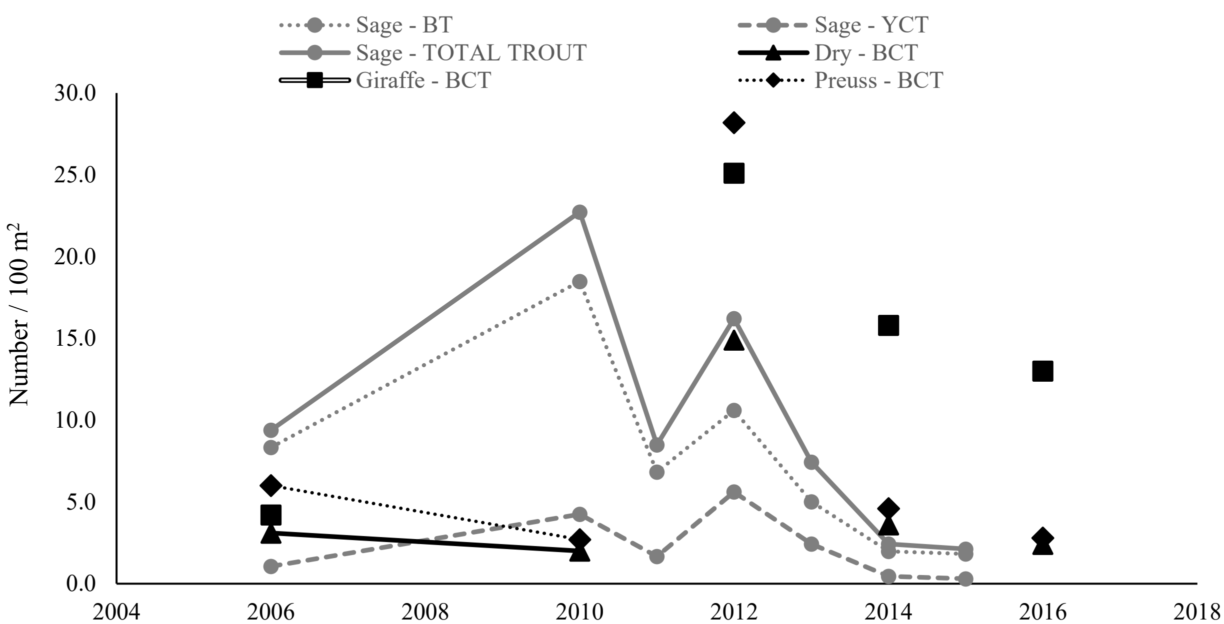
Table 3.9-13 Trout Population Estimates at LSV-4 for 2006, 2010-2015

SPECIES	FALL 2006	FALL 2010	FALL 2011	FALL 2012	FALL 2013	FALL 2014	FALL 2015
Yellowstone Cutthroat Trout							
Estimated Number	7	28	11	37	16	3	2
95% Confidence Intervals	±1	±26	±3	±26	±0	±0	±0
Number/km	55	221	87	293	126	23	16
Brown Trout							
Estimated Number	55	122	45	70	33	13	12
95% Confidence Intervals	±33	±293	±13	±50	±2	±2	±1
Number/km	435	965	356	553	261	102	94

Source: Formation Environmental (2016b).

Population estimates from 2010-2014 only include trout >75 mm in length. Population estimates based on 3-pass depletion

Figure 3.9-3 Trout Density in Sage Creek, Dry Creek, Giraffe Creek, and Preuss Creek



Source: Formation Environmental (2016b) and IDFG (2017b).

Sage Creek population estimates from 2010-2014 only include trout >75 mm in length

Population estimates based on 3-pass depletion

BT=brown trout; TOTAL TROUT=brown trout and Yellowstone cutthroat trout; BCT=Bonneville cutthroat trout

3.9.4.12 South Fork Sage Creek

Due to limited habitat, upper reaches of South Fork Sage Creek support limited fish populations, while the downstream reaches (i.e., near Sage Valley) support populations of YCT, non-native brown trout, and sculpins (**Table 3.9-14**). The 2004 and 2010 data shows that the YCT and brown trout populations fluctuate, with YCT dominant in 2001 and brown trout dominant in 2010. However, the YCT present at the site have been adults, with only large adults present in 2010. In contrast, a variety of age classes are present for brown trout. Maxim (2004b) did not sample fish populations at a fixed location, but rather qualitatively spot-shocked along approximately 1.5 miles. They found that habitat was somewhat limited, but that eight YCT were captured.

Table 3.9-14 Fish Abundance for South Fork Sage Creek Sample Locations

SPECIES	ABUNDANCE (1ST PASS)				MEAN LENGTH		MEAN WEIGHT	
	JUL-79	SEP-79	2004	2010	2004	2010	2004	2010
USS								
Yellowstone Cutthroat Trout	0	1	0	NS	–	NS	–	NS
Brown Trout	19	20	0	NS	–	NS	–	NS
Rainbow Trout	0	2	0	NS	–	NS	–	NS
LSS								
Yellowstone Cutthroat Trout	NS	NS	14	4	191	335	114	368
Brown Trout	NS	NS	4	20	210	254	84	167
Sculpin	NS	NS	2	1	–	–	–	–

Source: Mariah (1980), NewFields (2005), Formation Environmental (2014)
NS=Not sampled
For comparability, abundance is shown for 1st electrofishing pass only

3.9.4.13 Crow Creek

The most diverse fish assemblages are in Crow Creek. Crow Creek was sampled in 2003 by Maxim (2004b) and has been monitored at multiple locations since 2006 (**Table 3.9-15**). Although the locations sampled since 2006 (Formation Environmental 2016b) are different than those sampled by Maxim (2004b), all locations indicate diverse communities, with brown trout the most dominant fish species in terms for biomass. Dace, mountain whitefish, sculpins, and YCT are also common and small numbers of cutthroat/rainbow trout hybrids have been noted. Numerous size classes for brown trout, mountain whitefish, and YCT indicate resident populations (**Table 3.9-15**, Maxim 2004b). Similar to lower Sage Creek, numbers of brown trout and YCT have been lower in recent years, likely from lower than normal flows and shorter snowmelt runoff durations, although variation in numbers captured is not atypical of western streams where annual variations of 50 percent or more are common (Platts et al. 1988).

Table 3.9-15 Fish Abundance, Lengths, and Weights for Crow Creek Locations CC-1A and CC-3A

LOCATION	SPECIES	YEAR	NUMBER CAUGHT	MEAN TOTAL LENGTH (MM)	LENGTH RANGE (MM)	MEAN WEIGHT (G)	WEIGHT RANGE (G)
CC-1A	Brown Trout	Fall 2006	13	300.2	96-413	304.7	8.0-583
		Fall 2007	77	159.6	77-414	80.7	4.6-521
		Fall 2008	53	199.0	76-448	129.4	3.3-700.2
		Fall 2009	48	182.0	64-350	92.1	2.1-32.5
		Fall 2010	101	142.6	71-371	55.7	1.3-477
		Fall 2011	50	177.4	76-443	136.6	3.4-879.4
		Fall 2012	219	122.5	52-440	40.9	1.3-646.3
		Fall 2013	85	169.4	70-345	73.9	2.9-396.1
		Fall 2014	36	246.1	80-369	179.5	4.5-463.3
		Fall 2015	20	233.9	90-415	202.3	3.5-695.4
	Yellowstone Cutthroat Trout	Fall 2006	4	301.0	146-412	353.4	27.6-650
		Fall 2007	19	279.1	74-483	262.7	1.1-908
		Fall 2008	17	294.9	172-376	268	55.7-477.1
		Fall 2009	31	256.0	60-396	219.4	1-554
		Fall 2010	36	271.8	153-405	221.5	31.7-712.6
		Fall 2011	30	290.2	164-386	259.6	41.5-593.3
		Fall 2012	43	271.1	60-381	209.9	2.1-468.2
		Fall 2013	16	305.6	176-380	297.0	49.6-508.2
		Fall 2014	18	295.2	156-379	281.6	33.8-515.7
		Fall 2015	17	287.2	38-425	317.8	0.8-796.5
	Brook Trout	Fall 2010	1	240.0	-	144.5	-
		Fall 2011	1	70.0	-	3.0	-
	Hybrids: Rainbow Trout/ Cutthroat Trout	Fall 2009	1	465.0	-	873.5	-
	Mountain Whitefish	Fall 2007	23	232.8	104-350	149.9	8-346
		Fall 2008	52	297.0	117-388	256.7	12.4-481.3
		Fall 2009	61	301.0	115-390	277.8	13-479
		Fall 2010	35	258.8	119-365	182.70	12.6-466.4
		Fall 2011	69	304.0	101-379	307.8	10-620.1
		Fall 2012	112	258.8	115-405	-	-
		Fall 2013	61	282.2	116-385	238.1	12.2-501
		Fall 2014	63	303.0	68-380	265.9	2.7-482.4
		Fall 2015	41	274.9	84-365	242.1	3.9-518

LOCATION	SPECIES	YEAR	NUMBER CAUGHT	MEAN TOTAL LENGTH (MM)	LENGTH RANGE (MM)	MEAN WEIGHT (G)	WEIGHT RANGE (G)
CC-1A	Sculpin	Fall 2006	38	77.5	39-100	3.2	1.0-11.6
		Fall 2007	32	81.9	40-105	8.5	0.5-16.6
		Fall 2008	11	58.2	32-107	3.7	0.4-15.1
		Fall 2009	51	71.3	39-105	3.6	1.1-8.3
		Fall 2010	92	63.8	24-110	4.7	0.1-15.4
		Fall 2011	47	70.4	28-110	6.0	0.1-17.4
		Fall 2012	165	59.8	29-107	3.0	0.1-13.1
		Fall 2013	161	75.0	31-109	6.7	0.7-18.9
		Fall 2014	102	56.3	27-114	3.6	0.1-18.5
		Fall 2015	158	76.1	35-115	6.2	0.3-22.1
	Longnose Dace	Fall 2007	22	81.0	60-119	6	2.4-16.8
		Fall 2008	8	83.0	66-94	6.3	2.5-8.6
		Fall 2009	15	70.3	32-100	4.02	1-10.6
		Fall 2010	19	86.3	61-115	6.60	2.0-14.8
		Fall 2011	19	70.5	57-104	4.4	2.0-12.1
		Fall 2012	28	63.0	30-102	3.7	0.1-11.9
		Fall 2013	26	72.9	26-120	6.2	0.2-19.4
		Fall 2014	7	87.0	70-94	6.1	3.6-7.7
		Fall 2015	25	50.3	22-97	2.3	0.1-10.9
	Speckled Dace	Fall 2006	18	61.5	54-72	0.8	1.7-4.0
		Fall 2007	96	68.7	52-88	3.5	1.1-7.9
		Fall 2008	51	67.1	47-88	3.5	0.3-8.1
		Fall 2009	23	67.7	56-86	3.6	1.1-8.3
		Fall 2010	30	68.3	35-94	4	0.3-9.4
		Fall 2010	8	≤ 30 (YOY)	-	-	-
		Fall 2011	1	71.0	-	3.7	-
		Fall 2012	18	63.9	27-92	2.8	0.1-7.6
		Fall 2013	7	66.1	32-93	4.6	0.3-9.3
		Fall 2014	7	71.1	27-88	5.0	2.7-6.8
		Fall 2015	8	47.6	22-84	1.9	0.5-6.2
	Redside Shiner	Fall 2006	8	105	105	2.4	8.2-10.6
		Fall 2007	19	74.8	38-100	4.7	0.1-9.7
		Fall 2008	16	61.7	32-98	2.7	0.5-10.3
		Fall 2010	6	27.5	24-31	0.4	0.1-0.6
		Fall 2011	1	95.0	-	7.1	-
		Fall 2013	12	101.1	82-115	10.1	5.3-15.7
		Fall 2014	1	87.0	-	8.2	-

LOCATION	SPECIES	YEAR	NUMBER CAUGHT	MEAN TOTAL LENGTH (MM)	LENGTH RANGE (MM)	MEAN WEIGHT (G)	WEIGHT RANGE (G)
CC-1A	Cyprinid Species	Fall 2013	6	<30	-	NM	-
	Utah Sucker	Fall 2006	1	170.0	-	49.8	-
		Fall 2009	1	298.0	-	242.5	-
		Fall 2010	8	38.7	31-47	0.6	0.3-1.1
		Fall 2011	4	349.8	71-484	695.5	3.4-1162.2
		Fall 2012	2	146.5	38-255	100.3	0.7-199.9
		Fall 2013	3	54.3	41-76	1.6	0.5-3.1
		Fall 2014	1	191.0	-	71.9	-
	Catostomus Species	Fall 2013	1	34.0	-	NM	
CC-3A	Yellowstone Cutthroat Trout	Fall 2006	9	287.7	159-385	264.2	37.9-542
		Fall 2007	28	324.3	208-412	347.3	101.5-631.3
		Fall 2008	17	302.5	205-424	303.8	81.6-727.6
		Fall 2010	20	319.4	210-426	336.6	83.9-819
		Fall 2012	33	310.2	50-498	334.3	0.7-1962.2
		Fall 2013	9	347.7	306-418	387.4	269.9-611.8
		Fall 2014	10	338.5	228-405	391.8	113-652
		Fall 2015	5	333.2	230-401	394.1	135.2-620
	Brook Trout	Fall 2007	1	281	-	217.6	-
	Mountain Whitefish	Fall 2006	10	312.9	274-336	249.2	191-417
		Fall 2007	15	266.7	207-377	179.5	84-415.5
		Fall 2008	48	294.7	121-356	254.5	9.1-446.5
		Fall 2010	119	275.3	101-368	207.8	7.7-442.7
		Fall 2012	126	270.5	93-406	225.6	6.8-571.2
		Fall 2013	76	307.2	106-396	257.0	9.2-467
		Fall 2014	33	307.2	226-390	269.7	106-468
		Fall 2015	25	312.4	213-372	294.7	138.8-524.8
	Sculpin	Fall 2006	10	73.0	53-96	3.1	2.0-12.4
		Fall 2007	4	91.8	83-98	8.5	5.9-11.1
		Fall 2008	5	60.4	46-110	3.9	0.5-15.6
		Fall 2010	6	86.3	71-107	9.2	4.2-16.9
		Fall 2010	4	-	≤ 30 (YOY)	-	-
		Fall 2012	28	60.7	36-110	3.9	0.1-17.4
		Fall 2013	64	72.7	40-101	5.5	0.7-11.4
		Fall 2012	1	43.0	-	0.8	-
		Fall 2013	5	88.6	77-109	9.3	5.2-18.2
		Fall 2014	29	67.3	30-111	6.4	0.2-21.7
		Fall 2015	57	76.9	36-112	6.9	0.5-20

LOCATION	SPECIES	YEAR	NUMBER CAUGHT	MEAN TOTAL LENGTH (MM)	LENGTH RANGE (MM)	MEAN WEIGHT (G)	WEIGHT RANGE (G)
CC-3A	Longnose Dace	Fall 2007	60	69.2	41-120	3.1	0.2-17.3
		Fall 2008	48	75.9	58-116	5.3	0.8-15.1
		Fall 2010	58	84.4	54-121	6.6	0.7-21
		Fall 2012	24	68.6	29-104	3.5	0.2-10.4
		Fall 2013	61	74.5	35-107	4.4	1.4-10.6
		Fall 2014	6	91.3	70-105	8.2	3.8-10.9
		Fall 2015	10	81.8	32-108	6.7	0.2-12.2
	Speckled Dace	Fall 2006	86	57.0	43-80	2.1	0.7-5.6
		Fall 2007	122	65.0	49-90	2.1	0.3-7.7
		Fall 2008	152	65.9	43-94	3.5	0.5-8.1
		Fall 2010	68	66.9	49-92	3.6	1.1-8.3
		Fall 2012	110	56.4	33-92	1.8	0.1-9.1
		Fall 2013	84	69.2	30-92	3.6	1.0-8.2
		Fall 2014	18	69.8	27-90	5.1	1.3-12.5
		Fall 2015	46	60.4	32-92	2.4	0.1-8.3
	Redside Shiner	Fall 2006	43	77.1	56-97	2.0	1.0-8.2
		Fall 2007	8	60.0	35-90	2.3	0.1-6.5
		Fall 2008	26	73.9	48-107	4.4	0.5-14
		Fall 2010	7	88.6	75-94	7.8	4.8-10.2
		Fall 2012	7	60.7	53-68	1.8	1.0-2.7
		Fall 2013	8	70.4	64-85	3.2	1.3-5.4
		Fall 2014	4	48.0	35-60	1.5	1.0-1.8
		Fall 2015	10	57.6	50-72	1.5	1-3.2
	Utah Sucker	Fall 2006	2	96.5	95-98	8.4	8.2-8.5
		Fall 2007	7	128.4	70-178	25.5	5.4-56.5
		Fall 2008	45	324.2	72-542	527.5	3.4-1730.8
		Fall 2010	2	107.0	48-166	25.3	0.8-49.8
		Fall 2012	24	324.8	37-578	685.4	0.2-1757
		Fall 2013	7	168.1	90-555	209.2	7.4-1401
		Fall 2014	14	206.1	68-495	318.4	2.9-1185
		Fall 2015	4	363.0	42-502	821.9	0.7-1360

Source: Formation Environmental (2016b)
Sculpin includes both mottled sculpin and Paiute sculpin
mm=millimeters

3.9.5 Selenium

Due to past difficulty in meeting water quality criteria at some locations near the existing mine, and the associated bioaccumulation of selenium in the food chain, selenium is the primary contaminant of concern for fisheries and aquatic resources. Studies show that fish bioaccumulate selenium primarily via ingestion (Hamilton 2004, Hamilton et al. 2004). Invertebrates and plants (e.g., periphyton and algae) concentrate dissolved selenium from the water, and this selenium can then be part of the food base for fish feeding in contaminated reaches of streams (Chapman 2007, Hamilton et al. 2004). In addition, selenium that is initially released to streams as dissolved compounds or particulates can also be removed from the water through chemical and microbial reduction, adsorption to clay and organic detritus, reaction with iron, precipitation, co-precipitation, and settling (Chapman 2007). Excessive bioaccumulation of selenium in fish can result in larval developmental abnormalities and mortality (Holm et al. 2005), with toxicity most pronounced in developing embryos (Formation Environmental and Habitech 2012).

Numerous studies have been conducted within the Study Area to characterize the nature and extent of selenium in aquatic biota. These include the SI, monitoring conducted as part of the effort to develop the SSSC for fish tissue, Panel F&G monitoring, and the RI (Formation Environmental 2014). These studies did not include streams to the north of Smoky Creek, and the 2015 data collection was conducted primarily to gather data from Spring Creek, Webster Creek, and Draney Creek. This section presents a summary of the data from these various studies. The selenium data for all streams with the exception of Crow Creek is presented in **Table 3.9-16**. Crow Creek data is presented and discussed in **Section 3.9.5.14**.

Table 3.9-16 Mean Selenium Concentration in Sediment, Periphyton, Macroinvertebrates, and Fish, Except for Crow Creek

STREAM	LOCATION	YEAR	SELENIUM CONCENTRATION (MG/KG DW)				
			SEDIMENT	PERIPHYTON	MACRO INVERTEBRATES	SCULPIN[1] (MEAN)	TROUT (MEAN)
Spring Creek	SPRC-1	2015	0.13	2.12	4.37	5.74	4.20
Webster Creek	WC-2	2015	0.13	0.93	6.30	*	5.44
Draney Creek	DRC-1	2015	0.35	0.44	3.61	4.44	4.30
Smoky Creek	USm	2004	0.51	22.00	3.72	*	*
		2010	0.63	*	5.93	*	*
	LSm	2004	1.80	*	3.50	*	*
		2010	0.62	*	3.11	*	4.74
Tygee Creek	LT-5	2004	0.63	2.42	21.91	5.95	*
		2010	0.73	*	3.69	4.35	4.82
Roberts Creek	UR-3	2004	0.30	1.00	*	4.87	*
		2010	0.40	*	1.53	*	*
		2015	8.10	1.79	12.4	*	*
N. Fork Sage Creek	NSV-5	2004	0.37	*	5.96	*	*
	NSV-6	2010	6.50	*	11.90	*	*

STREAM	LOCATION	YEAR	SELENIUM CONCENTRATION (MG/KG DW)				
			SEDIMENT	PERIPHYTON	MACRO INVERTEBRATES	SCULPIN[1] (MEAN)	TROUT (MEAN)
Pole Canyon Creek	UP	2004	0.46	3.00	3.11	*	*
	LP	2004	58.10	69.10	90.71	*	*
	LP-PD	2010	13.40	*	16.90	*	*
Hoopes Spring[5]	HS-3	2006	Mean=6.9 Min=2.1 Max=10.5	6.5	Mean=20.08 Min=11.40 Max=28.40	21.85	20.60
		2007		6.2		22.60	18.14
		2008		24.2		23.81	26.99
		2010		*		17.35	19.56
		2011	*	*	*	*	24.12
		2013	*	*	*	32.48	35.04
Sage Creek[3]	US	2004	0.78	1.84	3.28	*	*
		2010	0.57	*	4.39	*	3.82
	US-4	2004	0.68	1.45	3.44	*	4.05
		2010	0.39	*	3.46	*	4.09
	LS	2004	1.80	2.14	3.11	*	3.61
		2009	*	*	*	*	5.39
		2010	0.65	*	7.98	*	3.83
Sage Creek[4]	LSV-2C	2006	*	2.60	*	17.47	19.45
		2007	5.40	18.50	8.26	15.12	16.23
		2008	5.70	4.38	23.90	23.13	20.23
		2009	11.90	13.00	25.50	16.61	20.32
		2010	7.00	13.30	53.40	18.66	16.24
		2011	5.50	8.54	12.70	14.29	17.16
	LSV-3	2010	6.60	*	64.60	16.53	13.53
		2013	*	*	*	32.13	*
	LSV-4	2004	3.30	4.00	*	17.24	15.86
		2006	*	7.42	*	20.01	16.20
		2007	3.90	11.70	9.08	18.28	15.18
		2010	4.70	10.50	24.10	20.25	19.38
		2011	2.00	17.20	17.60	18.55	22.42
		2013	*	*	*	41.64	*
S. Fork Sage Creek[5]	USS	2004	0.47	1.02	17.10	*	*
	LSS	2004	Mean=1.5 Min=1.2 Max=1.9	1.58	Mean=10.3 Min=8.1 Max=12.6	5.24	*
		2009		*		12.9	*
		2010		*		12.5	14.1
		2011		*		12.5	15.6

Source: NewFields (2005), Formation Environmental (2014), Formation Environmental (2016c), Formation Environmental (2016b)

[1] Concentration for forage fish, which is typically sculpin, but value is based on multiple species in Tygee Creek and on longnose dace for Roberts Creek.

[2] Concentration is an estimated quantity due to matrix interferences during laboratory analysis.

[3] Sage Creek upstream of Sage Valley has been sampled less intensively due to its location upstream of most contamination.

[4] Sage Creek downstream of Hoopes Spring has been sampled more intensively due to contamination from Hoopes Spring.

[5] Data on sediment and macroinvertebrates is presented as mean, minimum (min), and maximum (max) for the period of record as data for the individual years were not present in the sources used.

* Sample media not collected.

3.9.5.1 Selenium Thresholds

The selenium concentrations in fish tissue from all streams within the Study Area are compared to the applicable chronic whole-body fish tissue element of the Idaho selenium aquatic life criterion as approved by EPA (2019). This comparison is made even if the criterion was not in effect at the time a specific sample was collected. The general statewide whole-body fish tissue criterion is 8.5 mg/kg dry weight (dw), as derived from EPA's 2016 Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater (EPA 2016b), which is also 8.5 mg/kg dry weight (dw). However, all stream reaches in the Study Area have an approved SSSC whole-body fish tissue element that is greater than 8.5 mg/kg. The approved SSSC for selenium in Sage Creek below Hoopes Springs, which includes its tributaries (with the exception of Pole Canyon and North Fork Sage creeks, which EPA [2019] disapproved), is 13.6 mg/kg dw for whole-body fish tissue. The approved SSSC for selenium in Crow Creek between Sage Creek and the Wyoming state line is 12.5 mg/kg dw for whole-body fish tissue. Last, the approved SSSC for other stream reaches in the Study Area is 9.5 mg/kg dw for whole-body fish tissue.

Further, for streams without elevated selenium (primarily streams on the northern end of the Study Area, selenium concentrations in fish tissue are compared to reference concentrations from South Fork Tincup Creek (Stantec 2017c). Reference concentrations from South Fork Tincup Creek include concentrations for trout species, as well as for forage fish species (i.e., sculpin, dace, etc.). Mean fish tissue concentrations for trout in South Fork Tincup Creek ranged from 1.8–9.16 mg/kg dw. Tissue concentrations for sculpins ranged from 2.8–12.8 mg/kg dw.

Because a selenium criterion has not been developed for macroinvertebrates, tissue from composite macroinvertebrate samples (i.e., tissue from multiple taxa) from monitoring locations upstream of mine disturbance was used to develop a mean tissue concentration for unaffected macroinvertebrate tissue of 3.75 mg/kg dw (Formation Environmental 2014).

Background on Selenium Criteria Development

As noted above, Idaho's recently approved (EPA 2019) selenium aquatic life criterion (given at IDAPA 58.01.02.201.01, as modified under Docket Number 58-0101-1901) is based upon EPA's 2016 Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater (EPA 2016b). The criterion outlined in EPA (2016b) is a non-regulatory, scientific assessment of ecological effects. Its chronic criterion is composed of four elements; two elements are based on the concentration of selenium in fish tissue and two elements are based on the concentration in water. The fish tissue elements supersede the water elements, and the egg-ovary tissue element supersedes all other tissue elements. The fish tissue elements of the criterion state that freshwater aquatic life would be protected from the toxic effects of selenium if: 1) the concentration of selenium in the eggs or ovaries of fish does not exceed 15.1 mg/kg dw; and 2) the concentration of selenium in whole-body fish does not exceed 8.5 mg/kg dw, or in muscle tissue (skinless, boneless fillet) does not exceed 11.3 mg/kg dw. Idaho's statewide criterion has the same components and the same concentrations and is the default regulatory standard for ambient waters within the state.

However, states may also adopt water quality criteria that reflect adjustments to EPA's recommended criteria to reflect local environmental conditions. Idaho, using input from various independent entities, went through this process to develop and adopt SSSCs in various parts of the state, including the Study Area. Because previous draft aquatic life criteria (EPA 2002 and 2004) were based primarily on bluegill (*Lepomis macrochirus*) and not salmonids, Simplot undertook an effort to develop a SSSC for salmonids in Hoopes Spring, Sage Creek, and Crow Creek downstream of Sage Creek. These data were subsequently included along with other species effects thresholds into the 2016 Aquatic Life Ambient Water Quality Criterion for Selenium (EPA 2016b) and were used to develop the Idaho SSSC given at IDAPA 58.01.02.201.01 and approved by EPA (2019). The SSSC are:

- Sage Creek (below Hoopes Springs) and tributaries, except for Pole Canyon and North Fork Sage creeks – 13.6 mg/kg dw;
- Crow Creek between Sage Creek and the Wyoming state line – 12.5 mg/kg dw; and
- All other Study Area streams – 9.5 mg/kg dw (this SSSC was developed to cover certain watersheds in Idaho where sturgeon would not be present, including the Salt River watershed in which the Study Area occurs).

3.9.5.2 Other Non-governmental Organization Data

In addition to the data collected as part of the SI, RI, SSSC, and Panel F&G monitoring, most recently, the groups Greater Yellowstone Coalition, Earthworks, and the Crow Creek Conservation Alliance have also conducted testing on trout tissue samples from Sage Creek and Crow Creek. Reports from Earthworks found elevated levels of selenium concentrations in fish tissue (Earthworks 2017). Although results from these samples appear similar to the data discussed below (i.e. elevated concentrations of selenium in fish tissue), it is unknown if the GYC/Earthworks/Crow Creek Conservation Alliance data is directly comparable in this report. This is due in part to: 1) not knowing if the sample locations were the same because sample locations vs coordinates sometimes do not match; 2) issues with the way the data was reported because some samples were only reported as wet weight rather than dry weight, and; 3) a difference in the size of fish sampled because adult fish which may have migrated from other locations were collected rather than juvenile fish (Covington 2017). As a result, the data is not discussed in this report and is not compared to the more currently applicable SSSCs but can be obtained for reference from Earthworks/Crow Creek Conservation Alliance.

3.9.5.3 Spring Creek

Selenium concentration in macroinvertebrate tissue from Spring Creek (4.37 mg/kg dw) was higher than the reference concentration of 3.75 mg/kg dw. Mean selenium concentration in sculpin tissue (5.74 mg/kg dw) and trout tissue (4.20 mg/kg dw) were both below the applicable SSSC concentration of 9.5 mg/kg dw. They were also within the range of reference concentrations collected in South Fork Tincup Creek.

3.9.5.4 Webster Creek

Selenium concentration in macroinvertebrate tissue from Webster Creek (6.30 mg/kg dw) was higher than the reference concentration of 3.75 mg/kg dw. Mean selenium concentration in trout tissue (no sculpins were collected) was 5.44 mg/kg dw, which is below the applicable SSSC concentration of 9.5 mg/kg dw, and within the range of reference concentrations collected in South Fork Tincup Creek.

3.9.5.5 Draney Creek

Selenium concentration in macroinvertebrate tissue from Draney Creek (3.61 mg/kg dw) was below the reference concentration of 3.75 mg/kg dw. Mean selenium concentrations in both sculpin tissue and trout tissue (4.44 and 4.30 mg/kg dw, respectively) were below the applicable SSSC concentration of 9.5 mg/kg dw. They were also within the range of reference concentrations collected in South Fork Tincup Creek (less than half the maximum seen in the reference concentrations).

3.9.5.6 Smoky Creek

Selenium concentrations in macroinvertebrate tissue from both USm and LSm were below the reference concentration of 3.75 mg/kg dw in 2004, as well as at LSm in 2010. The concentration was greater than the reference condition in 2010 at USm (5.93 mg/kg dw). Fish tissue was only collected from LSm in 2010, with a mean concentration from two fish (both YCT) of 4.74 mg/kg dw, which is below the applicable SSSC concentration of 9.5 mg/kg dw. It is also within the range of reference concentrations collected in South Fork Tincup Creek.

3.9.5.7 Tygee Creek

Selenium concentration in macroinvertebrate tissue at LT-5 was 21.91 mg/kg dw in 2004, which is nearly six times the reference concentration of 3.75 mg/kg dw. However, in 2010, the concentration (3.69 mg/kg dw) was below the reference concentration. The mean concentration in forage fish in both 2004 and 2010 (5.95 and 4.35 mg/kg dw, respectively) was below the applicable SSSC concentration of 9.5 mg/kg dw. It was also within the range of reference concentrations collected in South Fork Tincup Creek. In addition, the mean concentration for trout (4.82 mg/kg dw) was also below the SSSC concentration of 9.5 mg/kg dw and within the range of reference concentrations. It is unclear what may have led to such high concentrations in macroinvertebrate tissue in 2004, as the concentration in periphyton was relatively low.

3.9.5.8 Roberts Creek

The selenium concentration in macroinvertebrate tissues at UR-3 was well below the reference concentration of 3.75 mg/kg dw in 2010 (1.53 mg/kg dw); however, it was over three times the reference concentration in 2015 (12.4 mg/kg dw). It is unclear what may have led to this increase, as concentrations in sediment and periphyton were low. Only one fish has been collected from Roberts Creek, with a concentration of 4.87 mg/kg dw. This is below the applicable SSSC concentration of 9.5 mg/kg dw, and within the range of reference concentrations collected in South Fork Tincup Creek.

3.9.5.9 North Fork Sage Creek

Sediment and macroinvertebrates in North Fork Sage Creek were sampled at different locations in 2004 and 2010. In 2004, they were sampled upstream of the Pole Canyon Creek confluence, but below the confluence in 2010. The higher selenium concentrations in both sediment and macroinvertebrate tissue at the downstream location clearly show the input of contaminated water from Pole Canyon Creek. At the upstream location, the selenium concentration in macroinvertebrate tissue (5.96 mg/kg dw) was above the reference concentration of 3.75 mg/kg dw, but the downstream concentration was nearly double that of the upstream (11.9 mg/kg dw) and three times the reference concentration. No fish tissue has been collected in North Fork Sage Creek. If fish were to have been found, the applicable SSSC would be 9.5 mg/kg dw for fish tissue.

3.9.5.10 Pole Canyon Creek

Similar to North Fork Sage Creek, the selenium data from Pole Canyon Creek clearly show the input of contaminated water from the Pole Canyon ODA, as well as the positive effect of the remediation measures implemented. Upstream of the ODA at UP, the selenium concentration in macroinvertebrate tissue (3.11 mg/kg dw) was below the reference concentration of 3.75 mg/kg dw in 2004. Downstream of the ODA, the concentration was 90.71 mg/kg dw in 2004 (over 24 times reference concentration). In 2010, at LP-PD, the concentration in macroinvertebrate tissue was 16.9, which is substantially lower than in 2004, but still higher than the reference condition. No fish have been collected in Pole Canyon Creek, but sediment concentration data shows a trend similar to the macroinvertebrate data. If fish were to have been found, the applicable SSSC would be 9.5 mg/kg dw for fish tissue.

3.9.5.11 Hoopes Spring

Hoopes Spring is the primary source of selenium to Sage Creek, and selenium concentrations are substantially elevated in all environmental media relative to most other streams (**Table 3.9-16**), reference conditions, and the applicable SSSC whole body tissue concentration (13.6 mg/kg dw). The mean concentration in macroinvertebrate tissue from 2006-2010 is over five times greater than the reference concentration of 3.75 mg/kg dw, with a minimum concentration from the same time period that is three times greater. Consistent with the data from macroinvertebrates, mean concentrations in fish tissue (both sculpins and trout) have also been higher than the whole-body tissue criterion (13.6 mg/kg dw) in all years. In 2013, the whole-body tissue concentrations were more than double the applicable SSSC concentration of 13.6 mg/kg dw, with trout tissue concentrations that were 2.6 times higher than the applicable SSSC (13.6 mg/kg dw) in 2013.

3.9.5.12 Sage Creek

Upstream of the confluence with Hoopes Spring, selenium concentrations have generally been low, with concentrations in macroinvertebrate tissues below the reference concentration of 3.75 mg/kg dw in all years and at all locations, except for 2010 at LS, when the concentration was 7.98 mg/kg dw. In addition, mean concentrations in trout tissue have generally been below the applicable SSSC selenium concentration for whole body tissue (9.5 mg/kg dw). There were, however, a couple of trout at US and LS (in 2010 and 2009, respectively) that had elevated tissue concentrations, including one trout that had concentrations higher than 9.5 mg/kg dw (Formation Environmental 2014). Formation Environmental (2014) hypothesized that these fish may have moved upstream from lower portions of Sage Creek where selenium exposure is greater.

Downstream of Hoopes Spring, which is the primary source of selenium to Sage Creek, selenium concentrations in both macroinvertebrates and fish tissue are substantially elevated relative to upstream conditions, reference conditions, and the applicable SSSC whole body tissue concentration (13.6 mg/kg dw). Concentrations in macroinvertebrate tissue have been greater than the reference concentration of 3.75 mg/kg dw at all locations and in all years, with concentrations often much greater. Consistent with the data from macroinvertebrates, mean concentrations in fish tissue (both sculpins and trout) have also been higher than the applicable SSSC whole-body tissue concentration (13.6 mg/kg dw) in all years (Formation Environmental 2014). Selenium concentrations in sculpin tissue in 2013 show a clear upward trend relative to past years.

3.9.5.13 South Fork Sage Creek

Selenium concentrations in macroinvertebrate tissue in South Fork Sage Creek have been greater than the reference concentration of 3.75 mg/kg dw in all years and at all locations, with a mean of 10.31 mg/kg dw, a minimum of 8.09 mg/kg dw, and maximum of 12.6 mg/kg dw. Mean fish tissue concentrations for sculpin have been less than the whole-body value of 13.6 mg/kg dw in 2004, 2009, and 2010. However, individual sculpin had tissue concentrations greater than 13.6 mg/kg dw in 2009 and 2010, with maximum concentrations of 16.10 and 17.90 mg/kg dw in 2009 and 2010, respectively. Mean tissue concentrations for trout were below the applicable SSSC (13.6 mg/kg dw) in 2010 and 2011. However, individual trout had tissue concentrations that exceeded 13.6 mg/kg dw in 2010, with a maximum concentration of 17.5 mg/kg dw (Formation Environmental 2014).

3.9.5.14 Crow Creek

Crow Creek has been sampled extensively for trout tissue samples from 2006–2011, with 315 individual tissue samples collected (Formation Environmental 2014). Because the data is extensive, it is not presented in **Table 3.9-16** as was done for the other streams. Rather, a summary of the data based on Formation Environmental (2014) is presented here, with the data available in Stantec 2017c.

Upstream of the confluence with Sage Creek, fish tissue samples have been taken at five sample locations, CC-75, CC-100, CC-150, CC-300, and CC-350, in order from upstream to downstream. Downstream of Sage Creek, tissue samples have been collected from two locations, CC-1A and CC-3A, in order from upstream to downstream. From 2006–2011, mean selenium concentrations in trout tissue upstream of Sage Creek were below the applicable 9.5 mg/kg dw SSSC at all locations.

Mean trout tissue concentrations downstream of Sage Creek have been elevated relative to the upstream concentrations. They have been above the applicable SSSC of 12.5 mg/kg dw in 2008, 2010, and 2013, but were below 12.5 mg/kg dw in 2006, 2007, 2009, and 2011. In 2008, the range in mean concentrations for the two locations downstream of Sage Creek was 15.09–18.24 mg/kg dw. In 2010, only one location was sampled downstream of Sage Creek, with a mean concentration of 12.81 mg/kg dw. In 2013, mean selenium concentrations in sculpin tissue at CC-1A and CC-3A were 22.95 and 21.82 mg/kg dw, respectively. The increased values downstream of Sage Creek reflect selenium loading from that stream. Although the tissue concentrations are lower than in Sage Creek, likely due to dilution in the larger Crow Creek, selenium concentrations in sculpin tissue show a clear upward trend in 2013 relative to past years.

3.10 LAND USE, TRANSPORTATION, AND SPECIAL DESIGNATIONS

The Study Area for land use, transportation, and special designations consists of the Project Area plus a ½-mile buffer surrounding the proposed disturbance (4,686 acres; **Figure 3.10-1**). The Study Area boundary was developed with the IDT experts and professional judgement. The Study Area contains 2,660 acres of NFS land (57 percent) within the CTNF Soda Springs Ranger District as well as private lands (2,026 acres or 43 percent). Simplot-owned land in the Study Area is split-estate, which means that Simplot owns the surface rights, but the federal government owns the subsurface (underground) mineral rights.

The Study Area within the CTNF[1] Soda Springs Ranger District is administered under the CNF RFP (USFS 2003a). The total area administered by the CTNF is over 3,000,000 acres (USFS 2016). The portion of the Study Area on NFS land is contained within CNF RFP Administrative Unit M331Df (Pruess Ridges and Hills subsection) (USFS 2003a). Management of this area emphasizes:

- Retention of large security areas for wildlife;
- Linkage habitat between the CNF and the Bridger-Teton National Forest;
- Restoration and protection of BCT habitat, particularly on the east side of the subsection;
- Restoration of deteriorated rangelands; and,
- Management of phosphate reserves (mining) and forested vegetation.

The USFS's general land management philosophy is to sustain management for multiple uses such as recreation, timber, range, minerals, watersheds, fisheries, wildlife, wilderness, scenery, scientific research, and cultural resources. As part of its implementation of this philosophy, the CTNF establishes management prescriptions, which are a set of practices applied to certain areas on the CTNF to attain multiple-use and provide a basis for consistently displaying management direction. Management prescriptions do not stand alone but are part of the management direction package for the CTNF that also includes Forest-wide goals, objectives, standards, and guidelines. Management prescriptions identified within the Study Area are briefly described as follows and shown on **Figure 3.10-1**. The Land Use TR (Stantec 2016f) discusses management prescriptions and their implementation in greater detail.

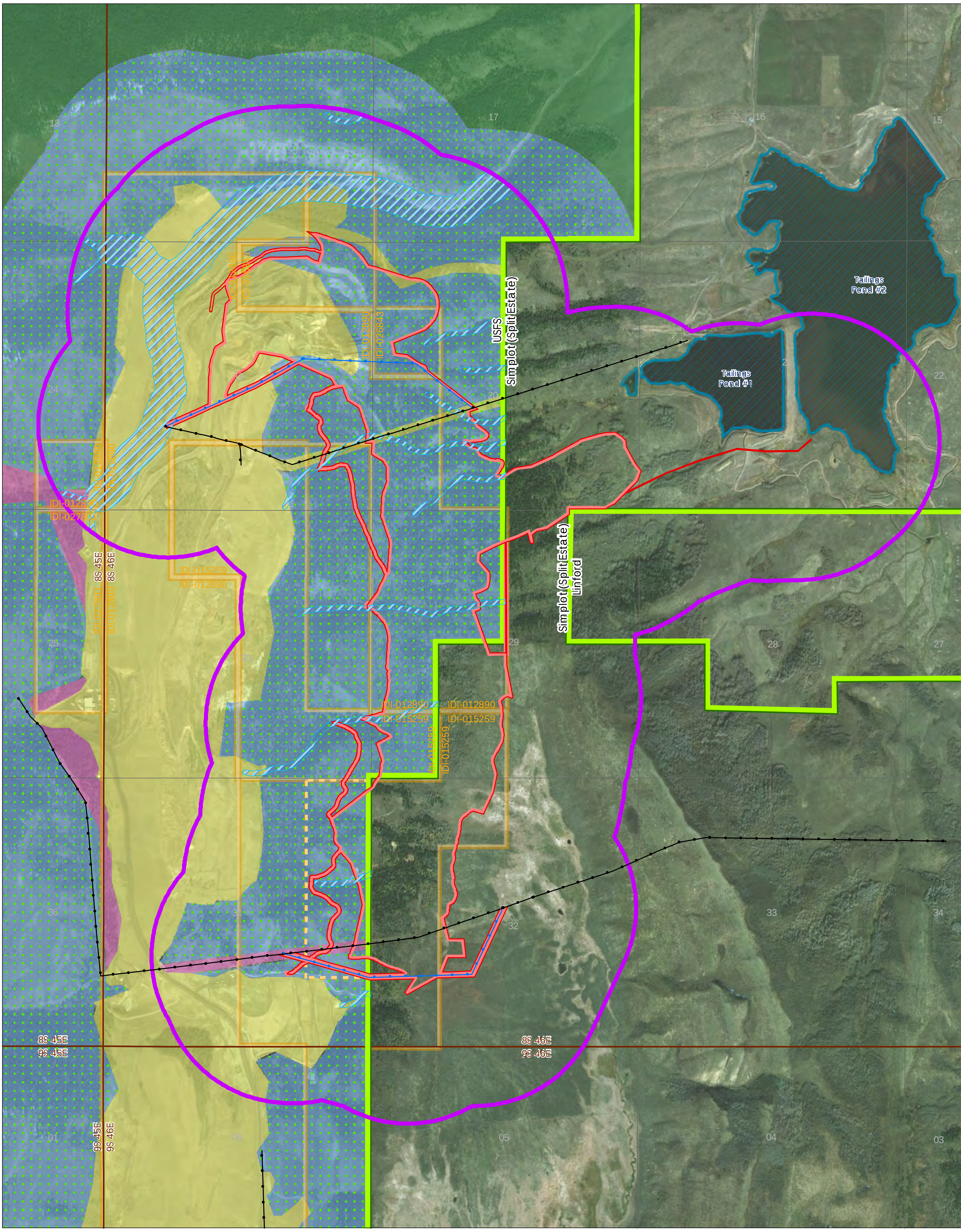
Prescription 2.8.3 – AIZ applies to the aquatic influence zone associated with lakes, reservoirs, ponds, perennial and intermittent streams, and wetlands. AIZ management direction overrides direction from other overlapping management areas. Management emphasis is to restore and maintain the health of these areas (USFS 2003a). This prescription applies to 249 acres or 5.3 percent of the Study Area.

Prescription 5.2 (b) – Forest Vegetation Management emphasizes scheduled wood-fiber production, timber growth, and yield. This prescription applies to 1,702.6 acres or 36 percent of the Study Area.

Prescription 8.1 (b) – Concentrated Development Areas applies to all existing concentrated developments including communications sites, utility corridors, and administrative sites. High noise levels may occur at these sites at times due to the use of heavy equipment and blasting. This prescription applies to 24.5 acres or 1 percent of the Study Area and is related to utilities.

Prescription 8.2.1 – Inactive Phosphate Leases applies to existing Federal Phosphate leases that have not been developed and do not have a current proposal for development and KPLAs. Until developed, these lands will generally resemble adjacent areas with a variety of vegetation types

[1] The CNF and the Targhee National Forest were combined to form the CTNF in 2000.



Legend

- Existing Overhead Powerline
- Proposed re-route Overhead Powerline
- Project Area Boundary
- Tailings Ponds
- Surface Ownership Boundary
- Land Use Study Area
- BLM Lease
- Proposed Lease Modification Area

Management Prescriptions (CNF)

- 2.8.3 Aquatic Influence Zones (AIZ)
- Previously 5.2(b) Forest Vegetation Management
- 5.2(b) Forest Vegetation Management
- 8.1(b) Concentrated Development Area
- 8.2.1 Inactive Phosphate Leases and KPLAs
- 8.2.2(g) Phosphate Mine Areas

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 3.10-1
Management Prescriptions
East Smoky Panel Mine EIS

and management activities. Associated mine development decisions would be made considering RFP Standards and Guidelines and the site-specific NEPA analysis prepared for the proposed activity, both on-lease and on adjacent lands. Following appropriate environmental analyses and M&RP approval, these lands will be managed according to Management Prescription 8.2.2.

Prescription 8.2.2 (g) – Phosphate Mine Areas are federal phosphate lease areas where mining, post-mining reclamation, or exploration is taking place. This prescription currently applies to 932 acres or 20 percent of the Study Area.

The private land in the Study Area may be subject to a local authority such as Caribou County. The Caribou County 2006 Comprehensive Plan (Caribou County 2006) has goals and policy regarding recreation pertaining to lands in the county. It provides recommendations for and supports development of recreation areas in the county. It includes both active and passive recreation activities. The goals and policies applicable to the Study Area are as follows:

2.1 Goal: Maintain positive relationships with all public lands entities and private owners for continuation of accessibility to popular recreation areas wherever possible. Encourage citizens to be involved in management decisions on public lands in the county.

2.5 Goal: Protect the agricultural lifestyle.

2.1.1 Policy: Ensure the integrity of the county's open space and scenic beauty.

3.10.1 Land Use

3.10.1.1 Current Land Uses

NFS land in the Study Area is used for recreation, wood products extraction such as timber and firewood, livestock (sheep and cattle) grazing, wildlife habitat, and minerals extraction. Over 20 percent of the Study Area is currently occupied by mining facilities and mining-related disturbance (**Figure 3.10-1**). There are no conservation easements in the Study Area. Private land in the general area is used for mining, ranching, and recreation. The only private landowners in the Study Area are Simplot and Alan Linford/Crow Creek Ranches (**Figure 3.10-1**).

Rights-of-Way (ROW) provide access and corridors for utilities associated with the mine. Dispersed recreational activities include hunting, fishing, camping, hiking, skiing, and snowmobiling on NFS land (Stantec 2016f). There are no developed recreation sites in the Study Area. The Study Area may also be used for Tribal hunting, fishing, and ceremonial activities consistent with the Shoshone-Bannock heritage.

All of these uses, in addition to ongoing or event-type, natural and human-induced disturbances, influence the land or ecosystem condition. The desired condition of CNF land and ecosystems is one of sufficient complexity, diversity, and productivity to be resilient to disturbances (USFS 2003a).

3.10.1.2 Special Use Authorizations

The RFP (USFS 2003a) allows special uses that are compatible with other resources. SUAs are issued for uses that serve the public, promote public health and safety, protect the environment, and are legally mandated. Bonds or other security instruments are required if the CTNF determines that a use has potential for disturbance that may require rehabilitation or when needed to ensure other performance. The CTNF establishes and maintains rental and user fees for all SUAs. Current

SUAs are shown on **Figure 3.10-2** and are related to mining disturbances and facilities associated with the existing Smoky Canyon Mine.

The CTNF can issue SUAs for those portions of exploration and mining operations that lie on CTNF land outside mineral lease boundaries. Off-lease mine related SUA facilities could include portions of haul roads, mill sites, power lines, communication sites, temporary stockpiles (topsoil/ore/waste rock), or drainage control structures. However, permanent disposal of mine overburden solid waste is not permitted under SUAs [36 CFR 251.54].

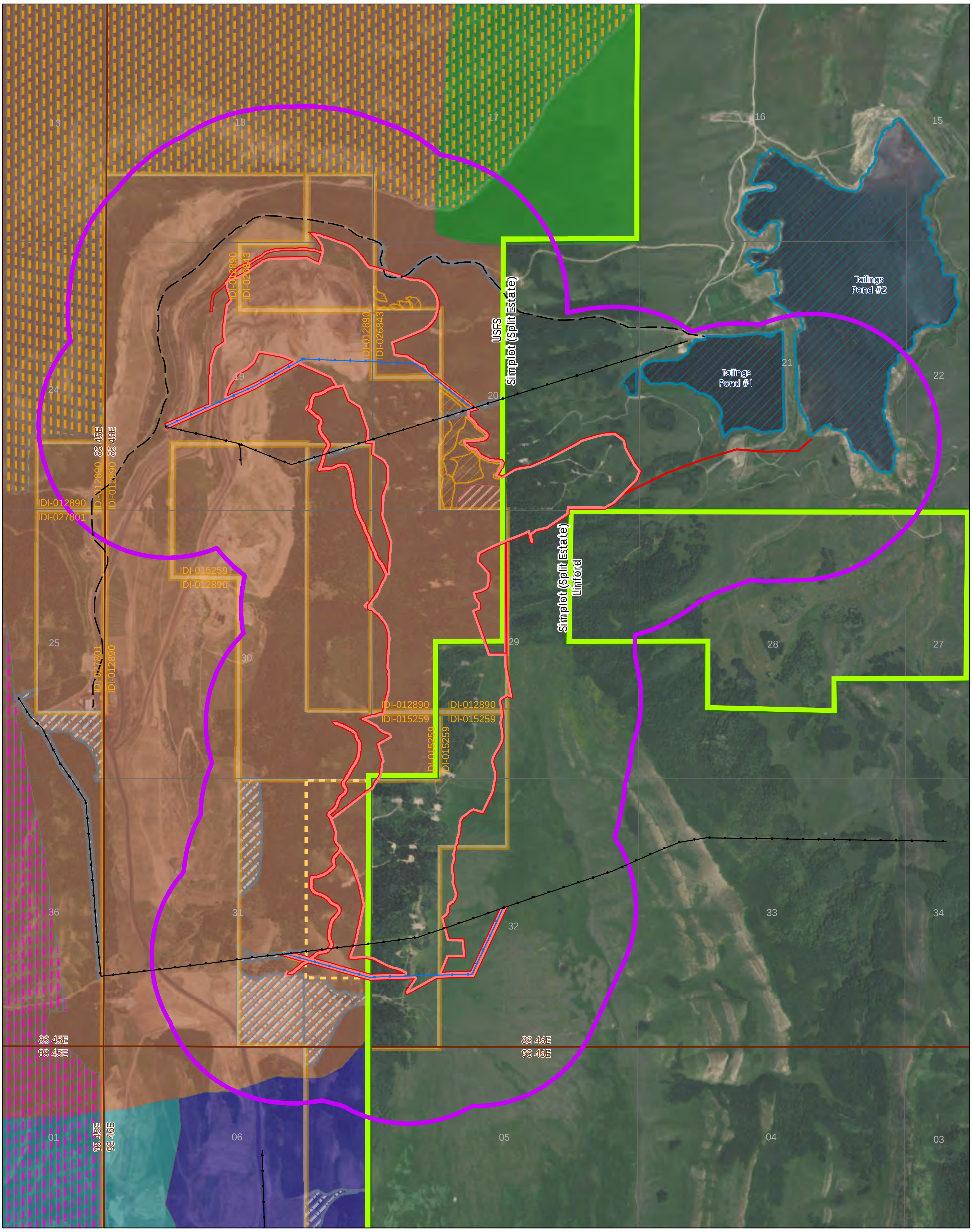
In addition to SUA areas on CTNF lands, other ROWs occur within the Study Area. The segment of the Smoky Canyon Road that passes through the north portion of the Study Area is in an easement granted to Caribou County by the CTNF for operation and maintenance of the road; it extends 33 feet each side of the road center line. Other segments of the Smoky Canyon Road outside the CTNF are under county jurisdictions – Caribou County in Idaho and Lincoln County in Wyoming.

3.10.1.3 Grazing and Range Resources

All 2,660 acres of NFS land in the Study Area are authorized for grazing under USFS grazing allotments. The desired future condition for grazing management on the CTNF that applies to the Study Area is to provide forage for domestic livestock while maintaining healthy and sustainable rangelands.

USFS grazing allotments within the Study Area include Salt Lick Creek, Sage Valley, and Pole Draney (**Figure 3.10-2**). However, only minor acreages (<100 acres total) of the Salt Lick Creek and Sage Valley allotments are within the Study Area and are not impacted by the Project, thus are not addressed in **Chapter 4**. Most of the Study Area falls within the boundaries of the Pole Draney Allotment.

The Pole Draney Allotment totals 12,071 acres, of which 2,561 acres (21 percent) is within the Study Area. There are 2,924 AUMs for the allotment; one AUM is the amount of forage needed by one cow and her calf (cattle) or approximately five ewes and their lambs (sheep) for one month. The Pole Draney Allotment is grazed from June 27 through September 20 of each year (USFS 2015b) and is currently utilized for sheep. According to the permittee, sheep are trailed from the south and arrive at the Pole Canyon Dump area around the 1st of July. They spend between 13 and 19 days, depending on available forage, feeding north to the slurry line corridor. They stay mostly on the NFS land but may also use some of Simplot's private land. They trail west along the slurry line corridor and then cross to the north of the Smoky Canyon Road. The first month on the allotment is spent on these lower slopes because the forage is advanced enough and the second part of the summer is spent gaining elevation as the forage matures. They feed to the north and west of the Smoky Canyon Mine until it is time to leave the allotment. They cross the active mine just north of the Pole Canyon dump and then trail south along the forest boundary on their way through and off the NFS land. Access to portions of the Pole Draney Allotment is coordinated with the Smoky Canyon Mine to avoid conflicts due to mining activities. The permittee is allowed to cross the mine area to get sheep to the allotment. Animals are not allowed to rest, water, or graze in the mine area.



Legend

- Existing Tailings Pipeline
- Existing Overhead Powerline
- Proposed re-route Overhead Powerline
- Project Area Boundary
- Tailings Ponds
- Surface Ownership Boundary
- Land Use Study Area
- BLM Lease
- Proposed Lease Modification Area

Special Use Authorization (SUA)

- Existing Special Use Authorization (SUA)
- Proposed Special Use Authorization (SUA)
- Proposed Mineral Materials Permit Area

Inventoried Roadless Area

- Sage Creek
- Stump Creek

Grazing Allotment (CNF)

- Pole Draney Sheep & Goat
- Sage Valley Cattle & Horse
- Salt Lick Creek Cattle & Horse
- Timber Creek Sheep & Goat

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 3.10-2
Land Use, Range Resources and Special Uses
East Smoky Panel Mine EIS

3.10.1.4 Recreation

Recreational use on federal lands is governed by federal land management plans, which generally include management for dispersed recreation. Land management plans and policies that apply to the Study Area include the CNF RFP (2003a) and the CNF Revised Travel Plan (RTP; USFS 2005a), as well as the Statewide Comprehensive Outdoor Recreation and Tourism Plan (SCORTP) and county land use regulations. These plans and policies, as they relate to recreation opportunities within the Study Area, are described briefly as follows and in more detail in the Recreation and Transportation Baseline TR (Stantec 2016g).

The CNF RFP (USFS 2003a) establishes the desired future condition for recreation on the CNF as, "People visiting the National Forest enjoy a broad range of recreation opportunities amid natural settings. Recreation experiences and settings meet public expectations of quality and variety, while complimenting other resource objectives." The CNF RFP provides a set of land management categories and prescriptions for management of CNF land.

The State of Idaho has plans that identify issues and opportunities in outdoor recreation and tourism (IDPR 2013) and guide the allocation of resources for maintaining and developing recreation facilities, practicing wise resource stewardship, and understanding the recreational needs of citizens (IDPR 2014). The Caribou County 2006 Comprehensive Plan (Caribou County 2006) describes goals and policy regarding recreation pertaining to lands in the county. It provides recommendations for and supports development of recreation areas in the county. It includes both active and passive recreation activities. County goals include enhancing accessibility to recreational sites and improving roadways leading to recreational areas. County policies deal with accessibility, public land diversity of use, and trail improvements.

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (ROS) is a system adopted by the USFS used to inventory, plan, and manage for recreational opportunities on NFS lands (USFS 1982). Its main objective is to attain consistency in the management of recreation through the integration of recreation and resource management planning. There are seven ROS classes which range from essentially natural, low-use areas (resource-dependent recreational opportunities) to highly developed, intensive use areas (facility/vehicle-dependent recreational opportunities). The CTNF includes four of those classes:

- Semi-primitive non-motorized (SPNM), which are areas over one-half mile from a designated motorized route with few facilities and development; SPNM makes up 26 percent of the CTNF.
- Semi-Primitive Motorized (SPM), which indicates areas within one-half mile of a motorized route with few facilities and development, and which account for 29 percent of the CTNF.
- Roaded Modified (RM) and Roaded Natural (RN). These are areas that are within one-half mile of a designated road and generally offer more facilities, information, and management presence.

The portion of the Study Area within the CTNF is wholly within the RM/RN classes, which are mapped as one unit in the RTP (USFS 2005). Near, but outside of the Study Area boundary, are areas classed as SPM and SPNM. These classes are described in more detail as follows.

SPNM

The area is predominantly a natural landscape. Recreational activities include backpacking, nature viewing, hunting (big game, small game, and upland birds), rock-climbing, hiking, and cross-country skiing. The experience provides for minimal contact with others, a high degree of interaction with nature, and a great deal of personal risk and challenge. Where there is evidence of other people, interaction is low, and few management controls exist (USFS 1982).

RM

The area has been substantially modified by development of structures and characterized by vegetative manipulation. All forms of access and travel modes may occur, although roads are generally not well suited to highway-type vehicles. Use by high clearance vehicles is common. OHV use on designated routes or areas is encouraged. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. Moderate user densities are present away from developed sites (USFS 1982).

Current Recreation Conditions

Many recreation opportunities are offered on the CTNF, such as camping, hiking, mountain bike riding, hunting, snowmobiling, cross country skiing, horseback riding, OHV use, wildlife viewing, photography, and scenic drives. The top five recreation activities of CTNF visitors were wildlife viewing, viewing natural features, walking/hiking, relaxing, and driving for pleasure (USFS 2005b). The portions of the Study Area under federal jurisdiction are technically available for dispersed, backcountry, and undeveloped recreational uses, although due to active mining and restricted public access under Prescription 8.2.2 in some areas, these opportunities are fairly limited or not utilized. OHV use is popular on the CTNF; however, only 2.2 miles of USFS roads are present in the Study Area that would be available for OHV use. Therefore, OHV use is limited in the Study Area and will not be discussed further.

The most popular type of recreation within the Study Area is hunting for big game, including elk, moose, and deer. The Study Area is within IDFG Hunting District 76 where big game, upland birds, small game, and waterfowl are harvestable. Hunting is prevalent throughout the CTNF during designated hunting seasons resulting in a substantial increase in recreational use at those times; however, hunting within the Study Area when compared to the rest of the CTNF would still be considered light due to the existing Smoky Canyon Mine. The terrain, combined with access safety restrictions and noise near current mining activity and lack of motorized access in some areas, deters many hunters from using the immediate area. Similarly, activities popular in the surrounding area are less likely within the Study Area because of these factors. Further, Smoky Creek is the only creek within the Study Area that contains game fish species, but due to its limited size and access restrictions, it likely does not support any semblance of a recreational fishery.

There are no parks or developed recreation facilities within the Study Area. The closest developed facilities, the Diamond Creek campground and Diamond Creek warming hut, are located approximately 4 miles west of the Study Area. There are no developed hiking trails within the Study Area.

The main recreational access to the Study Area is the Timber Creek Road/Smoky Canyon Road (Forest Road 110), which is accessed from Diamond Creek Road via Georgetown Canyon Road from State Highway 30 at Georgetown in Idaho or from Stump Creek Road via Tygee Road in Auburn, Wyoming (**Figure 3.10-4**; **Section 3.10.2**).

Of all the varied recreation activities that occur on the CTNF, the only activity that occurs in the immediate vicinity of the Project Area is dispersed recreation in the form of big game hunting. Even this activity is minimal due to very limited access and the ongoing nearby mining activities. No developed trails, developed sites, or dispersed camping opportunities exist in the Project Area.

3.10.2 Transportation

Access to the Study Area from the south is provided via U.S. Highway 30 traveling north from Montpelier, Idaho to Georgetown (**Figure 3.10-4**). From Georgetown, access is from Georgetown Canyon Road to Diamond Creek Road, then to the Timber Creek/Smoky Canyon Road (Forest Road 110). In addition to their use as access to the Study Area, Diamond Creek Road, Georgetown Canyon Road, and Wells Canyon Road are also considered primary routes across the CTNF. Access to the Study Area from the east is provided via U.S. Highway 89 to Auburn, Wyoming, then by traveling west on Tygee Road in Auburn, to Stump Creek Road. Stump Creek Road intersects Smoky Canyon Road (**Figure 3.10-4**).

Most roads to and within the Study Area were originally constructed as access for grazing, timber harvest, and mineral extraction. Most of these roads have been located, designed, and constructed to an approved CTNF or county standard. There are currently 9.5 miles of mapped roads within the Study Area (**Figure 3.10-3**). The only NFS road in the Study Area is the Smoky Canyon Road (Forest Road 110). Unnamed, native surface roads also access the Study Area from the east on private land (**Figure 3.10-3**; **Table 3.10-1**).

Table 3.10-1 Transportation Routes within the Study Area

ROAD	MILES WITHIN STUDY AREA	TYPE OF ROAD	PUBLIC USE
Smoky Canyon and Timber Creek Road	2.2	NFS	Open
Unnamed Roads (private)	7.3	Private	N/A

The CNF RFP (USFS 2003a) includes the following desired future conditions and goals applicable to transportation and access within the Study Area:

<u>Desired Future Conditions</u>

- Transportation system provides access to the CNF to meet planning and management goals including recreation, special uses, timber management, grazing, minerals development, and fire protection.

The transportation system is safe, environmentally sound, and is responsive to public needs and affordable to manage and maintain (USFS 2003a).

Goals

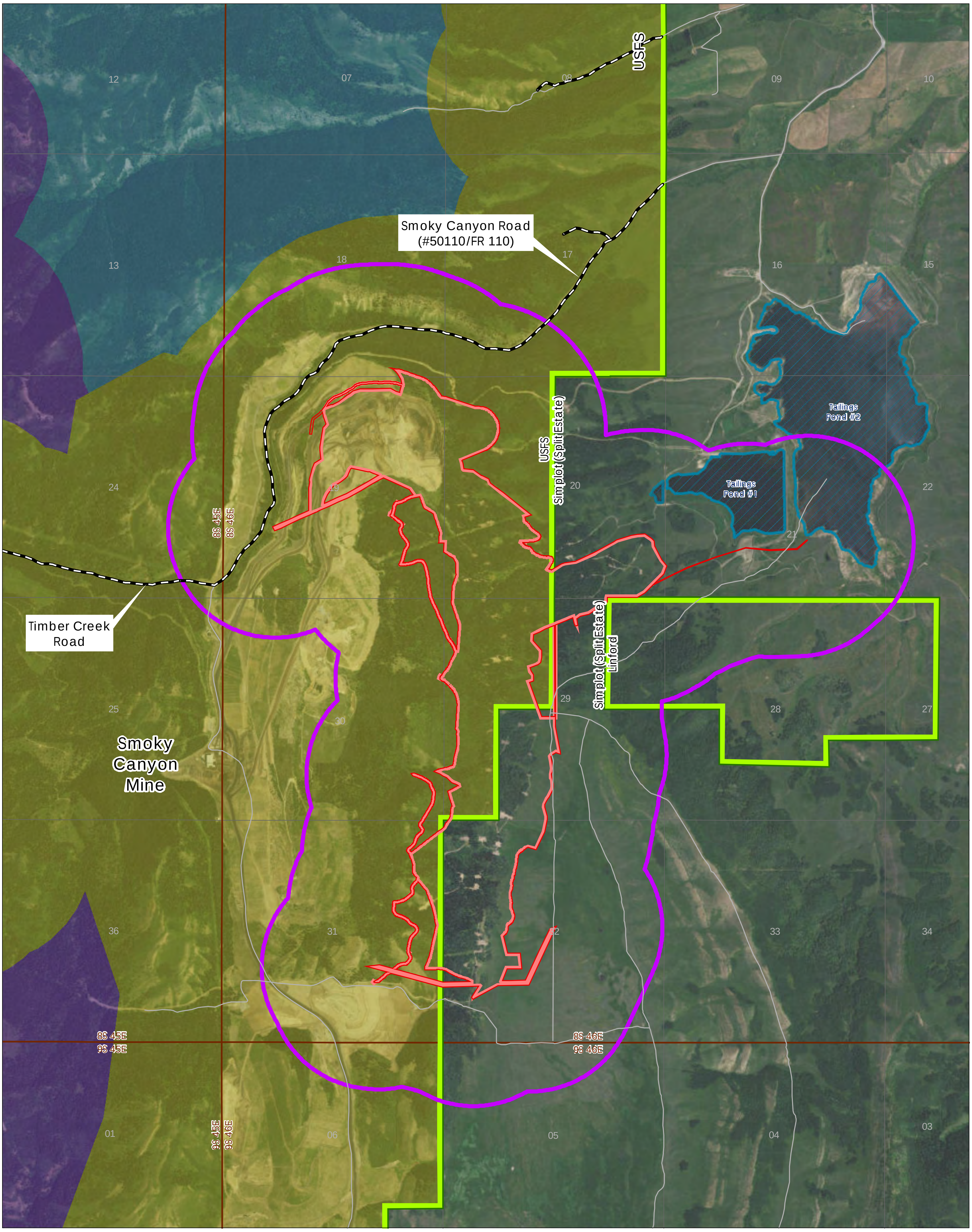
- NFS roads and trails needed for long-term objectives are maintained in a manner that provides for user safety and minimized impacts to forest resources.
- The forest transportation system is developed and maintained at the minimum level necessary to effectively and efficiently manage natural resources, provide user access, protect capital investments, provide for user health and safety, and protect the environment (USFS 2003a).

In August 2005, the CTNF completed the RTP to be in compliance with the 2003 RFP. The purpose of the RTP analysis and decision was to determine the motorized road and trail system, the non-motorized trail system, and designated mechanized trails for the CTNF. Motorized and non-motorized areas during winter season were also analyzed in the RTP (USFS 2005a).

The CNF RFP (USFS 2003a) and the RTP (USFS 2005a) provide direction on management of roads both generally and by prescription. In areas designated for semi primitive recreation, roads and trails are designed and maintained to allow for easy passage to maintain or enhance semi-primitive motorized and dispersed recreation opportunities. In areas designated as phosphate mine areas, public access is generally restricted due to safety concerns. Road construction and reconstruction are allowed to provide for mine development, but these roads are usually obliterated following mining activities unless site specific analysis determines the road is needed for forest management or public access.

The Smoky Canyon Mine is generally accessed by the Smoky Canyon Road (Forest Road 110). Simplot has worked with the USFS to improve the segment of the Smoky Canyon Road west of the intersection with the mine access road, which is typically referred to as Timber Creek Road. Under an SUA for the buried slurry line that runs down the Smoky Canyon/Timber Creek Road, Simplot conducts normal road maintenance including removal of debris; blading and shaping of roadway surfaces and ditches; repair of any roadway structures; restoration of eroded fills or berms; removal of snow; and installation of safety signs as appropriate. Improvements have included the addition of aggregate surfacing to the existing Timber Creek Road all the way to the Diamond Creek Road intersection (**Figure 3.10-4**) and some minor drainage improvements. The segments of the Smoky Canyon Road, northeast of the USFS boundary, are under county jurisdiction (Caribou County, Idaho and Lincoln County, Wyoming), and Simplot coordinates maintenance with the county on portions of these segments.

During the winter months, the Smoky Canyon Road from the northeast provides the only access to the mine. Although primary use of the road is for mine access traffic used by mine employees, commercial vendors, and suppliers, current use of the Smoky Canyon Road includes continued access to upper Smoky Creek and further west to Timber Creek and the Diamond Creek area along the single-lane gravel Timber Creek Road (during late spring through early fall months only). From Auburn, Wyoming, to the Wyoming/Idaho State line and then continuing west and south nearly another 5.2 miles, Stump Creek Road is about 24 feet wide with an asphalt surface. From that point, it becomes the Smoky Canyon Road, an improved surface, gravel, double-lane road to the intersection with the mine access road. A five-strand barbed wire fence lines the road on each side, and there are numerous cattle guards. As Smoky Canyon Road turns west and becomes Timber Creek Road, it transitions into a single lane, aggregate road which connects with the Diamond Creek Road.



Legend

Existing Tailings Pipeline

Project Area Boundary

Tailings Ponds

Surface Ownership Boundary

Recreation Study Area

Roads

Caribou National Forest Road Open to All Vehicles, Yearlong

Various Existing Roads

Recreation Opportunity Spectrum (ROS)

Caribou National Forest

Roaded Natural/Roaded Modified

Semi-Primitive Motorized

Semi-Primitive Non-Motorized

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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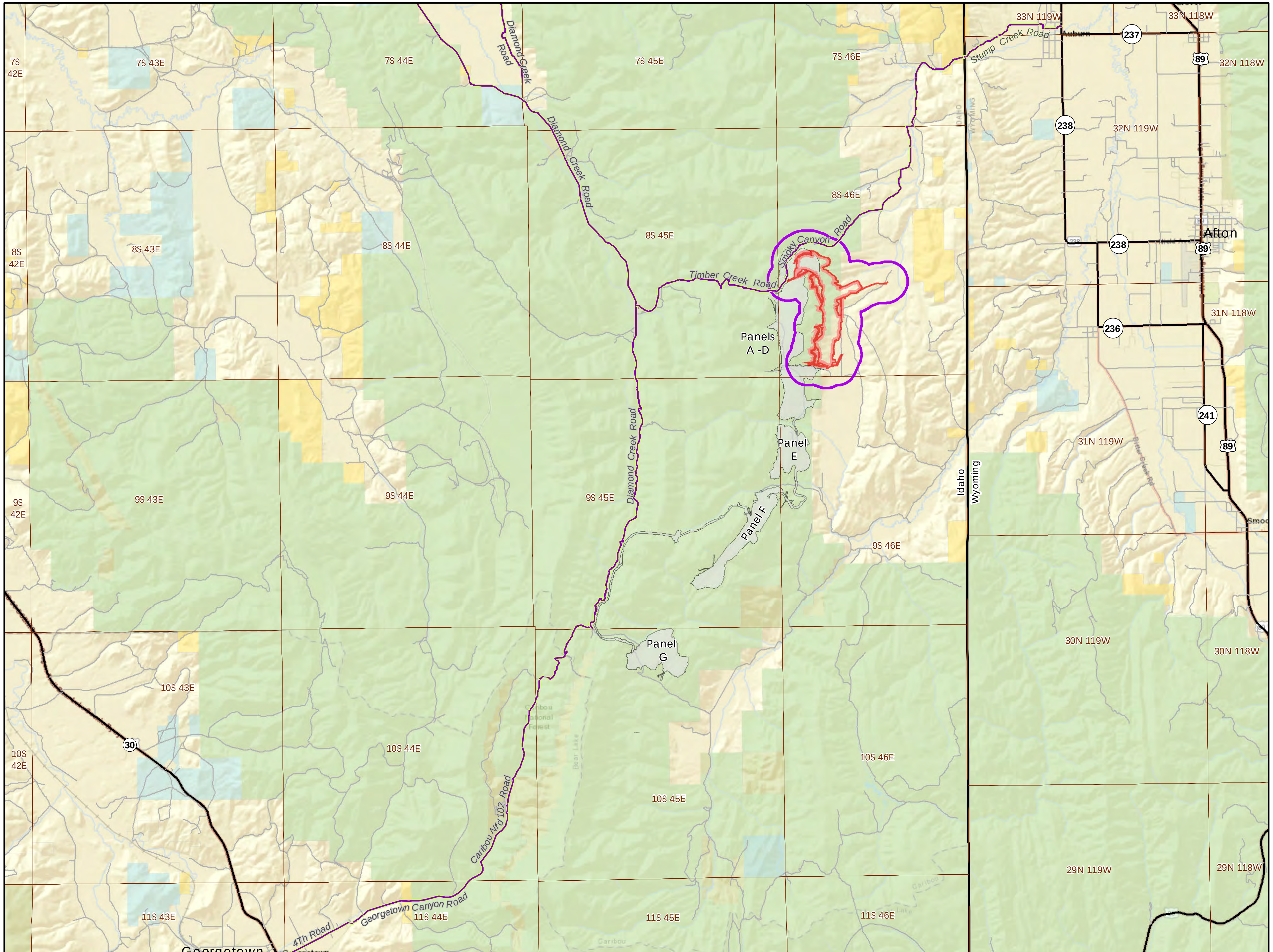
Figure 3.10-3

ROS Classifications and Nearby Roads

East Smoky Panel Mine EIS



Legend

- Study Area Access Road
- Major Road
- Minor Road
- Township Boundary
- Project Area Boundary
- Existing Mine Disturbance Boundary
- Recreation and Transportation Study Area

Land Ownership

- BLM
- Private
- State
- USFS

Notes
1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 3.10-4
Area Transportation
East Smoky Panel Mine EIS

Of the 201 full time employees that work at the Smoky Canyon Mine (Simplot 2016a), approximately two-thirds of the employees car-pool to and from the mine. Mine traffic is present seven days a week, 365 days a year, although approximately one-fourth of the employees work a standard Monday-Friday week. Most employees work 14 days per month (rotating 12-hour shifts of 3 days/week then 4 days/week). Thus, assuming that two-thirds of the employees car-pool, it was estimated that approximately 31 vehicles per day travel to the mine between Monday and Friday, and an additional 100 vehicles used by mine employees working 12-hour rotating shifts travel on Smoky Canyon Road seven days a week. The busiest times on this road would occur around shift changes and normal arrival and departure times from work that occur between 5:00 to 7:00 am and 5:00 to 6:00 pm. Saturdays and Sundays would have the least amount of travel on Smoky Canyon Road from mine related (employees and vendors) traffic, but these are likely the busiest travel days by recreational users.

The approximate number of vendor vehicles/visits to the mine each day was estimated using the Smoky Canyon Mine security log/sign-in sheets for the months of May and June 2004 and 20 random day counts (two per month) from January through September 2004. Based upon this data, it is estimated that approximately 15 vehicles/day from vendors/visitors use FR 110 to access the Smoky Canyon Mine. Visitor numbers to the mine are highest during the late spring and summer months when groups of teachers and students take tours. There has not been an increase in vendor needs in recent years; therefore, these estimates still apply.

3.10.3 Special Designations

The USFS assigns some NFS lands special designations due to their unique characteristics or benefits. Examples include National Wild and Scenic Rivers, National Monuments, Research National Areas, Land and Water Conservation Fund, and Inventoried Roadless Areas (IRAs).

The only specially-designated land that occurs within the Study Area, but is outside the Project Area, is the Stump Creek IRA (**Figure 3.10-2**). Approximately 257 acres (less than 1 percent) of the 96,824-acre Stump Creek IRA overlaps the Study Area (**Figure 3.10-2**), but since the Project would not result in any disturbance within this IRA, special designations, specifically IRAs, will not be addressed in **Chapter 4**.

3.11 VISUAL RESOURCES

The Study Area for visual resources was initially developed based on a preliminary seen/unseen analysis of the Project Area relative to potential sensitive viewers in the vicinity and later refined during field work (Stantec 2016h) to include a one-mile buffer around the Smoky Canyon Mine and proposed East Smoky Panel, as well as the points where sensitive viewers would view the Project in the context of the existing Smoky Canyon Mine (**Figure 3.11-1**). The Study Area boundary was developed with the IDT experts and professional judgement.

3.11.1 Visual Resource Management

3.11.1.1 Overview of Visual Analysis

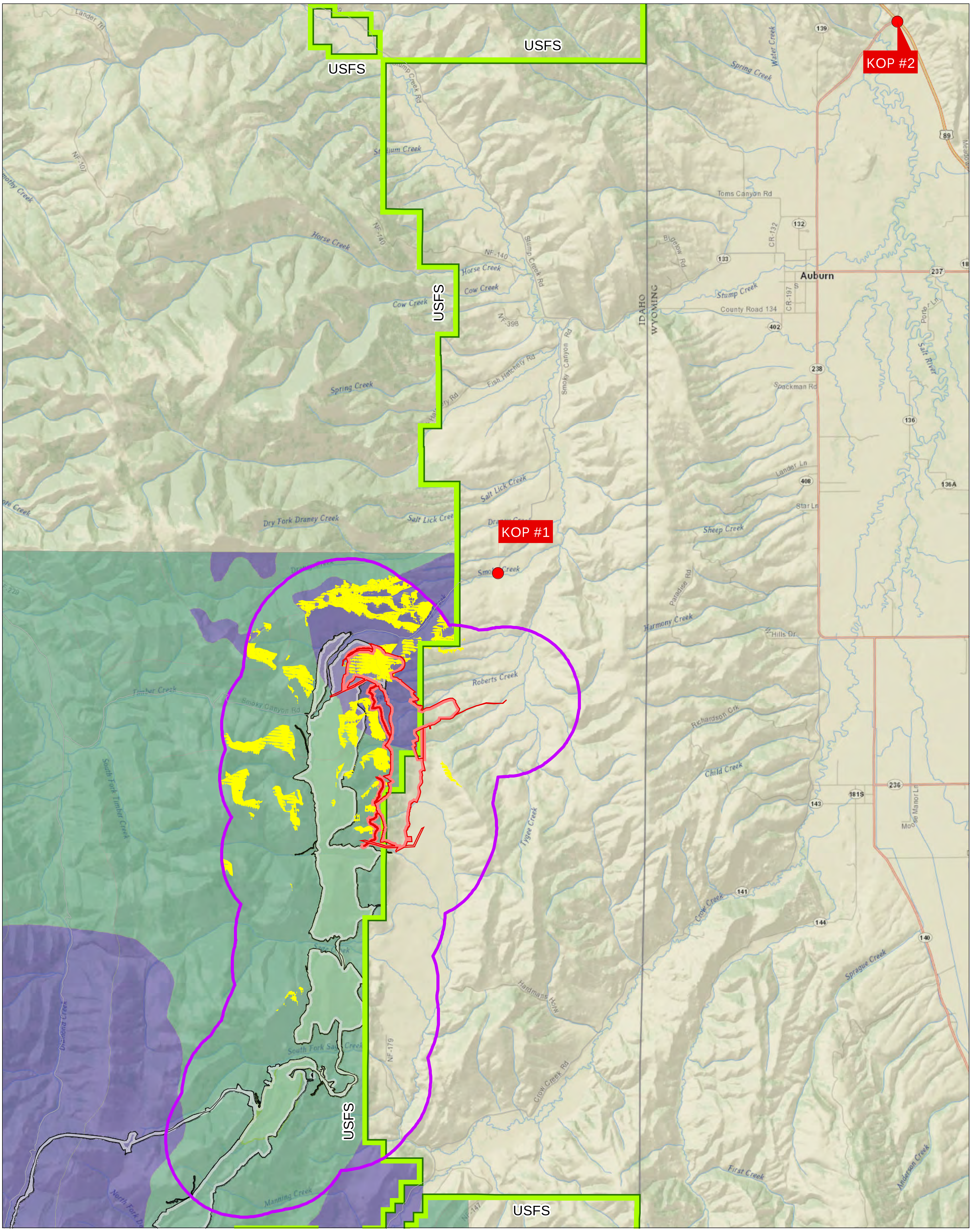
Federal land use management agencies have developed a variety of methods for describing landscapes and for analyzing the impacts to the scenic quality of a landscape. The common goal of these methods is to apply a level of objectivity and consistency to the process and to reduce the subjectivity associated with assessing landscape visual quality. One concept commonly used to assess impacts to scenic quality is contrast analysis. Contrast analysis can be summarized as the degree to which a project or activity affects scenic quality or visual resources depending on the visual contrasts created or imposed by a project on the existing landscape. The contrasts can be measured by comparing the project's features with the major features in the existing landscape (BLM 1986). Each land use agency applies the concept differently (e.g., different terminology, different methodologies for assessing impacts); however, the essential contrast analysis process described as follows is common to federal land management agencies.

Visual contrast analysis compares the existing, characteristic features and contrasts of the landscape to the contrasts imposed on that landscape by a proposed project. The landscape features used in the comparison are the forms, colors, textures, and lines that comprise the existing and potentially modified landscape. Landscape form refers to the unified masses or shapes of the landscape being analyzed, such as existing structures, topography, and natural objects (e.g., conical peaks, blocky mesas, rolling grassland). Landscape color refers to the colors of structures, vegetation, soil, water, rock, and sky. Landscape textures are the variations, patterns, density, and graininess of the landscape surface (e.g., uneven, sparse, and seemingly random-ordered shrubs in an arid landscape; even, orderly, and dense rows of trees in an orchard), and the dimensions of those surface variations (e.g., tall conifers, short grasses). Linear landscape features are the real or imagined paths that the eye follows when perceiving abrupt changes in form, color, or texture. These are often noticeable as the edge effect created at the boundary of two contrasting areas (e.g., a line of trees along a rocky slope or ledge, the abrupt boundary between forest and grassland, a dark ridgeline silhouetted against a bright sky). It should be noted that all of these observable landscape features (line, form, color, and texture) can be affected by environmental factors that include the viewing distance, the angle of view, atmospheric effects (e.g., haze, fog, dust, smoke), lighting conditions, and time of day.

For the Study Area, aesthetic or visual analysis involves determining the degree of visual change between the existing landscape and the landscape that would be produced by the Project for areas of "high scenic value" or "high visual sensitivity," that is, landscapes that are most interesting and appealing. These tend to be the undeveloped, natural landscapes with a harmonious blend, abundance, and diversity of lines, forms, colors, and textures.

A Key Observation Point (KOP) is one of a series of points on a travel route, use area, or a potential use area where the view of a management activity would be representative of views of the area. KOPs are chosen based on existing land use, frequency of visibility, duration of visibility, and anticipated activities of the observer. The criteria for selecting representative KOPs are as follows:

- Areas with visual sensitivity (as discussed previously), which for the Project Area includes areas designated as having High or Very High scenic integrity and areas with designated high Visual Quality Objectives (VQOs).



Legend

- Key Observation Point (KOP)
- Project Area Boundary
- Surface Ownership Boundary
- Visual Resources Study Area
- Existing Smoky Canyon Mine Disturbance
- Areas within the Study Area Visible from KOPs

Caribou National Forest Visual Quality Objectives

- Modification
- Partial Retention

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
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3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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Figure 3.11-1
Key Observation Points, Visibility Analysis and Visual Quality Objectives
East Smoky Panel Mine EIS

- The potential number of viewers of the Project Area. The most comprehensive views of the Project Area should be from major thoroughfares (highways, scenic backways, popular hiking trails and overlooks, and major travel intersections).

- The length of time the Project Area is in view. Motorists on the major thoroughfares or in frequently used recreation areas would have the best views of existing scenic quality and any changes to that quality.

- The angle of observation. More weight is given to potential viewpoints that show more of the Project Area, as more potential impacts would be visible. Views that are elevated and present slopes and aspects that show more of the Project Area are preferred. Conversely, flat areas are not considered ideal representative viewpoints because a relatively small portion of the Project Area is likely to be visible.

Typically, KOPs used for analysis are selected along well-used roadways and trails and near communities, as these are areas where the greatest number of people will see the project impacts for the longest time.

In general, an evaluator analyzes contrast by:

1. Describing the baseline Project Area landscape from the KOPs, using the landscape elements or features of form, line, color, and texture as previously discussed.

2. Determining the potential impacts to the baseline scenic quality after reviewing the Project description, determining the types and intensities of proposed development, describing the Project Area landscape, and noting the agency visual objectives for the area.

3. Using a mental process and landscape photographs to mentally overlay the proposed project activities and changes to the scenic environment onto the Project Area's existing baseline scenic landscape.

4. Determining if the degree of proposed impacts and Project-created visual contrasts meets or exceeds scenic integrity objectives of federal agencies on the portion of the Project Area that lies within its jurisdiction.

3.11.1.2 USFS

The CNF RFP (2003a) states that VQOs established in accordance with the Scenery Management Handbook 701 (USFS 1995) would be changed to adopt Scenic Integrity Objectives (SIO). However, until the Scenery Management System is fully implemented, projects should be planned and implemented to meet the VQOs as displayed on the Forest VQO map.

The USFS Visual Management System (VMS) relies on visual inventory and scenic quality classes to manage visual resources. National Forest System lands are typically inventoried based upon a system of VQOs as part of the forest unit planning process. They are represented by five terms, which can be defined as visual resource management goals. The VQOs are categories of acceptable landscape alteration measured in degrees of deviation from the natural landscape and are described in **Table 3.11-1**.

Table 3.11-1 Visual Quality Objectives

VISUAL QUALITY OBJECTIVE	OBJECTIVE DESCRIPTION
P - Preservation	Provides for ecological changes only. Management activities, except for very low visual impact recreation facilities are prohibited.
R - Retention	Activities are not evident to the casual forest visitor. Provides for management activities that are not visually evident. Under retention, activities may only repeat form, line, color and texture, which are frequently found in the characteristic landscape.
PR - Partial Retention	Activities may be evident, but must remain subordinate to the characteristic landscape. Activities may also introduce form, line, color or texture which are found infrequently or not at all in the characteristic landscape, but they should remain subordinate to the visual strength of the characteristic landscape.
M - Modification	Human activity may dominate the characteristic landscape, but must, at the same time, follow naturally established form, line, color and texture. It should appear as a natural occurrence when viewed in foreground or middle ground.
MM - Maximum Modification	Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

(USFS 2003a)

According to the RFP (USFS 2003a), the scenic environment of the CNF will be maintained through adherence to existing VQOs, with the exception of phosphate mining. Phosphate mining activities and reclamation may or may not meet the given VQO (USFS 2003a). In the case where the VQO is not met, the M&RP would mitigate visual changes to the degree that reclamation methods and economics allow.

3.11.2 Baseline Conditions for Visual Resources

3.11.2.1 Overview

The Project Area lies on the east slope of the Webster Range, which is generally north trending. Near the Project Area, Smoky Creek, Pole Canyon Creek, North Fork Sage Creek, and Sage Creek flow eastward through the Smoky Canyon Mine. Existing mining activity in the Project Area is evidenced by pit walls, roads, mine facility buildings, power lines, and overburden disposal areas.

The opportunity to experience the landscape and interpret scenery and visual change is dependent upon the degree of public access and use of an area. The only public access to the Project Area is along the Smoky Canyon/Timber Creek Road.

The western portion of the Smoky Canyon Mine area is characterized by fairly high elevations, and incised drainages with steep gradients. The eastern portion of the Study Area is characterized by lower elevations and meandering streams within broad valleys. Land cover in the Study Area is a mix of aspen and conifer forests, shrub lands, and largely unvegetated areas disturbed by mining activities. There is a strong seasonal aspect to the visual resource. Spring and summer offer varying shades of green, with foliage softening landforms. Fall colors of red and yellow can be brilliant along the creeks and bottoms and throughout forested areas interspersed with aspen patches. A blanket of snow in the wintertime colors the area uniformly white, punctuated by colors and textures created by forested areas.

The more resistant Rex Chert and Grandeur members of the Phosphoria Formation form outcrops and dip slopes along ridges. The Rex Chert Member consists of massive grey and black chert and cherty limestone. The Grandeur Member consists of light-brownish-grey limestone and dolomite with some chert nodules near the top.

3.11.2.2 CNF Management of Visual Resources

All NFS lands in the Project Area have been classified by VQOs and the VQOs for the Study Area and surroundings are shown on **Figure 3.11-1**. As shown, these areas are classed as either Modification or Partial Retention.

Additionally, as described in the CNF RFP (USFS 2003a), the USFS manages lands using management prescriptions, which are a set of practices applied to a specific area to attain multiple-use and provide a basis for consistently displaying management direction on land administered by the CNF. The CNF has established a management prescription 2.1.2(b), Visual Quality Maintenance, which emphasizes maintaining the existing scenery within major travel corridors with high quality natural vistas (USFS 2003a). However, this management prescription is not applied by the USFS to lands within the Study Area for visual resources for the Project.

3.11.3 Key Observation Points (KOPs)

Two KOPs were established for capturing the views of sensitive viewers traveling in the area (**Figure 3.11-1**).

3.11.3.1 KOP 1

KOP 1 is located on the tailings pond road near the junction with the Smoky Canyon Road (Forest Road 110). The viewpoint was from the junction on the south side of the Smoky Canyon Road looking southwest. This is the view for westbound travelers on the Smoky Canyon Road, which would include mine employees, recreationists, and local landowners/residents. The Smoky Canyon Road is a two-lane road that has an all-weather surface; therefore, sensitive viewers would be traveling between 30 and 40 miles an hour. Viewers looking southwest would be viewing existing Smoky Canyon Mine disturbance in Panel B partially blocked by an undisturbed ridge (**Photo 3.11-1**). The portions of the Smoky Canyon Mine and the Project Area visible from KOP 1 are within the Partial Retention VQO.

Viewers from KOP 1 are at an elevation lower than the mine and are looking up at the mining disturbance located at a higher elevation. The landscape is characterized by mountains and rolling hills in the distance with gently rolling open valleys in the foreground and middle ground. The mountainside forms an irregular curvilinear line at the skyline with rounded, sculpted natural landforms and blocky irregular landforms where mining has occurred. Mining disturbance appears as flattened areas that create horizontal lines that contrast with the surrounding softer, more rounded mountaintops.

Photo 3.11-1 KOP 1 (Photographed April 2015)

The fence in the foreground adds strong vertical elements to the surrounding vegetation. Foreground vegetation consisting of grasses and small shrubs gives way to larger shrubby vegetation that obscures middle ground views. Background vegetation is mixed conifer and deciduous trees, with mined areas devoid of vegetation. Because the photo was taken in spring, foreground grasses are mixed green and brown, and shrubs are shades of brown because they have not yet leafed out. Conifer forest in the background is dark green punctuated by snow and light brown deciduous trees that have not yet leafed out.

Textures in the foreground range from smooth to pebbly on the dirt road, soft to spiky where grasses and shrubs are growing. Vegetation textures in the background are vertical and spiky where forested with conifers, and smooth to dappled in mined areas.

Previous mine disturbance is distinct and noticeable in the background.

3.11.3.2 KOP 2

KOP 2 is located at the intersection of U.S. 89 and Wyoming Highway 238. The Smoky Canyon Mine and Study Area are visible to the southwest; therefore, the KOP represents the views of south bound travelers on U.S. 89 and southwest bound travelers on Wyoming Highway 238. Travelers on U.S. 89 would include both people traveling through the area as well as local or regional residents who would be traveling at highway speeds of 55 miles per hour or more. Travelers on Highway 238 would be locals to the area traveling at slower speeds appropriate to a local two-lane highway. The portions of Smoky Canyon Mine and the Project Area visible from KOP 2 are within the Partial Retention VQO.

Photo 3.11-2 KOP 2 (Photographed May 2015)

Viewers at KOP 2 are at a lower elevation than the mine, which is viewed in the background across rolling hills and valleys (**Photo 3.11-2**). The hills and rolling mountainous terrain create an undulating line at the skyline. Landforms are mostly horizontal, soft, and rounded oval shapes interrupted by flat-appearing valleys. Foreground vegetation consists of grasses, a few shrubs, and deciduous trees that appear newly leafed out when photographed. Valley vegetation appears relatively flat and green, while middle ground vegetation on hillsides is varying shades of dark green to black and stippled. Background vegetation is patchy shades of green where forested areas give way to shrubs or grasses, which appear smooth to stippled or dotted.

The texture of trees and shrubs in the foreground is coarse, rough, and ragged, compared to the relatively smooth or stippled appearance of vegetation in the middle ground and background. The mine is brown and readily distinguished from the surrounding vegetation, but the curvilinear lines and soft forms blend with the background topography so that, while the color distinguishes it from the surroundings, it does not attract attention from this distance. The brown color of the mine disturbance in the distance repeats the brown colors of the road cut and drainage banks in the foreground to middle ground.

The foreground to middle ground is dominated by the serpentine road through the valley and rolling hills. The landscape is also dotted with various structures, making the scene appear rural and pastoral.

3.12 CULTURAL RESOURCES

Cultural resources are non-renewable resources. The National Historic Preservation Act (NHPA) of 1966 (as amended) and the Archaeological Resources Protection Act (ARPA) of 1979 are the primary laws regulating preservation of cultural resources. Federal regulations obligate federal agencies to take into account the effects of their undertakings on important archaeological and historic sites in the area of potential affect (APE).

Cultural resources are defined as any definite location of past human activity identifiable through field survey, historical documentation, and/or oral evidence. Cultural resources include archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains. Cultural resources have many values and provide data regarding past technologies, settlement patterns, subsistence strategies, and many other aspects of history.

Section 106 of the NHPA, as amended, requires federal agencies to take into account any action that may adversely affect any structure or object that is, or can be included in the NRHP. These regulations, codified at 36 CFR 800, provide a basis for which to determine if a site is eligible. Beyond that, the regulations define how those properties or sites are to be dealt with by federal agencies or other involved parties. These regulations must be considered for historic properties or sites of historic importance, as well as for archaeological sites.

Cultural resources provide data regarding past technologies, settlement patterns, subsistence strategies, and many other aspects of history. The guidelines for evaluation of significance and procedures for nominating cultural resources to the NRHP can be found in 36 CFR 60.4. In order to be eligible for nomination to the NRHP, a cultural resource site/historic property must retain cultural integrity and meet at least one of the four National Register Criteria:

- association with events that have made a significant contribution to the broad patterns of our history, or
- association with the lives of persons significant to our past, or
- embody the distinctive characteristics of a type, period, or method of construction; or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
- have yielded or may be likely to yield information important in prehistory or history.

A Traditional Cultural Property (TCP), as defined in the NHPA, is a property that is eligible for inclusion on the National Register of Historic Places "because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998). Stated another way, a TCP is defined as a property with "significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices" (Parker and King 1998).

The term "Heritage Resources", used by the Forest Service, encompasses not only cultural resources but also traditional and historic use areas by all groups (Native Americans, Euro-Americans, etc.). Heritage resources include lifeways or the way humans interact and survive within an ecosystem (USFS 2003b). Objects, buildings, places, and their uses become recognized as "heritage" through conscious decisions and unspoken values of particular people, for reasons that are strongly shaped by social contexts and processes (Avrami et al. 2000).

Heritage resources define the characteristics of a social group (i.e., community, families, ethnic group, disciplines, or professional groups). Places and objects are transformed into "heritage" through values that give them significance.

3.12.1 Cultural Context

Evidence of 11,000 years of prehistoric occupation and use of the CTNF has been documented through rock shelters, stone circles, hunting blinds, bison kill sites, and projectile points (USFS 2003b). The prehistory of southeastern Idaho and the northeastern Great Basin has been previously detailed (e.g., BLM 1981; BLM and USFS 1998; Butler 1978, 1986; Carambelas et al. 1994; Gehr et al. 1982; Lohse 1993; Madsen 1982; Meatte 1990; Ringe et al. 1987; Swanson 1972, 1974). Overviews specific to the history of southeastern Idaho have been written to address the needs of cultural resources management (e.g., BLM 1981; Fiori 1981; Sommers and Fiori 1981) and to identify a number of significant themes for the region. These prehistories are based on archaeological research and may differ from the perspective of local Indian tribes.

The following brief prehistoric overview was summarized from the Final EIS for the CNF Phosphate Leasing Proposal (BLM and USFS 1998).

3.12.1.1 Prehistory

The prehistory of southeastern Idaho can be divided into at least three periods; Paleo-Indian (ca. 10,000 to 7,000 before present [B.P.]), Archaic (7,000 to 300 B.P.), and Protohistoric (300 B.P. to present). These periods are generally defined by distinct artifact types and characterized by different settlement and subsistence patterns.

Paleo-Indian Period

The Paleo-Indian period largely is defined by three projectile point types: Clovis, Folsom, and Plano. Paleo-Indian groups who occupied the region focused their subsistence efforts on large, migratory animals as indicated by the association of Folsom spear points and large animal remains. It may be reasonable to assume that Paleo-Indian groups in southeastern Idaho also traveled over large annual ranges (Goodyear 1979; Letourneau 1992) and exhibited a high degree of residential mobility (Binford 1980; Kelly and Todd 1988).

Archaic Period

The Archaic period is generally defined by the introduction of stemmed (Pinto series) and notched (Northern Side-notched and Elko series) projectile points and the apparent broadening of the resource base. The shift from large, lanceolate-shaped points to small, stemmed and notched points is believed to be related to the introduction of the atlatl and dart from two separate regions, the Great Basin and the Plains (Gruhn 1961). Although data indicates that large mammals were the primary food resource of Archaic groups, the exploitation of a wider array of resources is evidenced in ground stone artifacts and small mammal remains at some sites (Sant and Douglas 1992). The Archaic Period can be subdivided into three subperiods based on variation in artifact assemblages and settlement and subsistence practices (Sant and Douglas 1992). These subperiods are the Early Archaic (7,000 to 4,500 B.P.), Middle Archaic (4,500 B.P. to 1,300 B.P.), and the Late Archaic (1,300 to 300 B.P.).

Subsistence and settlement patterns in southeastern Idaho remained fairly consistent between the Early and Middle Archaic (Gruhn 1961; Ranere 1971; Swanson 1972), although artifact assemblages differ. The Late Archaic is defined by the introduction of ceramics and small triangular and side-notched points. These artifact classes, particularly the ceramics, indicate the occupation of at least two groups or "cultural manifestations" (Butler 1986) in southeastern Idaho: the Fremont (ca. 1300 to 650 B.P.) and the Shoshonean (ca. 700 B.P. to present). The Fremont are typically thought of as horticulturalists. Evidence for horticulture has not been found in southeastern Idaho (Holmer 1986; Ringe et al. 1987); therefore, the presence of Fremont artifacts has been problematic to some. Sant and Douglas (1992) suggest that Fremont artifacts arrived in southeastern Idaho through trade. Some have argued that northern Fremont populations were primarily hunters and gatherers, rather than horticulturalists (Madsen 1982; Simms 1990); if that is the case, then the presence of Fremont artifacts in southeastern Idaho would likely be a consequence of Fremont hunter-gatherers occupying the area.

Occupation of southeastern Idaho by the Shoshone and Bannock coincides with the expansion of Numic speaking people from the southwestern Great Basin to the north and east. Brown-ware ceramics and Desert Side-notched and Cottonwood triangular projectile points are thought to be temporally and ethnically sensitive artifacts. Artifacts recovered from the Wahmuza site, in southeastern Idaho, indicate continuous Shoshonean occupation since 700 B.P. (Geminis 1986 as cited in Sant and Douglas 1992). The Shoshone and Bannock groups are characterized as relatively mobile hunter-gatherers.

The Shoshone-Bannock Tribes state that the ancestors of the Shoshone and Bannock peoples have an extensive history in southeastern Idaho and the Project Area. Their ancestors used present-day southeastern Idaho for subsistence hunting, fishing, gathering, medicinal and ceremonial purposes, warfare, transportation, and social purposes.

Protohistoric

Existing research and records indicate two horse-owning groups may have passed through the Manning Creek Tract (south of the Project Area) during their annual forays. According to Stewart (1938), the Cache Valley Shoshone hunted and gathered along the Bear River and crossed the Wasatch Mountains (south of the Project Area) during bison hunting excursions to Wyoming. Bannock and Shoshone groups living at Fort Hall also may have passed through the area while hunting elk, deer, and mountain sheep, and gathering berries along the Bear River (Murphy and Murphy 1986), or when traveling to Wyoming to hunt bison (Stewart 1938). These hunting and gathering forays began to change during the nineteenth century, when westward expansion and increasing conflicts with Euro-Americans eventually forced most of the Shoshone and Bannock into the reservation system. Mixed bands of Shoshoni or the Western Shoshone signed a treaty with the United States Government at Soda Springs, Idaho on October 14, 1863 (Kappler 1941), which set aside large tracts of Indian land in Idaho, Nevada, Oregon, Utah, and Wyoming (Manning and Deaver 1992). Unbeknownst to the Shoshone people, this treaty was not ratified by the United States Government. In 1867 and 1868, the Fort Hall and Wind River Valley Reservations, respectively, were established, and by 1868, the Shoshone had relinquished all their lands in Idaho and Wyoming except for lands specifically set aside as reserves (Clements and Forbush 1970). The Bannock were assigned to the Fort Hall Reservation in 1869, and between 1879 and 1907, a number of other Native American groups were relocated to Fort Hall (Manning and Deaver 1992).

Sacred sites, such as burials, rock art, monumental rock features and formations, rock structures or rings, sweat lodges, timber and brush structures, eagle catching pits, and prayer and offering locales, are located throughout the region (Manning and Deaver 1992). Much of the landscape in southeastern Idaho also is sacred to local Native American groups and, thus, is not defined by archaeological remains.

3.12.1.2 Euro-American History

Fur trappers and explorers were the first non-native Americans to pass through the region (Fiori 1981) and are documented as early as the early 1800s. In the early-1800s, under the command of Robert Stuart, one group of Astorians (fur traders whose base was Fort Astoria) made their way from the Bear River to the Salt River and thence to the Snake River, a route which likely took them through Georgetown Canyon, Crow Creek, and Star Valley. During the early 1840s, great numbers of emigrants began moving westward. In Idaho, emigrants could follow the Oregon Trail, via Fort Hall and Fort Boise, or the California Trail at Soda Springs, Fort Hall, or Raft River (Fiori 1981). Brigham Young led Mormon pioneers into the Salt Lake Valley in 1847, and by early-1860, had dispatched settlers into southeastern Idaho (Fiori 1981). The general area surrounding the Project Area, including the town of Soda Springs (the County seat), was along the routes of the earliest explorers, fur trappers, and emigrants.

Soda Springs was an early transportation hub (ISHS 1981a) with open valley connections to Bear Lake and Wyoming, with the Blackfoot River north to Montana, with Portneuf Valley used by Oregon Trail emigrants to Fort Hall, with Hudspeth's Cutoff west to California, and down Bear River to Cache Valley and Salt Lake.

Between the 1860s and 1890s, miners and railroad workers came to southeastern Idaho. Cariboo Fairchild, who had taken part in the gold rush in the Cariboo region of British Columbia in 1860, discovered gold in this region two years later (IMNH 2017). A modest gold rush began in the Caribou Mountain area in 1870 and ended in the early 1900s (USFS 2003b). During this time, Keenan and Caribou City became thriving boomtowns. Sulfur mining commenced in the early 1880s.

The mines in the Cariboo District depended on distant sources for supplies. The miners' needs provided an enticement for settlers to develop the surrounding country at a time when not too many other economic attractions were available to encourage settlement of southeastern Idaho (ISHS 1981b).

Livestock

As necessitated by the mining boom, small herds of cattle were driven into the region during the 1860s. Crowding on the plains prompted cattlemen to locate larger herds in southeastern Idaho during the 1870s and 1880s (Fiori 1981). Sheep were brought into the area as early as the 1830s-1840s by missionaries and emigrants (Fiori 1981), with larger herds brought in during the mining boom. Large herds of sheep were established in Caribou County during the late 1890s and early1900s (Barnard et al. 1958 as cited in BLM and USFS 1998). Basque sheep herders moved to the area after 1925 (Carambelas et al. 1994). Grazing allotments encompass the Project Area (See **Section 3.10.1.3**). Evidence of historic and modern livestock grazing is present within the Project Area in the form of arborglyphs, livestock trails, and temporary campsites. Arborglyphs are etchings or carvings of art and words in aspen trees that over time turn black against the white trunk, becoming more apparent. Recent studies (Mallea-Olaetxe 2000) indicate the relevance of tree carvings in depicting livestock usage/trailways, range boundaries, sheep herder lifeways, cultural affiliations, periods of use, and transportation routes.

Roads

Freighting was the original mode of mass transportation of goods in southeastern Idaho. The discovery of gold and the explosive growth of mining towns in Idaho and Montana resulted in a surge of freighting activities along the trade routes to the mines. By the 1860s, freight and stage roads passed through southeastern Idaho and contributed to its settlement (BLM 1981; ISHS 1971). Large scale freighting occurred between 1864 and 1884. There were two main routes in this region: the Montana Road (from Corrine, Utah to western Montana) and the Kelton Road (from Kelton, Utah to Boise, Idaho). Approximately 1,000 freighters hauled between Idaho and Montana on the Montana Road in 1873 (BLM 1981). One early report states that the only "direct and safe route [to Cariboo Mountain gold deposits] is to go up the regular Montana road to Ross Fork…" (ISHS 1981b). Road conditions were poor, and tolls were often charged to obtain funding for improvements. Railroads diminished the need for freighting except in the areas not served by railroads.

Early settlers developed the Crow Creek Road, in the Project Area, as a path of commerce from Fairview, Wyoming to Montpelier, Idaho (Druss et al. 1979). This road is still well traveled and is known as the Crow Creek Road. It runs southwest and south to Montpelier Canyon and west to the town of Montpelier. It appears on historic General Land Office (GLO) maps (1901, 1902) of the area as *Montpelier to Star Valley Road*.

The Fairview Cutoff was a route from Fairview, Wyoming to Soda Springs, Idaho. The route cut off from Crow Creek at Hardmans Hollow, ran north to Tygee Creek, then southwest through Smoky Canyon to Soda Springs (Druss et al. 1980). Located north of the Project Area, this road is known currently as the Smoky Canyon Road.

Timber

Timber resources in southeastern Idaho are not as abundant as in other parts of the state, but still played a role in the development of the area. As communities were established, lumber was harvested locally through primitive means such as the pit saw (BLM 1981). As the demand for lumber grew, other means of lumbering were needed. A water-powered sawmill was the next technology introduced into the region, built by Samuel Parkinson and Thomas Smart in 1863 in Franklin. In response to railroad construction in the West, Majors Tie Camp was established in 1868 by Alexander Majors, who directed the cutting of thousands of trees along the Bear River. Majors floated the resulting ties down the Bear River to Corrine, Utah, where they were used for the Transcontinental Railroad. A steam sawmill was brought into the area in 1871. Approximately 30 sawmills were operating in southeastern Idaho by 1883. Historic sites associated with sawmills and lumbering activities have been recorded in the general Project Area.

3.12.2 Previous Research

Cultural resource inventories for previous mine expansions have recorded prehistoric and historic sites in and around the current Project Area. Site types in the general vicinity include prehistoric campsites, mining sites, and livestock/ranching sites. Also, historic sites associated with sawmills and lumbering activities have been recorded. Other known historic sites near but not within the Project Area include the Lander Trail, Fairview Cutoff, and Oneida Salt Works. Historic GLO maps show two historic roads were historically present adjacent to the Project Area. Prehistoric sites found in the area are generally considered significant due to the paucity of prehistoric sites in this high elevation environment.

There have been 29 previous cultural resource inventories completed (**Table 3.12-1**) within 1 mile of the Project Area. Four previously conducted surveys completely inventoried the Project APE (Pagano 2014a, 2014b, 2014c, and 2015).

Table 3.12-1 Previous Cultural Resource Inventories within One Mile of the Project Area

REPORT NUMBER	TITLE	AUTHOR	YEAR	PROJECT NUMBER
1989/1515	Survey Report #3, Smoky Canyon Project, 1981. Basin and Range Research, Pocatello.	Druss, Claudia and Steven Wright (Basin and Range Associates)	1981	CRM-CB-110
1989/1519	Final Report: Intensive field study of archaeological resources at drill locations & proposed roads, Smoky Canyon Lease I-012890, J.R. Simplot Co., Fall 1978.	Druss, Mark (Idaho State University [ISU])	1978	CRM-CB-19
1989/1520	Final Report-Stage I investigation & analysis of archaeological resources in pit area, mill sites, and dump site, Smoky Canyon Lease I-012890, J.R. Simplot Company, Summer and Fall 1979.	Druss, Mark (ISU)	1980	CRM-CB-61
1989/1521	Archaeological Survey, 161 kV Transmission Line, Smoky Canyon Area.	Druss, Mark (ISU)	1982	CRMB-CB-124
1989/1534	Archaeological Investigations in the Smoky Canyon Area, 1980.	Druss, Mark et al. (ISU)	1981	--
1989/4474	Cultural Resources Inventory of the Smoky Canyon Mine Lease.	McGuire, David	1982	--
1989/4529	A Class III Cultural Resource Inventory of Proposed Tailings Reservoir No. 2 at J.R. Simplot Company's Smoky Canyon Mine, Caribou County, Idaho.	McNees, Lance and Craig S. Smith (Mariah Associates)	1988	--
1989/5497	A Cultural Resources Snow Monitor of Four Proposed Drill Pads and Two Access Roads, Caribou County, Idaho.	Polk, Michael (Sagebrush Consultants)	1987	--

REPORT NUMBER	TITLE	AUTHOR	YEAR	PROJECT NUMBER
1989/6883	Archaeological Investigations in Eastern Idaho: the Lower Valley Power and Light Tincup Loop Transmission Line Cultural Resource Survey. Caribou National Forest.	Walker, Danny	1982	--
1991/529	A Class III Cultural Resource Inventory of Additional Area for the Proposed Tailing Reservoir No. 2 at J.R. Simplot Company's Smoky Canyon Mine, Caribou County, Idaho.	Smith, Craig	1991	ID3-91-38
1992/764	An Archaeological Evaluation of Site 10CU90, Caribou County, Idaho.	Polk, Michael (Sagebrush Consultants)	1982	--
1993/224	Diamond Creek GIS Area. Caribou NF.	Christensen, B. (USFS)	1991	CB-91-0218
1994/167	Diamond Creek GIS Update. Caribou National Forest.	Robertson, Mary (USFS)	1993	CB-93-306
1995/1034	Alan Linford Springs Development & Pipeline. Frank Fink, SCS Boise.	Robertson, Mary (USFS)	No date	NRCS95455
1997/490	JR Simplot Panel B Exploration, Extension of 1996 Req. Caribou National Forest.	Robertson, Mary (USFS)	1997	CB-97-432
1997/664	Smoky Canyon Panel B Exploration, Caribou National Forest.	Robertson, Mary (USFS)	1997	CB-97-434
1997/851	Simplot Smoky Canyon Phosphate Exploration BLM Report. BLM, Idaho Falls District.	Cresswell, Lisa (BLM)	1997	ID-030-97-8
1998/58	Hartman Land Exchange. BLM, Idaho Falls District.	Myler, Terrie (BLM)	1997	CEEA#97-14
2002/622	Smoky Canyon Panels B&C. Prepared for J.R. Simplot Co., Boise, by Frontier Historical Consultants, Grand View, Idaho.	Gray, Dale (Frontier Historical Consultants)	2001	CB-01-530
2006/567	Pole Canyon Removal Area, Frontier Historical Consultants, Grand View, Idaho.	Stratham, William (Frontier Historical Consultants)	2006	CB-06-562
2010/552	Soda Springs Allotments Management Plan. Caribou N.F.	Hall, D. (USFS)	2010	CB-10-603
2013/349	Soda Springs RD 5 Allotments AMP. Caribou National Forest.	Shelton, Jeffry (USFS)	2012	CB-12-649
2013/527	JR Simplot Smoky Canyon Mine Diversion Channel, Caribou County.	Pagano, Sandy and Michael Polk (Sagebrush Consultants)	2012	CB-12-0655
2015/2	JR Simplot East Smoky Canyon, GW-29 Exploration Area.	Sandy Pagano (Sagebrush Consultants)	2014*	CB-14-689
2014/569	JR Simplot East Smoky Canyon, Proposed Borrow Areas.	Sandy Pagano (Sagebrush Consultants)	2014*	2014-PFO-15
2015/60	JR Simplot East Smoky Canyon, GW-30 Groundwater Monitoring Well.	Sandy Pagano (Sagebrush Consultants)	2014*	CB-15-694/ 2015-PFO-3
2015/294	The Proposed J. R. Simplot East Smoky Panel, Smoky Canyon Mine, Caribou County, Idaho.	Sandy Pagano (Sagebrush Consultants)	2015*	CB-15-692/ 2015-PFO-4

*project-specific inventory within the APE

As a result of the previous inventories, 10 previously recorded sites (**Table 3.12-2**) have been recorded within 1 mile of the Project Area. The prehistoric sites include lithic scatters while the historic sites include arborglyphs (i.e., tree carvings associated with sheep herding activities), a salt works site, and a sheep bridge.

Table 3.12-2 Previously Recorded Sites within One Mile of the Project Area

SITE NUMBER	AFFILIATION	NRHP EVALUATION	LAND STATUS
10CU76 (CB-33)	Native American, Historic	Eligible	CTNF
10CU77 (CB-34)	Native American	Eligible	CTNF
10CU90 (CB-77)	Native American	Undetermined	CTNF
10CU112 (CB-94)	Historic	Undetermined	CTNF
10CU113 (CB-95)	Historic	Undetermined	CTNF
10CU132 (MA337-1)	Historic	Not eligible	Private
10CU247 (DG-1)	Historic	Undetermined	CTNF
10CU326 (CB-468)	Historic	Not Eligible	CTNF
10CU418 (CB-598)	Historic	Undetermined	CTNF
29-15962 (CB-445)	Historic	Undetermined	CTNF

3.12.3 Cultural Resource Sites

As a result of the Project-specific cultural resource inventories (Pagano 2014a, 2014b, 2014c, and 2015), two historic sites were identified within the Project Area. No prehistoric sites were encountered during the inventories. The two historic sites have been evaluated as not eligible for the NRHP (**Table 3.12-3**), and the SHPO concurred with this determination (SHPO 2015).

Table 3.12-3 Cultural Resources in the Project Area

SITE NUMBER	SITE TYPE	AFFILIATION	NRHP EVALUATION
CB-635	Log Cabin	Euro-American	Not Eligible
CB-636	Corral	Euro-American	Not Eligible

3.12.4 Heritage Resources

Southeastern Idaho has been traditionally utilized by the Shoshone-Bannock Tribes for subsistence and ceremonial uses. The Fort Bridger Treaty of 1868 reserved the Tribes' rights to hunt, gather, and fish on all unoccupied federal lands (See **Section 3.13**). Physical remains of prehistoric lifeways on the CTNF include campsites and associated artifacts (USFS 2003b). During previous consultations (BLM and USFS 2007), the Shoshone-Bannock Tribes stated that the general areas within and adjacent to the Project Area are currently used for traditional activities such as hunting, gathering, and ceremonial uses. According to the RFP (USFS 2003b), representations of historic lifeways on the forest include wagon trails, homesteads, mining sites, and Civilian Conservation Corps camps.

Heritage resources in or adjacent to Project Area also include the historic uses of livestock trailing and grazing. This is in part evidenced in the numerous arborglyphs (tree carvings) present in and around the Project Area, as well as the stock drive (CB-593). Grazing availability and allotments in the Project Area are described in **Section 3.10.1.3**. Roads and trails in the Project Area are described in **Section 3.10.1.4** (Recreation) and **Section 3.10.2** (Transportation).

3.13 NATIVE AMERICAN CONCERNS AND TREATY RIGHTS RESOURCES

The Shoshone-Bannock Tribes are a sovereign nation with their own governing system and not simply members of the general public. The federal agencies must consult at the government-to-government level, in accordance with federal laws, treaties, and executive orders. The trust responsibility of the federal government includes an obligation to protect and preserve the natural resources affecting the Tribes' treaty rights and therefore must consider the effects of federal actions on Tribal interests and rights.

Federal agencies are required by law (National Historic Preservation Act of 1966 and Archaeological Resources Protection Act of 1979) to consult with Native Americans on actions that may affect their traditions or uses of public lands. Specifically, the agencies are required to follow the Section 106 process as recorded in 36 CFR 800 - Subpart B, as amended January 11, 2001. The goal of the BLM as stated in Policy Manual Section 8160 is to "assure that tribal governments, Native American communities, and individuals whose interests might be affected have a sufficient opportunity for productive participation in BLM planning and resource management decision making." To this end, the Pocatello BLM Field Office and the CTNF, Soda Springs Ranger District have engaged in consultation with the Native Americans associated with southeastern Idaho.

The American Indian Religious Freedom Act (AIRFA) of 1978 states "...henceforth it shall be the policy of the United States to protect and preserve for American Indians their inherent right and freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites [42 United States Code (U.S.C.) 1996]." Agencies are required to review their policies and procedures in consultation with traditional native religious leaders.

Executive Order (EO) 13007 - Indian Sacred Sites requires agencies to accommodate access to and ceremonial use of Indian sacred sites and to avoid adversely affecting the physical integrity of said sites. According to EO 13007, a sacred site is defined as "any specific, discrete, narrowly delineated location on federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." Sacred sites may consist of a variety of places and landscapes.

The DOI Departmental Manual 512 DM 2 (DOI 1995) requires that all bureaus within DOI develop policies and procedures to identify, conserve, and protect Indian Trust Assets, trust resources, and tribal health and safety. Indian Trust Assets are legal interests in assets held in trust by the United States for Indian Tribes or individuals and can include: minerals, hunting and fishing rights, and water rights.

3.13.1 Introduction

The Shoshone-Bannock Tribes state that the ancestors of the Shoshone and Bannock peoples have an extensive history in southeastern Idaho and the Project Area. Their ancestors used present-day southeast Idaho for subsistence hunting, fishing, gathering, medicinal and ceremonial purposes, warfare, transportation, and social purposes.

The Fort Hall Reservation was created by Executive Order on June 14, 1867 and was established as a permanent homeland to Shoshone and Bannock peoples pursuant to the Fort Bridger Treaty of July 3, 1868. The original reservation was approximately 2 million acres, but by subsequent cessation agreements, the United States obtained land for non-Indian settlers, and the federal government. An 1888 Executive Order ceded the Marsh Valley area for settlement, resulting in the loss of approximately 240,000 acres of Reservation lands. A June 6, 1900 Agreement with the Tribes ceded surplus lands resulting in the establishment of the City of Pocatello when approximately 419,000 acres of treaty-reserved lands were opened for settlement. The current Fort Hall Indian Reservation is approximately 544,000 acres, which does not include recently acquired lands adjacent to the Reservation. Some of the CTNF is in those ceded lands.

The 1868 Fort Bridger Treaty reserved off-reservation treaty rights on all unoccupied federal lands. These rights include hunting, fishing, gathering, and other practices such as trade.

The CTNF is also part of the ancestral homeland of the Northwest Band of the Shoshoni. Their core homeland included northern and western Utah and the southeast corner of Idaho. In their 1863 Treaty, they assented to the Fort Bridger Treaty (Treaty with the Shoshoni-Northwestern Bands, July 30, 1863). As stated in the 1863 Treaty signed at Box Elder, the Northwest Band of the Shoshoni "assent to all of the provisions of said treaty, and the same are hereby adopted as a part of this agreement, and the same shall be binding upon the parties hereto." Thus, tribal members of the Northwest Band of Shoshoni also have reserved rights to hunt, fish, and gather on all unoccupied federal lands of the United States.

Prior to white settlement of the west, the Shoshone and Bannock peoples were comprised of many smaller nomadic bands inhabiting a vast area of the west. Their aboriginal territory includes six states and ranged north into Canada and south to Mexico. The bands were generally extended family groups who moved across the western landscape hunting, fishing, and gathering with the changing seasons. The Fort Hall area was a traditional wintering area for many of the bands. In addition to gathering camas bulbs, many bands met on the Camas Prairie for trade events each spring. The CTNF was an integral part of the Shoshone-Bannock Tribes ancestral lands.

Few “traditional use sites” have been documented through consultation with the Tribes. This is due mostly to privacy issues. For this analysis, it is assumed that the NFS lands were, and are, used for traditional practices such as hunting, fishing, and gathering. It is also assumed that Tribal members utilize the CTNF for traditional activities such as ceremonies and religious practices. To protect the privacy of the Tribes, these activities will be discussed and analyzed in general terms. The following information is from “Shoshone-Bannock Tribes” published by the Shoshone-Bannock Tribal Cultural Committee and Tribal Elders.

> *Spirituality and religious ceremonies have always played a significant role in Indian cultures. Natural resources played an integral part of these ceremonies. Items such as sweet sage and tobacco made from a variety of plants were and are used in ceremonies. The Indians gathered many plants for medicinal purposes, including chokecherry, sagebrush, and peppermint. A myriad of other plants were gathered for food and to provide shelter. Rocks and clays were also used for ceremonies, ornamentation and shelter. Some bands inhabiting the upper Snake region were known as the “sheepeaters” since bighorn sheep were a staple of their diet. Buffalo, elk, deer and moose were also hunted and used by the aboriginal people. The Shoshone and Bannock bands also relied on upland game birds and small mammals. Salmon fishing was an integral part of aboriginal culture. Geysers, thermal pools and other water features were also utilized heavily by the Shoshone-Bannock Tribes.*

These activities are still practiced today across the CTNF and southeastern Idaho although the extent of those activities is unknown. Many Tribal members hunt, fish, and gather for subsistence and to maintain their traditional way of life.

3.13.2 Indian Treaty Rights

The federal government has federal trust responsibilities to Native American Tribes (DOI 1995). As discussed previously, the 1868 Fort Bridger Treaty, between the United States and the Shoshone and Bannock Tribes, reserves the Tribes’ right to continue traditional activities on all unoccupied federal lands. The Tribes’ advocate the preservation of harvest opportunity on culturally significant resources necessary to fulfill inherent, traditional, and contemporary Treaty Rights (Shoshone-Bannock 1994). The Project Area is within the portion of southeast Idaho that is of historical usage for hunting and gathering (Shoshone-Bannock 2003) and continues to retain cultural values.

Article 4 of the 1868 Treaty states, “The Indians herein named…shall have the right to hunt on the unoccupied land of the United States so long as game may be found thereon…” While the Treaty itself only specifies hunting, the court case “State of Idaho v. Tinno” established that any rights not specifically given up in the Treaty were, in fact, reserved by the Tribes. Further, in the Shoshone language, the same verb is used for hunt, fish, and gather so it is assumed that the Tribes’ expect to retain rights for all of those practices (from a presentation at the Shoshone-Bannock Tribes, 1868 Fort Bridger Treaty Rights Seminar: April 12-13, 2004).

The Tribes’ Fish and Game Department regulates and enforces the 1975 Tribal Fish and Game Code, for all off-reservation hunting and fishing activities. The federal agencies recognize that the Tribes’ regulate their own Tribal members for hunting and do not require Tribal members to secure state hunting permits to hunt within BLM or USFS lands.

Tribal grazing rights outside the Fort Hall Reservation only exist in areas ceded to the federal government. As stated in Article IV of the Agreement of February 5, 1898 (31Stat. 674, 15 Stat. 673), between the United States and the Shoshone-Bannock Tribes, ratified by the Act of June 6, 1900: "So long as any of the lands ceded, granted and relinquished under this treaty remain part of the public domain, Indians belonging to the previously mentioned Shoshone-Bannock tribes, and living on the reduced Fort Hall reservation, shall have the right, without any charge therefore, to cut timber for their own use, but not for sale and to pasture their livestock on said public lands, and to hunt thereon and to fish in the streams thereof." None of these ceded areas are within the Project Area; therefore, Tribal grazing rights are not affected by the Project. In 2002, an MOU was signed by BLM and the Fort Hall Business Council regarding the recognition of Tribal grazing rights on public land within the ceded land boundary established by the previously stated Agreement of February 5, 1898 (31Stat. 674, 15 Stat. 673), between the United States and the Shoshone-Bannock Tribes, ratified by the Act of June 6, 1900.

In regard to federal trust responsibilities, known items of interest to the Tribes are as follows.

<u>Tribal Historical/Archaeological Sites</u>
Project-specific cultural resource inventories have been conducted in the Project Area. This information is in **Section 3.12** (Cultural Resources). No prehistoric archaeological sites were located within Project Area boundaries during the inventories.

<u>Rock Art</u>
No resources of this nature have been identified in the Project Area.

<u>Sacred Sites (EO 13007)/TCP (NHPA)</u>
EO 13007 directs federal land-managing agencies to accommodate Native Americans' use of sacred sites for religious purposes and to avoid adversely affecting the physical integrity of sacred sites. Federal agencies managing lands must implement procedures to ensure reasonable notice where an agency's action may restrict ceremonial use of a sacred site or adversely affect its physical integrity. No sacred sites have been specifically identified in the Project Area.

A TCP, as defined in the NHPA, is defined as a property that is eligible for inclusion on the NRHP "because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and are important in maintaining the continuing cultural identity of the community" (Parker and King 1994). Stated another way, a significant TCP is defined as a property with "significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices" (Parker and King 1994). No TCPs have been nominated or designated in the Project Area.

<u>Traditional Use Sites</u>
Traditional use sites are those historically used by tribes for traditional land uses including fishing, hunting, gathering, ceremonies, and religious practices. Few traditional use sites have been documented through consultation with the Tribes as Tribal information regarding these sites is closely guarded. The Tribes have not disclosed specific details of traditional use in the Project Area; however, they have asserted that the area is significant, traditionally used, and retains cultural values.

<u>Water Quality</u>
The Project Area includes lands in the Tygee Creek and Sage Creek watersheds. A detailed discussion of water resources is located in **Section 3.5** of this EIS.

Wetlands
One wetland was identified in the Project Area, as noted in **Section 3.7.4**.

Fisheries
Fisheries and Aquatics resources are addressed in detail in **Section 3.9**. Roberts Creek, North Fork Sage Creek, and Pole Canyon Creek are small streams lacking sufficient flow and habitat to support fish populations. Spring Creek, Webster Creek, Draney Creek, Smoky Creek, Tygee Creek, Sage Creek, South Fork Sage Creek, and Crow Creek support fish populations, including populations of non-native brook trout and brown trout, as well as populations of native Yellowstone cutthroat trout. In Spring Creek, lower Sage Creek, and Crow Creek non-native brown trout are the most abundant game species. In Webster Creek, non-native brook trout are the most abundant. In all the other streams, Yellowstone cutthroat trout are the most abundant game species, although sculpins and other fish species are more numerous.

Studies of habitat conditions and macroinvertebrate populations indicate relatively poor environmental conditions in Draney Creek, Smoky Creek, and Tygee Creek. Habitat conditions and fish populations are healthier in Spring Creek, Webster Creek, Sage Creek, South Fork Sage Creek, and Crow Creek. Lower Sage Creek and Crow Creek support the most diverse fish communities and largest populations of game fish species. Concentrations of selenium in fish tissue from reaches of Sage Creek downstream of Hoopes Spring have been greater than the EPA whole body tissue threshold for brown trout. Selenium concentrations in fish from Crow Creek downstream of Sage Creek have also been shown to be elevated above the EPA threshold, although not as consistently as fish from lower Sage Creek.

The Tribes have not designated any specific traditional fishing areas on the CTNF, but the entire CTNF is used for exercising fishing rights.

Vegetation
Specific information regarding vegetation in the Project Area can be found in **Section 3.7**. Access to traditional plant resources is protected under the Fort Bridger Treaty of 1868. As discussed in **Section 3.7.7**, the Culturally Significant Plants Database for the Shoshone – Bannock Tribes (EWMP 2014) was reviewed and an informal inventory was conducted while other vegetation data were being collected. Thirty-five out of the 238 species listed in the database were observed within the Study Area while conducting detailed forest and vegetation data collection.

The Tribes use specific-sized lodgepole pine trees for tipi poles. Baseline studies indicate that approximately 50 percent of the vegetation in the Vegetation Study Area (the Project Area with a 0.25-mile buffer) is composed of the aspen/conifer, Douglas-fir, dry aspen/conifer, dry conifer mix, lodgepole pine, or mixed conifer communities, each of which includes lodgepole pine as a possible component.

Noxious Weeds and Invasive Species
There is Tribal concern about non-native vegetation replacing native vegetation. See **Section 3.7.8** for discussion on noxious weeds and invasive species within the Project Area.

Wildlife
Detailed information regarding the wildlife in the Project Area can be found in **Section 3.8**. Big game wildlife important for Tribal hunting includes elk, deer, antelope, and moose. Small game important for Tribal hunting includes sharp-tailed grouse, sage grouse, rabbits, rockchucks

(marmots), squirrels, and partridges. Eagles, wolves, and grizzly bears are also of concern to the Tribes.

Grizzly bear, antelope, and partridge are likely absent from the Project Area. No bald eagle nests occur within 2.5 miles of the Study Area. No greater sage-grouse and sharp-tailed grouse are known to occur within the Study Area.

There is suitable habitat for the gray wolf, but wolves are known only as transient visitors. Mule deer, elk, and moose roam through most of the Study Area year-round. Numerous calves are produced in the aspen patches along the edges of Sage Valley.

<u>Land Access/Transportation</u>
Currently motorized access to the Project Area is via the Smoky Canyon/Timber Creek Road (Forest Road 110).

In addition, there are 4-wheel drive/OHV roads and trails through the Project Area. The area can also be accessed by horse and foot with few areas of restriction, although active mining areas occur immediately adjacent to the Project Area that are restricted. Additional information regarding access into the Project Area can be found in **Section 3.10.2** (Transportation).

<u>Treaty Rights Access</u>
The Tribes are concerned with retaining access on unoccupied federal lands in order to exercise Tribal Treaty Rights. The Tribes assert their responsibility to preserve their Treaty Rights for future use of lands to ensure future opportunity, and therefore it is Tribal policy to “promote the conservation, protection, restoration, and enhancement of natural resources”.

According to the Tribes, “access” to exercise Treaty Rights goes beyond the concept of simple entry into the Project Area by vehicle or foot. “Access” also includes continued availability of the traditional natural resources in an area. Therefore, the Tribal interpretation of loss of access extends to the exclusion, limitation, or unavailability of the traditional resources due to mining disturbance and road construction. It would also presumably apply to the displacement of wildlife in those areas.

<u>Recreation</u>
Most recreation in the Project Area is dispersed (no improvements). There are no developed campgrounds. The dominant type of dispersed recreation is hunting for elk, moose, and deer. Fishing occurs on Crow, Deer, and Diamond Creeks, outside the Project Area to the west and south.

As discussed previously, Tribal hunting and gathering rights, reserved by the 1868 Treaty, need no state regulations or permits to be exercised by Tribal members. The Tribes’ Fish & Game Department regulates and enforces the 1975 Tribal Fish & Game Code for all off-reservation hunting and fishing activities. Federal agencies recognize that the Tribes regulate their own Tribal members for hunting, and do not require Tribal members to secure State hunting or fishing permits within BLM or USFS lands.

<u>Land Status</u>
Much of the Project Area is on NFS land administered by the CTNF and is mostly unoccupied federal lands, although Simplot holds existing federal mineral leases and operates an existing mine; most lands are available for Treaty Rights use as stated in the Fort Bridger Treaty of 1868. These rights include hunting, fishing, gathering, and other practices such as trade. Regarding transfer of federal lands, the Shoshone-Bannock Tribes have stated (Shoshone-Bannock 2005):

"*…The transfer or purchase of federal lands, and the extension of leases for mining on federal lands by private businesses enable them to control access and use, which jeopardize access to certain Shoshone-Bannock traditional fishing, hunting and gathering areas, and grazing and timber use…*"

and:

"*…The Shoshone-Bannock Tribes oppose any land transfers that impacts our treaty rights of hunting, fishing and gathering on federal lands. We certainly welcome the opportunity to work with any federal agency is transferring any federal lands to the Shoshone-Bannock Tribes to insure the Tribes' treating rights are secured for future generations…*"

Air Quality

Specific data regarding air resources is located in **Section 3.3**. All lands within the Study Area have been designated Class II for NAAQS. The air quality in the vicinity of the Smoky Canyon Mine is good to excellent because of the site's remote location, and relatively limited industrial activity in the area. Air quality in the Study Area is designated as in attainment or unclassifiable for all NAAQS and Idaho Ambient Air Quality Standards.

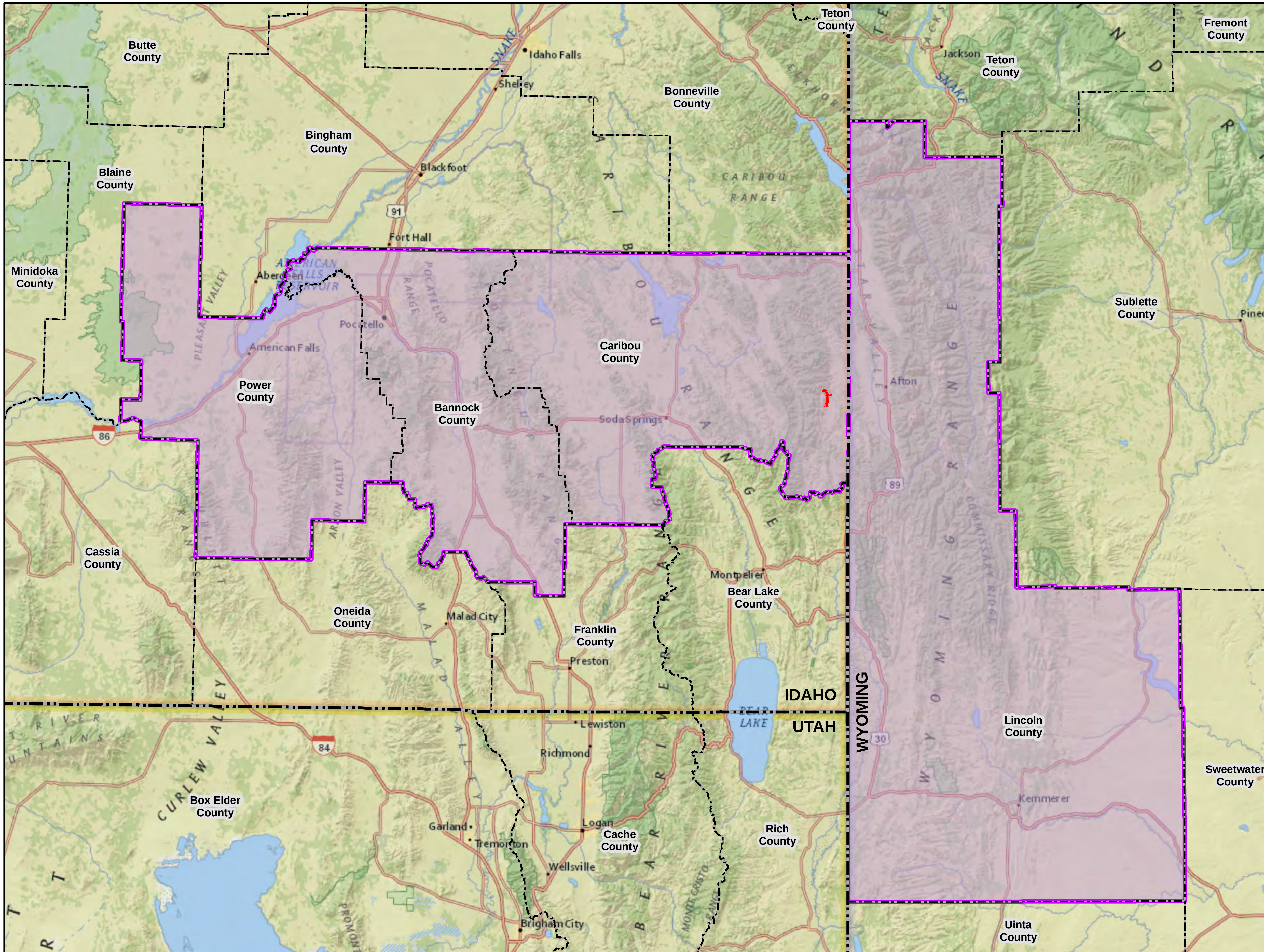
Socioeconomics and Environmental Justice

See **Sections 3.14** and **3.15**, respectively, for baseline information regarding socioeconomics and environmental justice (EO 12898).

EO12898 directs agencies to consider patterns of subsistence hunting and fishing when an agency action may affect fish or wildlife. The affected environment for wildlife and fish can be found in **Sections 3.8** and **3.9**, respectively.

3.14 SOCIAL AND ECONOMIC RESOURCES

The social and economic factors associated with the Project and the Smoky Canyon Mine were studied for the four-county area of Bannock, Caribou, and Power counties, Idaho; and Lincoln County, Wyoming (**Figure 3.14-1**). This Study Area boundary was developed with the IDT experts and professional judgement. Baseline conditions for economic history, land ownership (including the reservation component), population, demographics, employment, wages and income, housing, government finance and services, agriculture and mining were gathered. The primary data sources used in evaluating social and economic resources related to the Project and anticipated impacts were various sources of economic data collected and published by government agencies, as described in the Socioeconomics and Environmental Justice Baseline TR (Stantec 2016i). The U.S. Department of Commerce was the largest data source utilized, including the U.S. Census Bureau 2010 Decennial Census. Forests, watersheds, water supplies, fish and wildlife populations each have resource values that can also be translated into economic value. However, their economic value is difficult to quantify but not thought to be significant. As such, these are not the focus of this section because they are expected to be relatively minor in comparison to the economic metrics that are covered here and analyzed in **Section 4.14**.



Legend

- Project Area Boundary
- Socioeconomics and Environmental Justice Study Area
- State Boundary
- County Boundary

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E Caribou County, Idaho

0 5 10 15 20 Miles

1:950,400 (at original document size of 11x17)

N

Figure 3.14-1
Socioeconomics and Environmental Justice Study Area
East Smoky Panel Mine EIS

In general, residents of Caribou County, Idaho and Star Valley, Wyoming are known to travel to Pocatello, Idaho, Evanston, Wyoming, and Salt Lake City, Utah, for goods and services that are not available locally. Over the past several decades, the western portion of Wyoming has seen an influx of affluent residents, property owners, and tourists centered around Jackson, Wyoming, as has the entire Greater Yellowstone area. Many of these affluent property owners are part-time residents of western Wyoming and maintain permanent residences elsewhere. Simultaneously, the area's economy has become more dependent upon investment income (dividends, interest, and rent) and government transfer payments and less dependent upon mining and manufacturing. Natural resources are important components of the residents' lifestyle, recreational activities, and the economy of the four counties.

3.14.1 Land Ownership and Population

3.14.1.1 Land Ownership

The four counties are contiguous, with Power County, Idaho being the farthest west and Lincoln County, Wyoming being the farthest east. The location of the four counties in relationship to surrounding areas in Idaho, Utah, and Wyoming is shown on **Figure 3.14-1**. Bannock and Power counties, Idaho, comprise the Pocatello, Idaho Metropolitan Area as defined by the U.S. Office of Management and Budget. The other two subject counties are not part of any metropolitan statistical area. Government is a significant landowner in each of the four counties (**Table 3.14-1**). Bannock County has the highest percentage of privately owned land of the four counties. Lincoln County is the largest of the three counties and is over three times as large as Bannock County, the smallest of the four.

Table 3.14-1 Land Ownership in the Study Area

DESCRIPTION	BANNOCK COUNTY	CARIBOU COUNTY	POWER COUNTY	LINCOLN COUNTY
Acres	734,178	1,151,231	922,793	2,623,356
Federal	26.5%	39.4%	30.5%	73.1%
Fort Hall Indian Reservation	6.8%	0.9%	8.6%	0.0%
State	6.5%	9.3%	2.9%	4.1%
City and County (Other)	9.0%	5.2%	9.5%	0.4%
Private	51.2%	45.2%	48.4%	22.3%

Source: cloud.insideidaho.org 2016

The Fort Hall Indian Reservation overlaps lands that are within Bannock, Caribou, and Power counties (as well as Bingham County outside of the Study Area). The Shoshone-Bannock Tribes govern the Reservation, with most government offices and tribal businesses located in Fort Hall (Shoshone-Bannock Tribes 2016). Fort Hall is in Bingham County, outside of the Study Area.

Further, the federal government has federal trust responsibilities to Native American Tribes (DOI 1995) and the 1868 Fort Bridger Treaty reserves the Shoshone and Bannock Tribes' right to continue traditional activities on all unoccupied federal lands. While the Treaty itself only specifies hunting, the lawsuit "State of Idaho v. Tinno" established that any rights not specifically given up in the Treaty were, in fact, reserved by the Tribes. Further, in the Shoshone language, the same verb is used for hunting, fishing, and gathering, so it is assumed that the Tribes' expect to retain rights for all of those practices (from a presentation by the Shoshone-Bannock Tribes, 1868 Fort Bridger Treaty Rights Seminar: April 12-13, 2004). The Tribes' Fish and Game Department regulates and enforces the 1975 Tribal Fish and Game Code for all off-reservation hunting and fishing activities. The federal agencies recognize that the Tribes regulate their own tribal members for hunting and do not require Tribal members to secure state hunting permits to hunt on lands managed by the BLM or USFS. Tribal grazing rights outside the Fort Hall Reservation only exist in areas ceded to the federal government, none of which occur in the Project Area. In regard to federal trust responsibilities, other known items of interest to the Tribes include tribal historical and archaeological sites, rock art, sacred sites, traditional cultural properties, traditional use sites, treaty rights access, and physical and biological resources (e.g., water quality, wetlands, fisheries, vegetation, wildlife). All of these subjects are addressed in this EIS.

3.14.1.2 Population and Demographics

The population of Bannock County, Idaho is concentrated in the City of Pocatello, which had a 2014 population of 54,292, or 65.5 percent of the Bannock County, Idaho population. Soda Springs is the largest city in Caribou County, Idaho, with a 2014 population of 2,980, which was 43.9 percent of the Caribou County, Idaho population (U.S. Census 2016).

American Falls is the largest city in Power County, Idaho, with a population of 4,314 or 57.0 percent of the Power County, Idaho population. Lincoln County, Wyoming has two centers of population. Kemmerer, in the southern part of the county, is the county seat. Kemmerer and surrounding communities account for about 30 percent of the population. Kemmerer had a 2014 population of 2,732, while the nearby towns of Diamondville and Opal had populations of 737 and 96, respectively. The other population center in Lincoln County, Wyoming is the Star Valley in the northwest portion of the county. Afton, essentially Star Valley, had a 2014 population of 1,968. The largest population concentration in the Study Area is in the City of Pocatello in Bannock County, which is part of the Pocatello Metropolitan Area. The second largest population of 13,922 occurs in Chubbuck in Bannock County (U.S. Census 2010).

Simplot provided data on its employees (Simplot 2016b) showing that the Smoky Canyon Mine averaged 254 employees in 2015 and the associated Don Plant averaged 372 employees for the same year. Data showing where their employees resided is incomplete but likely to approximate the proportion of employees in each of the population areas. For the Smoky Canyon Mine, 193 lived in Wyoming compared to 53 living in Idaho; The Idaho contingent included workers residing in Caribou, Bingham, and Bear Lake counties (Simplot 2016a). All employees of the Don Plant lived in Idaho, the great majority in Pocatello (Simplot 2016a). Simplot also employed 121 workers in its Agribusiness Administration division and 253 in its Simplot Grower Solutions retail division in 2015 (Simplot 2016b).

3.14.1.3 Housing

Although the majority of the Project's employees live in Lincoln County, the remaining Study Area counties may also be affected. According to the 2010 Census, a greater number of housing units in the Study Area occur in Bannock County, as would be expected, given the proportionately large population. Bannock County also has the highest number of vacant units (2,509). Approximately 16.8 percent of Caribou County's housing units, owned or rental, are vacant, while

Lincoln County has the highest rental vacancy rate (17.8 percent). This information is presented in the Socioeconomics and Environmental Justice Baseline TR (Stantec 2016i).

3.14.2 Local Government Finances and Services

Local government finances for the Study Area counties are presented in the Socioeconomics and Environmental Justice Baseline TR (Stantec 2016i). These data include all local governments, including county governments, municipalities, school districts, and special districts within the counties. Lincoln County had the second highest general revenue, highest per capita taxes and spent the largest percentage of its budget on education. Bannock County had the highest general revenue and spent the highest percentage on health care. Caribou County had the second lowest general revenue, lowest per capita taxes, spent the highest percentage for police protection among the four counties, and had the lowest debt (per capita and total). All of the counties spent their third highest percentage of budget on highways. Lincoln County had the highest outstanding debt per capita, followed by Power County.

3.14.2.1 Current Fiscal Condition

The Socioeconomics and Environmental Justice Baseline TR (Stantec 2016i) presents the actual budget revenues and expenditures for 2012 and 2013 for the Study Area counties. Public finances in all counties included locally derived revenues, with the largest share derived from property and other taxes. Other taxes may have included sales tax, motor vehicle taxes, and general service taxes. The three categories of Taxes, Charges for Services, and Intergovernmental Revenues accounted for over 90 percent of all revenue in Bannock, Caribou, and Lincoln counties, and over 80 percent in Power County for 2012 and 2013. Intergovernmental Resources dropped by approximately five percent in Bannock County, and approximately 31 percent in Lincoln County between 2012 and 2013, while increasing by five percent in Caribou County, and 21 percent in Power County between 2012 and 2013.

Bannock, Power, and Lincoln counties did not experience an overall increase in revenues between 2012 and 2013. Note that Wyoming does not have personal or corporate income tax.

Spending in Caribou County for 2012 and 2013, and Lincoln County for 2012, was roughly parallel (in percentage terms) across measurable categories of General Government, Public Safety, and Public Works/Roads, comprising between 70 and 79 percent of their total expenditures during both 2012 and 2013. Spending across these three same categories was between 61 and 65 percent in Bannock County, and 88 percent in Lincoln County in 2013. General Government was the highest expenditure in Bannock and Power Counties in both 2012 and 2013, and Lincoln County in 2012, while the highest expenditure category was Public Works/Roads in Caribou County in 2012 and 2013, and Lincoln County in 2013.

3.14.2.2 Community Services

Schools

The Study Area is served by four school districts. **Table 3.14-2** outlines the school districts in the Study Area and enrollment statistics for the 2014-2015 school year.

Table 3.14-2 School Enrollment in the Study Area

SCHOOL DISTRICT	2014-2015 SCHOOL DISTRICT ENROLLMENT
Bannock County	
Marsh Valley Joint School District #21	1,271
Pocatello/Chubbuck School District #25	12,504
Caribou County	
Grace Joint School District #148	463
North Gem School District #149	197
Soda Springs Joint School District #150	815
Power County	
American Falls Joint High School District #381	1,450
Arbon Elementary School District #383	20
Rockland School District #382	184
Lincoln County	
Lincoln County School District #1	634
Lincoln County School District #2	2,681

Sources: ISDE 2015; WDE 2015

Law Enforcement

The Bannock County Sheriff's Department (BCSD) provides law enforcement to the unincorporated areas of Bannock County, and four contracted municipalities. The patrol area encompasses 1,142 square miles. The BCSD includes the patrol, detention, detective, court services, training, civil, and support services divisions. As of 2012 there were 19 patrol deputies in the department. A modern jail facility was constructed in 1994 and can house 253 inmates (Enviroscientists Inc. 2015). The Pocatello and Chubbuck police departments provide law enforcement services to the two incorporated cities. The Pocatello Police Department (PPD) employs 90 sworn officers. The PPD includes patrol/traffic, investigations, and support services divisions. The PPD staffing ratio is currently 1.6 officers per 1,000 persons in the population (Enviroscientists Inc. 2015). The Chubbuck Police Department (CPD) provides law enforcement services to the City of Chubbuck and includes the following divisions: patrol; criminal investigations; animal control; code enforcement; records; and evidence (Enviroscientists Inc. 2015).

The Caribou County Sheriff's Office (CCSO) provides law enforcement services to the unincorporated areas of Caribou County, as well as to the cities of Bancroft and Grace. The CCSO employs eight sworn officers and includes patrol and criminal investigation; civil and driver's license; communications and dispatch; and detention divisions (Enviroscientists Inc. 2015). The Soda Springs Police (SSPD) provides law enforcement services to the City of Soda Springs and employs a staff of seven full-time sworn personnel and two non-sworn personnel (Enviroscientists Inc. 2015).

Law enforcement services in the unincorporated portions of Power County and the community of Rockland are provided by the Power County Sheriff's Office (PCSO). The PCSO provides patrol, crime, dispatch, and administrative services. The PCSO also issues driver's licenses and coordinates with local and state police. The American Falls Police Department provides law enforcement services within the City of American Falls.

Portions of the Study Area are located within the District 5 patrol area of the Idaho State Police (ISP), which covers approximately 4,677 road miles. The ISP enforces traffic laws, investigates traffic collisions, assists motorists, and conducts criminal interdiction along Idaho's interstate, state, and secondary highways. The ISP force also provides assistance to local sheriff's offices and police departments in performing other law enforcement duties, as required (Enviroscientists Inc. 2015).

The Lincoln County Sheriff's Office (LCSO) provides law enforcement services to the unincorporated areas of Lincoln County with branch offices in Kemmerer and Afton. The LCSO includes two main divisions: support, which includes detention, civil processing, and administration; and operations, which includes patrol, investigations, and dispatch. The LCSO employs approximately 17 sworn patrol officers (Enviroscientists Inc. 2015). Law enforcement services within incorporated cities in Lincoln County are provided by the Kemmerer Police Department, the Diamondville Police Department, the Afton Police Department, the Cokeville Police Department, the Alpine Police Department, the LaBarge Police Department, and the Thayne Police Department.

Portions of the Study Area are located within District 3 of the Wyoming Highway Patrol (WHP). The WHP includes two main divisions: field operations and support services. The field operations primarily include the patrol of approximately 6,800 miles of highways, traffic enforcement, crash investigation, criminal interdiction, drug interdiction, and commercial vehicle enforcement (Enviroscientists Inc. 2015).

Fire Protection

Fire protection services in the Study Area are provided by several local, state, and federal agencies. Fire protection services in the unincorporated areas of Bannock County are provided by the following: the Inkom Fire District; the Lava Fire District; the McCammon Fire District; the Pocatello Valley Fire Department; and the Downey Fire Department. The City of Pocatello Fire Department and the City of Chubbuck Fire Department provide fire protection services within the two cities. Wildland fire protection services are provided by federal and state agencies such as the USFS, BLM, and IDL (Bannock County 2011).

As the primary landowners in Caribou County are federal and state agencies, fire protection in Caribou County is primarily provided by the USFS, BLM, and IDL. The remainder of Caribou County is protected by four volunteer fire departments (VFDs): the Caribou County VFD is staffed by 18 volunteers; the Grace VFD is staffed by 13 volunteers; the Bancroft VFD is staffed by 12 volunteers; and the City of Soda Springs VFD is staffed by 17 volunteers (W.H. West & Associates 2004).

The American Falls VFD and Rockland VFD provide fire protection services in Power County. The American Falls VFD consists of one fire station with 19 paid per call firefighters. The Rockland VFD consists of one fire station with 16 volunteer firefighters. Wildland fire protection services in the County are provided by the USFS, BLM, and IDL (Power County 2010).

Fire protection services in Lincoln County are primarily provided by seven volunteer fire districts: Bear River Fire District; Upper Valley Fire District; Thayne Fire Department; Alpine Fire Department; La Barge Fire Department; Kemmerer Fire Department; and the South Lincoln County Fire District. Other agencies such as the USFS and the BLM assist with firefighting efforts on federal and state lands (WDFPES 2013).

Health Care

Bannock, Caribou, and Power counties are part of District 6 of the Southeastern Idaho Public Health District (SIPHD). The SIPHD provides non-critical community health services within the SIPHD area. SIPHD clinics are located in Pocatello, Soda Springs, and American Falls within the Study Area. The SIPHD has partnered with Health West, Inc. to provide non-critical community health services in Aberdeen, American Falls, Chubbuck, Downey, Lava Hot Springs, McCammon, and Pocatello. Medical services are also provided at the Portneuf Medical Center in Pocatello, Bannock Memorial Hospital in Pocatello, Caribou Memorial Hospital in Soda Springs, and the Power County Hospital District in American Falls. (EnviroScientists Inc. 2015)

Public health services in Lincoln County are provided by the Lincoln County Public Health Department (LCPHD). The Public Health Nursing Program, an organization within the Community and Rural Health Division of the Wyoming Health Department, provides non-critical health services and testing at clinics located in Kemmerer and Afton (Enviroscientists 2015). Medical services are also provided at the Star Valley Medical Center in Afton and the South Lincoln Medical Center in Kemmerer.

Electricity and Natural Gas Service

Electrical service in Bannock, Caribou, and Power counties is provided by Rocky Mountain Power, Utah Power, and Idaho Power Company. Soda Springs Municipal Light and Power and Lower Valley Energy also provide electrical service to areas in Caribou County. Natural gas service in Bannock, Caribou, and Power counties is provided by Intermountain Gas Company. Electrical service in Lincoln County is provided by Rocky Mountain Power and Lower Valley Energy. Natural gas service in Lincoln County is provided by Questar Gas Company.

Water Service

The majority of potable water in the unincorporated portions of the Study Area is provided by private wells. There are public water systems in the following incorporated cities in the Study Area: Chubbuck and Pocatello in Bannock County; Soda Springs, Grace, and Bancroft in Caribou County; American Falls and Rockland in Power County; and Kemmerer in Lincoln County. Smaller community public water systems also occur throughout the Study Area.

Wastewater Service

A majority of the wastewater service in the unincorporated portions of the Study Area is provided by individual septic systems. Some of the larger communities and incorporated cities have public sewer systems.

Landfill

There are multiple landfill locations in the Study Area where residents may bring refuse for disposal or recycling. The Bannock County Landfill and McCammon Transfer Station provide solid waste and recycling facilities for residents and businesses in Bannock County. Landfills are located in the City of Grace in Caribou County and the City of American Falls in Power County. Solid waste and recycling facilities in Lincoln County can be found at the Kemmerer Landfill, the Cokeville Landfill, and the Thayne Landfill.

3.14.3 Employment

As described in the Socioeconomics and Environmental Justice Baseline TR (Stantec 2016i), the unemployment rate in all four counties increased between 2008 and 2010, as mirrored by the economic downturn in the U.S. starting in 2008. Between 2008 and 2010, the unemployment rates in Bannock and Power counties approximately doubled, and nearly tripled in Lincoln County. The unemployment rates decreased in 2012 and decreased even further in 2014 when it ranged from a low of 4.0 percent in Caribou County to a high of 5.4 percent in Lincoln County (Stantec 2016i).

Employment by industrial sector, using the North American Industry Classification System (NAICS) for the Study Area (**Table 3.14-3**) shows that employment declined for all but two sectors between 2007 and 2010: transportation, warehousing, and public utilities; and healthcare and social assistance. By 2013, the only other sectors where employment exceeded 2007 levels were farming, manufacturing, and wholesale trade. Government was a major source of employment in the Study Area in 2013, representing 18.2 percent of jobs. This was followed by retail trade; healthcare and social assistance; finance, insurance and real estate; manufacturing; and accommodation and food service.

Employment at the Smoky Canyon Mine and the Don Plant has remained relatively stable in recent years. The mine employed, on average, 250 workers in 2012, 243 in 2013, 240 in 2014, and 254 in 2015 (Simplot 2016b). The Don Plant employed, on average, 355 workers in 2012, 357 in 2013, 350 in 2014, and 372 in 2015 (Simplot 2016b). These figures do not include indirect employment (impacts on regional businesses that provide goods and services directly to the mine) or induced employment (jobs created as a result of employee spending in the region), which are estimated to create an additional 2.69 jobs in the region for every direct mine employee and 1.87 for every Don Plant employee (BEA 2017). In other words, in addition to the approximately 626 workers employed at the Smoky Canyon Mine and the Don Plant in 2015, an additional 1,379 jobs in the region can be attributed to the Smoky Canyon Mine Project (Peterson 2013).

Table 3.14-3 Employment by Industrial Sector NAICS Basis in the Study Area from 2001 – 2013

DESCRIPTION	2001	2004	2007	2010	2013
Total Employment	60,855	63,501	68,893	62,585	63,705
Farm Employment	3,132	2,960	2,827	2,813	2,886
Nonfarm Employment	57,723	60,541	66,066	59,772	60,819
Forestry, Fishing, and Related Activities	102[B,C,P]	116[B,C,P]	367[C]	312[B,C]	81[B,C,P]
Mining	782[B]	678[B,C]	1,248	1,212[B]	899[B,C]
Construction	4,685	4,570[C]	5,839[C]	3,973[C]	3,792
Manufacturing	5,587	3,912[C]	3,988[C]	3,517[C]	4,209
Transportation, Warehousing, and Public Utilities	640[B,P,L]	661[B,P,L]	2,263[P,L]	2,424[P]	2,453
Wholesale Trade	1,362[P, L]	1,378[P, L]	1,473[P,L]	1,345[P]	1,560
Retail Trade	7,448	7,637	8,173	6,879	7,080
Information	882[C,P]	1,010[P]	1,171	704[P]	673[P]
Finance, Insurance, and Real Estate	3,709	4,275	5,277	5,022[P]	5,238
Accommodation & Food Service	4,153	4,180	4,371	4,069[P]	4,008
Health Care & Social Assistance	4,013[L]	4,032[P,L]	4,600[C,P]	6,416[C]	6,896[P]
Other Services Except Public Administration	2,627	2,961	3,096	3,018	3,053
Professional, Scientific, and Technical	2,275[P]	2,310[P]	2,734	1,966[L]	234[B,L]
Administrative & Waste Management	3,038[L]	3,892[L]	4,235[C,L]	2,772[C,P]	3,052[C,P]
Government and Government Enterprises	12,194	12,977	12,916	11,790	11,637

Source: Bureau of Economic Analysis (BEA 2015)

Notes:

B – data for Bannock County not included to avoid disclosure of confidential information

C – data for Caribou County not included to avoid disclosure of confidential information

P – data for Power County not included to avoid disclosure of confidential information

L – data for Lincoln County not included to avoid disclosure of confidential information

On a county-by-county level (**Table 3.14-4**), government was the top employer in Bannock and Lincoln counties in 2013 (18.8 percent and 19.2 percent, respectively). For Caribou and Power counties, the largest employers were in the manufacturing industry, with approximately 16 percent of Caribou County's total employment, and approximately 25 percent of Power County's total employment. In addition to government, the construction, retail trade, and mining industries were important to Lincoln County, making up approximately 29 percent of the total 2013 employment. Mining alone made up approximately nine percent of Lincoln County's total employment.

In addition to government, other industrial sectors accounting for significant portions of employment in Bannock County are retail trade (12.4 percent), health care (13.8 percent), and accommodation and foodservices (7.2 percent).

Important industrial sectors in Caribou County are manufacturing, farm employment, and construction. Mining, the sector that includes the phosphate mines, accounted for 7.3 percent of Caribou County employment in 2010 (data not available for 2013). The phosphate processing plants are included under the manufacturing sector, which in 2013 accounted for 15.8 percent of employment in Caribou County, while construction accounted for 9.0 percent of employment.

The largest industrial sector in Power County in terms of employment is manufacturing, which was responsible for 25.0 percent of employment in 2013. Of the four counties, Power County is also the most dependent upon farm employment, accounting for 18.2 percent of total employment.

Industrial sectors accounting for significant portions of employment in Lincoln County are construction (10.9 percent) and retail trade (9.5 percent). Although a large majority of the employees at the Smoky Canyon Mine live in Lincoln County, their employment is reported under Caribou County, since that is where the actual employment occurs.

Table 3.14-4 Employment by NAICS Industrial Sector (2013) in the Study Area

INDUSTRY	BANNOCK COUNTY	CARIBOU COUNTY	POWER COUNTY	LINCOLN COUNTY
Farm Employment	915	554	812	605
Forestry, Fishing, and Related Activities	D	D	D	81
Mining	D	D	48	851
Utilities	128	31	10	202
Construction	2,201	439	102	1,050
Manufacturing	2,095	770	1,115	229
Wholesale Trade	1,125	137	193	105
Retail Trade	5,533	383	252	912
Transportation and Warehousing	1,420	99	267	296
Information	501	50	D	122
Finance and Insurance	2,586	103	D	320
Real Estate and Rental and Leasing	1,494	213	D	522
Professional, Scientific, and Technical Services	D	174	60	D
Management of Companies and Enterprises	D	D	D	D
Administrative and Waste Management Services	2,764	D	D	288
Educational Services	546	53	D	61
Health Care and Social Assistance	6,188	175	D	533
Arts, Entertainment, and Recreation	923	53	D	145
Accommodation and Food Services	3,229	164	63	552
Other Services, Except Public Administration	2,203	195	159	496
Government and Government Enterprises	8,419	683	685	1,850
Total Employment	**44,739**	**4,878**	**4,465**	**9,623**

Source: BEA 2014

D = not shown to avoid disclosure of confidential information, but the estimates for these items are included in the totals.

Major private employers in Bannock County are Beacon Health Services, Belmont Care Center, Convergys Customer Management, Farmers Insurance Group, Heinz Frozen Foods, Idaho State University, Portneuf Medical Center, ON Semiconductor, Union Pacific Railroad, Varsity Contractors, and Wal-Mart. The largest industrial sector by number of employees was government (Idaho Department of Labor 2015a).

Major private employers in Caribou County, Idaho are Agrium U.S. Inc., Broulim's, Degerstrom-Dravo, J.R. Simplot Co. Smoky Canyon Mine, Kiewit, Mark III, Monsanto Company, and Mullen Crane & Transport. The largest industrial sector by number of employees was government (Idaho Department of Labor 2015b).

Major private employers in Power County, Idaho are Con Agra, County Line Farms, Driscoll Potatoes, Double L Manufacturing, Great Rift Transportation, Ken's Food Market, J. R. Simplot Company, Koompin Farms, and Lance Funk Farms. The second largest industrial sector by number of employees, after manufacturing, was government (Idaho Department of Labor 2015c).

Major employers (including government entities) in Star Valley are Lincoln County School District #2, Lincoln County Government, Lower Valley Energy, the J.R. Simplot Smoky Canyon Mine (however recorded in Caribou County), Aviat, Star Valley Cheese, Freedom Arms, and Maverick Corporation (Lincoln County 1998).

3.14.4 Wages and Income

Workers at the Smoky Canyon Mine had an average annual salary of $98,731, including benefits, in 2015, for an annual payroll of $25,077,772 (Simplot 2016b). Workers at the Don Plant had an average annual wage, including benefits, of $95,898 for a total annual payroll of $35,674,038 (Simplot 2016b). Using the Regional Input-Output Modeling System (RIMS II) economic input-output multipliers for the four-county area, additional indirect earnings would have been approximately $91,714,252 and induced earnings would have been approximately $18,840,690.

Caribou County had the highest average annual wage of the four counties and their respective states (**Table 3.14-5**) between 1980 and 2014; during this time period, the county's average annual wage increased 227 percent. The average annual wage in Bannock, Power, and Lincoln counties increased approximately 161 percent, 189 percent, and 189 percent, respectively, over the same period. Although Bannock County's average annual wage increased by 161 percent, it had the lowest average annual wages of the four counties throughout this period, although higher than the State of Idaho in 1980 and 1991 (BEA 2016a).

Lincoln County had the highest estimated median household income in 2014 at $66,530, driven primarily by the health care industry, followed by Caribou County at $54,481. Bannock County had the lowest median household income in the Study Area in 2014 at $43,953. Lincoln County had the lowest percentage of persons living below the poverty level, while Bannock and Power counties had the highest percentage of persons living below the poverty level (U.S. Census 2015a-d).

Although in 2014 there was a significant difference in the percentage of people living below the poverty level among the four counties, the percentage of people living below the poverty level for the state of Idaho was 15.6 percent, and, for the state of Wyoming, the poverty rate was 11.6 percent (American Community Survey 2016). Consequently, only Bannock County had a poverty level higher than that of its respective state, and only by half a percent. It can be concluded from previously presented information that no counties in the Study Area would be considered minority populations under CEQ guidelines for low income populations.

Table 3.14-5 Average Annual Wages, Median Household Incomes, and Poverty Levels in the Study Area

WAGES AND INCOME	IDAHO	BANNOCK COUNTY	CARIBOU COUNTY	POWER COUNTY	WYOMING	LINCOLN COUNTY
Average Annual Wage (1980)[1]	$12,174	$13,094	$15,714	$14,252	$15,335	$15,160
Average Annual Wage (1990)[1]	$18,739	$19,008	$22,817	$20,300	$20,058	$20,368
Average Annual Wage (2000)[1]	$27,557	$24,512	$31,475	$28,115	$27,138	$25,680
Average Annual Wage (2010)[1]	$35,714	$32,493	$44,239	$34,799	$42,637	$39,406
Average Annual Wage (2014)[1]	$38,893	$34,202	$51,451	$41,191	$47,361	$43,751
Median Household Income Estimate (2010-2014)[2]	$47,334	$43,953	$54,481	$45,010	$58,252	$66,530
Estimate of Persons Living Below Poverty Level (%) (2010-2014)[2]	15.6	16.1	9.1	13.4	11.6	7.9

Sources:

[1]BEA 2016a

[2] U.S. Census 2015a-d; U.S. Census 2016

The structural change in the Study Area's economy in recent years is shown in **Table 3.14-6.** Income from investments (dividends, interest, and rent) dropping from 16.8 percent of total personal income in 2001 to 14.9 percent in 2010 (during the recession), then up to 18.2 percent in 2014. Personal current transfers (i.e., Social Security, veterans' benefits, unemployment insurance, etc.), between 2001 and 2014 rose from 15.4 percent of total personal income to 22.6 percent in 2010 (during the recession), then down to 21.4 percent in 2014.

According to the Socioeconomics and Environmental Justice Baseline TR (Stantec 2016i), between 1970 and 2000, mining increased as a percent of personal income in the four-county area from 3.7 percent in 1970 to 9.3 percent in 1980, then decreased to 3.1 percent in 2000. Transportation and public utilities decreased from 16.4 percent of personal income in 1970 to 9.5 percent in 2000, and retail trade dropped over the same period from 11.7 percent of personal income to 9.2 percent. Over the same period service industries increased from 9.9 percent of personal income to 17.1 percent, and government increased from 16.6 percent to 24.2 percent (BEA 2016a).

Between 2001 and 2010, mining increased as a percent of personal income from 2.6 percent to 4.1 percent, then declined to 2.9 percent. Manufacturing followed an opposite pattern, falling from 16.1 percent in 2001 to 8.5 percent in 2010, then rising to 11.4 percent in 2014. Two NAICS industrial sectors grew overall as percentages of personal income in the Study Area between 2001 and 2014: transportation and warehousing (1.2 percent to 4.3 percent) and health care and social assistance (7.3 percent to 11.1 percent) (BEA 2016b).

Table 3.14-6 Personal Income by NAICS Source in the Four-County Study Area from 2001-2014 (Dollars Times 1,000)

DESCRIPTION	2001	2010	2014
Total Personal Income	2,422,612	3,475,116	3,931,068
Population (persons)	105,741	115,902	116,368
Earnings by Place of Work (Wages plus Employer Paid Supplements)	1,818,162	2,369,702	2,594,558
Per Capita Personal Income (dollars)*	90,940	124,617	143,441
Farm Earnings	55,831	80,151	104,027
Forestry, Fishing, and Related Activities	1,552[B,C,P]	6,381[B,C]	1,266[B,C,P]
Mining	47,698[B]	97,017[B,P]	75,181[B,C,P]
Utilities	2,080[B,P,L]	37,285[P]	38,107
Construction	44,290	54,356[C]	46,920
Manufacturing	292,520	200,519[C]	296,567
Transportation and Warehousing	21,855[B]	116,970	128,776
Wholesale Trade	53,572[P,L]	64,650[P]	91,693
Retail Trade	136,199	159,996	177,741
Information	27,049[C,P]	30,884[P]	34,737[P]
Finance, Insurance, and Real Estate	68,738	97,433	111,855[C]
Professional, Scientific, & Technical Services	59,674[P]	67,826[L]	86,222[C]
Health Care & Social Assistance	132,535[L]	260,363[C]	287,184[P]
Accommodation & Food Services	47,868	61,008[P]	68,148[P]
Government and Government Enterprises	446,453	582,848	624,769
Federal, Civilian	41,116	63,354	63,765
Military	6,645	18,408	13,421
State Government	162,957	219,267	242,169
Local Government	235,735	281,819	305,414

Source: BEA 2016b

*Unlike the other data this category is not x 1,000.

B – data for Bannock County not included to avoid disclosure of confidential information

C – data for Caribou County not included to avoid disclosure of confidential information

P – data for Power County not included to avoid disclosure of confidential information

L – data for Lincoln County not included to avoid disclosure of confidential information

In 2013, Bannock County had the most diversified sources of earnings of the four counties (**Table 3.14-7**). Government employment was responsible for 16.4 percent of the earnings in Bannock County, followed by health care and social assistance (10.2 percent), retail trade (5.3 percent), and manufacturing (4.8 percent). In determining personal income for Bannock County, there was a positive adjustment for Caribou County's economy was less diverse than Bannock County's in 2013, with two industry sectors, manufacturing and government, making up approximately 42 percent of the total earnings. Manufacturing accounted for 30.4 percent of Caribou County's earnings, while government employment made up 11.5 percent. The next largest industry, as measured by wages, was construction with 8.9 percent. In Caribou County, there was a negative adjustment for residence of approximately $65 million, indicating a net pattern of commuting outside of the County for employment.

Table 3.14-7 Personal Income by NAICS Source by County in the Study Area for 2013 (Dollars Times 1,000)

WAGES AND INCOME	BANNOCK COUNTY	CARIBOU COUNTY	POWER COUNTY	LINCOLN COUNTY
Personal Income	2,574,578	274,472	316,317	757,490
Population[1]	83,249	6,808	7,719	18,364
Per Capita Personal Income (dollars)	30,926	40,316	40,979	41,249
Earnings by Place of Work	1,660,119	262,863	259,441	405,118
Adjustment for Residence[2]	64,664	(55,915)	(14,541)	48,450
Net Earnings by Place of Residence	1,508,700	178,460	222,588	405,797
Farm Earnings	21,983	37,816	95,019	10,999
Mining	(D)	(D)	(L)	75,195
Construction	82,701	2,554	915	23,133
Manufacturing	123,572	24,362	3,002	46,100
Wholesale Trade	62,936	83,654	72,026	7,599
Retail Trade	136,727	6,365	14,234	3,746
Transportation and Warehousing	98,377	8,815	5,947	24,878
Health Care and Social Assistance	263,425	3,982	14,626	15,979
Accommodation and Food Services	54,252	3,445	(D)	13,414
Government and Government Enterprises	423,118	2,557	667	8,289

Source: BEA 2015

[1]U.S. Census midyear population estimates. Estimates for 2010-2013 reflect county population estimates available as of March 2014.

[2]The adjustment for residence is the net inflow of the earnings of interarea commuters. For the US, it consists of adjustments for border workers and U.S. residents employed by international organizations and foreign embassies.

Note: All dollar estimates are in current dollars (not adjusted for inflation).

(D) Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.

(L) Less than $50,000, but the estimates for this item are included in the totals.

Power County's economy was the least diverse in 2013, with two industries making up approximately 53 percent of the total earnings. Farming accounted for 30.0 percent of personal income and manufacturing was responsible for 22.8 percent of the earnings; government employment constituted another 9.1 percent. The high manufacturing numbers in Power County result from the Don Plant, the ConAgra-Lamb Weston food manufacturing plant, and AMS, Inc.'s environmental and geotechnical sampling equipment manufacturing plant. In determining personal income, Power County also had a negative adjustment for residence of approximately $14.5 million, also indicating a net commuting pattern into the county for employment.

In 2013, Lincoln County's economy was diverse, with three industries making up approximately 30 percent of the total earnings. Government employment was responsible for 14.4 percent of the earnings in Lincoln County, followed by mining (9.9 percent), and construction (6.1 percent). In determining personal income for Lincoln County, there was a positive adjustment for residence of approximately $48 million, indicating a net commuting pattern outside of Lincoln County for employment.

3.14.5 Agriculture

Agriculture plays an important role in the economies of each of the Study Area counties. As presented in the Socioeconomics and Environmental Justice Baseline TR (Stantec 2016i), Power County has the highest value of agricultural production among the four counties, producing more than $238 million worth of agricultural products in 2012. The value of production was dominated by crops in Bannock, Caribou, and Power counties, while livestock accounted for the majority of production in Lincoln County. Although crops dominated the value in Bannock and Caribou counties, cattle accounted for 21 and 17 percent of the value of the overall production in those counties respectively. Cattle accounted for 45 percent of the total value of production in Lincoln County. Vegetables, melons, potatoes, and sweet potatoes were significant crops in Bannock and Power counties, while grains were the highest single commodity of agriculture in Caribou County.

Power County had the largest and most profitable farms of the four counties. The average return in Power County was $773,746 in 2012. Bannock County had the smallest farms and the smallest average profits. The farms in Lincoln County were slightly more profitable than those in Bannock County and Caribou County farms were close to the four-county Study Area average of $194,131 in 2012.

Collectively, the four counties contained 2,171 farms in 2012 (defined as those with sales of agricultural products of $1,000 or more). The average return for the four-county Study Area was $194,131, although over 70 percent of the farms in Bannock County had sales of less than $10,000 and Caribou County was the only one with fewer than 50 percent of the farms averaging less than $10,000. Over half the people engaged in farming in Bannock and Lincoln counties had a principal occupation other than farming and over 60 percent worked at least one day annually off the farm. Over 35 percent worked more than 200 days off the farm (NASS 2012). While agriculture plays a large role in the identity and social life of the area, these statistics indicate that outside employment is usually necessary in addition to farming.

3.14.6 Mining in Idaho

3.14.6.1 Idaho Mining Industry

A study completed for the Idaho Mining Association (IMA) for the years 2007 to 2012 (Peterson 2013) stated that mining jobs were among the highest paid industrial or service employment sectors in Idaho with average earnings per worker of $102,132 (including salary, employee fringe benefits, and all employer contributions to fringe benefits). Average annual salary for Smoky Canyon Mine workers in 2015, including wages and benefits, was $98,731; for the Don Plant the average annual salary plus benefits for 2015 was $95,898 (Simplot 2016b). This was shown by data collected from the eight operating members of the IMA in 2012, including the three southeastern Idaho phosphate operators (i.e., J.R. Simplot, Agrium, Inc., and Monsanto, Inc.). The other IMA members mine for commodities other than phosphate. In 2012, there were approximately 3,206 IMA member company direct employees, subcontractors, or employees from mining-related operations. This included approximately 2,399 from direct mine and mine processing employment; approximately 368 were identified as subcontractor employees; and approximately 439 employees were from agricultural cluster related Idaho operations.

Impacts from mining were apportioned into two levels in the IMA study. The first level was the direct impact of mining expenditures on the Idaho economy – the jobs, payroll and earnings, gross state product, and sales that are directly created by the industry as export (export is defined as any activity that brings new revenues to Idaho) businesses. The second was comprised of two parts: 1) the impacts on other regional businesses that provide goods or services to the mines – the indirect impacts– and; 2) the effect of employee and related consumer spending on the economy – the induced impacts. The indirect and induced impacts are often called “ripple” or multiplier effects of mining and mine processing on the economy (Peterson 2013).

For every direct IMA job, an *additional* 1.89 jobs are created in the Idaho economy. This jobs multiplier is robust because of three major factors. First, the high wages paid to mining workers creates a high level of employee spending and strong downstream consumer linkages to the overall economy. Secondly, there are deep backward linkages from IMA firms’ mining activity to Idaho’s economy from the products and services that IMA firms purchase from other Idaho’s businesses. Finally, mine processing, particularly fertilizer and herbicide manufacturing, has robust employment multipliers resulting from that industry’s backward economic linkages (Peterson 2013).

Simplot’s Smoky Canyon Mine made purchases totaling $12,991,222 to Idaho vendors in 2015, and the Don Plant made purchases of $14,657,530 (Simplot 2016b). Simplot’s Agribusiness Administration division made purchases from Idaho vendors totaling $1,654,245 in 2015, and the Simplot Grower Solutions division made purchases from Idaho vendors totaling $10,430,560 (Simplot 2016b).

The multiplier effects are driven by the exports of an economy. Exports (i.e., the new money coming into an economy) set off a web of transactions as each business seeks to fulfill the demands of their customers. Mining’s impact upon the economy is thus comprised of the magnitude of the multiplier(s) and the magnitude of the exports. The sum of the direct, indirect, and induced effects measures the total impact of an industry to an economy (the multiplier effects). IMA member company economic impacts create a substantial contribution to state and local tax revenues, including the direct tax payments of IMA member companies, and the indirect and induced tax impacts from the economic activity resulting from mining and mine processing. In 2012, IMA member company mining activity contributed $25.9 million in local property taxes, $39.4 million in Idaho sales taxes, $13.4 million in excise, royalties, and other taxes, and $27.8 million in personal and corporate income taxes, for a total of $106.6 million, including the multiplier effects. Out of the $106.6 million total tax contributions, approximately $71.4 million were from IMA phosphate industry member firms located in southern Idaho (Enviroscientists, Inc. 2015).

In 2015, Simplot paid $2.7 million in property taxes to Power County, $48,000 to Bannock County, and $748,000 to Caribou County (Simplot 2016c). Total tax expenditures for the Smoky Canyon Mine were $797,088 in 2015; for the Don Plant, tax expenditures for 2015 were $2,736,444. For the AgriBusiness Administration and Simplot Grower Solutions division, Simplot paid an additional $1,137,950 (Simplot 2016b).

An Idaho Mine License Tax Return must be filed by every person or entity that mines or receives royalties from a mining claim in Idaho that contains precious or valuable minerals or metals. The tax rate for the mine license tax is one percent of the net value of the ores mined or extracted or of the royalties received. The majority of the taxes collected, or 66 percent, goes to the state's general fund, while the other 34 percent is allocated to the abandoned mine reclamation fund (Enviroscientists Inc. 2015).

3.14.6.2 Idaho Phosphate Mining and Processing Industry

Phosphate is an essential component of the nitrogen-phosphorus-potassium fertilizers that are consumed by the world's agricultural industry. Phosphate rock minerals are the only significant global source of phosphorus. The U.S. is the world's leading producer and consumer of phosphate rock, which is used to produce fertilizers and industrial products (BLM and USFS 2007).

Since phosphate mining began in southeastern Idaho, there have been a total of 31 phosphate mines in the area (USGS 2001). Of these, 12 were small underground mines, all of which produced small quantities of ore and have been closed for years. There have been 20 surface mining operations of which those with significant production and surface area include: Waterloo, Conda, Gay, Ballard, Maybe Canyon, Georgetown Canyon, Mountain Fuel, Henry, Little Long Valley, Lanes Creek, Champ, Smoky Canyon, Enoch Valley, Rasmussen Ridge, and Dry Valley (BLM and USFS 2007). Simplot's Idaho phosphate mining and fertilizer manufacturing operations are part of an integrated phosphate nutrient/fertilizer network for the Western United States. Simplot is the largest provider of phosphate nutrients in the Western United States. As such, their products are key to the viability and vitality of agriculture in the West, including the San Joaquin Valley in California. The phosphate resources in Idaho are important for providing food security for the United States and assists with providing nutrients necessary for feeding the sustaining world agriculture and food production.

Royalties from the Idaho phosphate industry have risen from approximately $8 million in 2010 to over $10 million in 2015 (**Table 3.14-8**). Phosphate royalties account for over 90 percent of mineral lease payments in Idaho. Fifty percent of federal mineral lease payments are returned to the states. Idaho returns 10 percent of the federal mineral royalties it receives from the federal government to the impacted counties, in this case, Caribou County, Idaho. Phosphate rock represents about 30 percent of the value of nonfuel minerals produced in Idaho.

Over the past 4 years (Fiscal Year End 2013 – 2016), the Smoky Canyon Mine has provided royalty payments to the Office of Natural Resources Revenue (ONRR) that have annually ranged from $4.1 to $5.4 million (Simplot 2016d).

Table 3.14-8 Idaho Phosphate Sales and Royalties for Operations on Federal Land

DESCRIPTION	2010	2011	2012	2013	2014	2015
Sales Volume (tons)	3,907,353	4,236,877	5,167,959	4,461,461	5,267,317	5,376,712
Sales Value ($)	171,260,429	167,406,627	188,332,575	194,948,619	218,448,635	208,914,974
Reported Royalties ($)	8,553,747	8,370,331	9,416,629	9,747,431	10,922,432	10,556,968

Source: ONRR 2015, 2016

Southeastern Idaho is currently home to three large phosphate mining operations. These mines are operated by J.R. Simplot, Agrium, Inc., and Monsanto, Inc. Phosphate rock is converted into either phosphate fertilizer or elemental phosphorus at processing plants near Soda Springs, Idaho and Pocatello, Idaho. Ore from J.R. Simplot's Smoky Canyon Mine is transported via an 86-mile slurry pipeline to the company's wet process phosphoric acid (WPPA) plant in Pocatello. Agrium, Inc. operates the North Rasmussen Mine, which supplies its Conda WPPA plant. Monsanto, Inc. operates the Blackfoot Bridge Mine, which supplies its elemental phosphorus plant in Soda Springs.

3.15 ENVIRONMENTAL JUSTICE

Demographics and income data (Stantec 2016i) were used to determine if there are any minority or low-income populations, as defined by environmental justice analyses, and if those populations would be disproportionately affected by the Project. The four subject counties are relatively uniform demographically (**Table 3.15-1**). Because Bannock County accounts for 71.6 percent of the population in the four counties, the demographics for the Study Area are highly influenced by the demographics of Bannock County. The presence of Idaho State University in Bannock County also influences the demographics. Bannock County is 91.9 percent white, while Caribou County, Power County, and Lincoln County are 97.2 percent, 93.4 percent, and 96.3 percent white, respectively. Hispanic is the most populous minority in each of the four counties. The largest Native American population in the four subject counties is in Bannock and Power counties, which include portions of the Fort Hall Indian Reservation. Native Americans represent 3.5 and 2.9 percent of these counties' populations, respectively.

The racial composition of the four counties within the Study Area is relatively uniform, as shown in **Table 3.15-1**. Consequently, it can be concluded that no populations exist in the Study Area that would be considered minority populations based on race or ethnicity under CEQ Environmental Justice guidelines.

As noted in **Section 3.14.4** and in **Table 3.14-5**, none of the counties in the Study Area would be considered to have an Environmental Justice population based on poverty levels, either. Thus, since there are no Environmental Justice populations, this topic will not be analyzed in **Chapter 4**.

Table 3.15-1 Racial Composition in the Study Area in 2013

RACE	BANNOCK COUNTY	CARIBOU COUNTY	POWER COUNTY	STATE OF IDAHO	LINCOLN COUNTY	STATE OF WYOMING
White[1]	76,573/ 91.9%	6,639/ 97.2%	7,186/ 93.4%	1,511,234/ 93.7%	17,648/ 96.3%	540,648/ 92.7%
Black or African American[1]	667/ 0.8%	20/ 0.3%	77/ 1.0%	12,903/ 0.8%	183/ 0.2%	9,915/ 1.7%
American Indian or Alaska Native[1]	2,916/ 3.5%	41/ 0.6%	223/ 2.9%	27,418/ 1.7%	183/ 1.0%	15,164/ 2.6%
Asian[1]	1,167/ 1.4%	41/ 0.6%	38/ 0.5%	22,580/ 1.4%	57/ 1.0%	5,249/ 0.9%
Native Hawaiian or Other Pacific Islander[1]	250/ 0.3%	14/ 0.2%	15/ 0.2%	3,226/ 0.2%	18/ 0.1%	583/ 0.1%
Two or More Races	1,833/ 2.2%	82/ 1.2%	162/ 2.1%	35,483/ 2.2%	202/ 1.1%	11,081/ 1.9%
Hispanic or Latino[2]	6,332/ 7.6%	369/ 5.4%	2,393/ 31.1%	190,315/ 11.8%	825/ 4.5%	56,573/ 9.7%
Total Population	82,839	6,830	7,694	1,612,843	18,326	583,223

Source: U.S. Census 2015a, 2015b, 2015c, and 2015d

[1]Includes persons reporting only one race.

[2]Hispanics may be of any race, so also are included in applicable race categories.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

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CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter presents the results of environmental impact analyses for the various resources introduced in **Chapter 3** of this EIS. **Section 4.1** provides an introduction to the chapter and the definitions for terms used to describe environmental effects. **Sections 4.2** through **4.14** discuss the environmental consequences, the irreversible and irretrievable commitments of resources, the relationship between short-term uses and long-term productivity of resources, and the unavoidable (residual) adverse impacts for each resource brought forward for analysis. Tables summarizing conformance with the CNF RFP (USFS 2003a) and the BLM ARMP (2012) are provided in **Appendix 4A**.

4.1.1 Impact Assessment

The Proposed Action and alternatives outlined in **Chapter 2** may cause, either directly or indirectly, changes in the human environment. This EIS assesses and analyzes these potential changes and discloses the effects to the decision-makers and public. This process of disclosure is one of the fundamental aims of NEPA.

Many concepts and terms used when discussing impacts assessment may not be familiar to the average reader. The following sections attempt to clarify some of these concepts.

4.1.1.1 Effects/Impacts

The terms "effect" and "impact" are synonymous under NEPA. Effects may refer to ecological, aesthetic, historical, cultural, economic, social, or health-related phenomena that may be caused by the Proposed Action or any of the alternatives. Effects may be direct, indirect, or cumulative in nature. Cumulative effects are analyzed in **Chapter 5**.

4.1.1.2 Direct and Indirect Effects

A direct effect occurs at the same time and place as the action. Indirect effects are reasonably foreseeable effects that occur later in time or are removed in distance from the action. Direct and indirect effects are discussed in combination under each affected resource.

4.1.1.3 Mitigation for Impacts

Where applicable, mitigation measures are proposed in this document. If residual effects remain after the mitigation is applied, those effects are described as well. Mitigation measures are means to address environmental impacts that are applied in the impact analysis to reduce intensity or eliminate the impacts. For most resources, Project design features, EMPs, BMPs, and the M&RP reduce environmental impacts such that additional mitigation would not be needed and is not proposed. Mitigation for other resources is detailed by resource in the relevant subsections and is summarized as follows.

<u>Water Resources</u>: Springs currently in use that are disrupted by mining under the Proposed Action or Alternative 1 would be replaced with alternate, permanent, and generally equivalent water sources by Simplot, in accordance with the RFP requirements (**Section 4.5.3**).

Land Use: Simplot would be required to prevent livestock grazing on active and reclaimed mine disturbances until these areas are accepted for grazing management by the CTNF. This would be done by coordination between Simplot and the permittee to identify exclusion areas and discuss additional measures that may be needed, such as fencing or bilingual signs. Simplot would also collaborate annually with the permittee to share mining progress plans and to discuss and resolve any potential access issues.

4.1.1.4 Irreversible and Irretrievable Commitment of Resources

An irreversible commitment of resources occurs if the commitment cannot be changed once made. An irreversible commitment of resources occurs when resources are used, consumed, destroyed, or degraded during Project construction and operation and cannot be reused or recovered. It effectively removes the option of future resource use. Irretrievable commitments of resources occur when there are long-term losses of resource production or use. These losses are not permanent and can be reversed in the long term if Project facilities or land uses change.

4.1.1.5 Relationship of Short-term Uses and Long-term Productivity of Resource

The relationship between short-term uses and long-term productivity describes the effects of the short-term use of the resource for the Project, and whether that use is likely to adversely affect the long-term productivity and sustainability of the resource.

4.1.1.6 Significance

The word "significant" has a very particular meaning when used in a NEPA document. Significance is defined by CEQ as a measure of the intensity and context of the effects of a major federal action on, or the importance of that action to, the human environment. Significance is a function of the beneficial and adverse effects of an action on the environment.

Intensity refers to the severity or level of magnitude of impact. Public health and safety, proximity to sensitive areas, level of controversy, unique risks, or potentially precedent-setting effects are all factors to be considered in determining intensity of effect. This EIS will primarily use the terms major, moderate, minor, or negligible in describing the intensity of effects.

Context means that the effect(s) of an action must be analyzed within a framework, or within physical or conceptual limits. Resource disciplines; location, type, or size of area affected (e.g., site-specific, local, regional, national); and affected interests are all elements of context that ultimately determine significance. Both long- and short-term effects are relevant to context.

4.1.1.7 Indicators

An impact indicator is an element or parameter used to determine change (and the intensity of change) in a resource. Working from an established existing condition (i.e., baseline conditions described in **Chapter 3**) an indicator is used to predict or detect change in a resource related to causal effects of the Proposed Action. Use of the term "significant" when referring to effects indicates some threshold for a particular impact indicator has been exceeded.

4.1.1.8 Environmental Effect Categories

The following environmental effect categories (**Table 4.1-1**) are presented to define relative levels of effect intensity and duration and to provide a common language when describing effects. The definitions in the following table are general. Descriptors are specifically defined for certain resources when the general definitions presented in this table are inadequate.

Table 4.1-1 Summary of Terms Used to Describe Effects in the EIS

ATTRIBUTE OF EFFECT		DESCRIPTION
Magnitude (Intensity)	Negligible	No measurable change in current conditions.
	Minor	A small but measurable change in current conditions.
	Moderate	An easily discernible and measurable change in current conditions.
	Major	A large, easily measurable change in current conditions.
Duration	Short-term	Less than 12 years.
	Long-term	More than 12 years.

4.2 GEOLOGY, MINERALS, AND PALEONTOLOGY

4.2.1 Issues and Indicators

Issue: Physical and chemical characterization of ore and solid wastes and wastewater should be determined to provide projections and potential impacts of wastewater and solid wastes from the Project.

Indicator:

- Estimates of waste rock and ore volumes generated from the Project and the chemical characterization.

4.2.2 Direct and Indirect Impacts

4.2.2.1 Proposed Action

Under the Proposed Action, geology and mineral resources would be directly affected by the removal of phosphate ore and overburden. Ore would be removed and processed, then hauled offsite. The leased deposit would become economically depleted of ore, representing a major and long-term impact. The recovered phosphate resources would be available to meet regional and national requirements for this commodity.

As described in **Section 2.4.3.1**, 60.2 million BCY of overburden would be removed from the pit area as part of exposing the mineral resource, and then either placed back in the East Smoky Panel pit or be added to the already mined Panel B area. This would be a long-term, major, local impact on geologic resources.

Chemical and physical alteration of the overburden, including its ability to transmit water and change water chemistry (especially regarding selenium mobilization), were analyzed during geochemical baseline studies, as described in **Section 3.2.3**. Acid Base Accounting data indicate that overburden would not present a significant risk of Acid Rock Drainage. COPCs that are flushed from the overburden during weathering are available to be transported from the overburden by surface runoff water and/or infiltration. The Proposed Action describes the process by which the more geochemically reactive portion of the overburden (i.e., the center waste shales) would be quickly covered during backfill operations to minimize the effects of exposure, as well as other techniques to minimize infiltration, etc. These actions would further reduce potential geochemical effects from the overburden on water resources, which would be an indirect effect. These effects are described in **Section 4.5**.

Operational practices have been developed to address pit wall and road cut stability. The Smoky Canyon Mine has over 30 years of experience with constructing stable cut and fill slopes. Reclamation of inactive overburden fills to stable slopes would be performed concurrently with mining. Pit backfilling would bury most of the excavated pit highwalls, eliminating the long-term stability issue for these cuts. The remaining exposed highwalls, which would be on private land (covering an area of approximately 1,600 by 200 feet, or approximately 12 acres), would be expected to remain in a stable condition.

Topographic alterations would occur over the approximately 850 acres that would be modified by the disturbance. During reclamation, overburden would be replaced as pit backfill in the East Smoky Panel pit, and also within the existing Panel B pit to provide additional backfill. Both of these actions would reduce topographic impacts. Final reclamation topography for the Proposed Action is shown in **Figure 2.4-5**. Final reclaimed configurations would mimic the pre-mining landforms and slope aspects. This would be a minor but long-term impact.

Effects to paleontological resources could occur from the disturbance of the ore and overburden removal during mining, along with road construction and other miscellaneous disturbance activities. Rock units disturbed would be in the Dinwoody Formation, various members of the Phosphoria Formation, Wells Formation, and alluvium. Invertebrate fossils in the geologic units that would be disturbed are not likely to be unique and the type of fossils are not restricted only to the Smoky Canyon area. They are likely to be found throughout the outcrop area of these formations in Southeastern Idaho. Any vertebrate fossils encountered would be managed as described in **Section 2.5.1**. This is expected to present a negligible impact.

4.2.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

Geological effects would be similar or improved compared to those predicted for the Proposed Action. Although the pit would have a smaller footprint, by 78 acres, it would be deeper and have steeper side slopes to allow a similar amount of ore removed. Less overburden would be removed to obtain this ore. This pit configuration with steeper sides has been analyzed and determined to be stable (CNI 2017), and thus does not represent any increased geotechnical hazard compared to the Proposed Action. These pit slopes are not steeper than slopes typically constructed at other pits at the Smoky Canyon Mine.

The smaller pit footprint avoids disturbance of the Cherty Shale materials which contain elevated contaminants of concern, thereby improving the geochemical characteristics (see **Section 4.5**) of overburden and pit walls, compared to the Proposed Action. However, any additional disturbances resulting from unanticipated slope instability requiring potential laybacks are accounted for by the conservatively-sized miscellaneous disturbance areas shown on **Figure 2.6-2**.

Final reclamation contours would have a somewhat more natural topography than under the Proposed Action, and a somewhat smaller area of highwall would remain unreclaimed (approximately 9 acres).

4.2.2.3 No Action Alternative

Under the No Action Alternative, Simplot would not be allowed to proceed with mining ore in the East Smoky Panel until an M&RP acceptable to the BLM and USFS were developed and approved.

Simplot already possesses leases IDI-012890, IDI-015259, and IDI-015259 that grants them "exclusive development rights" for phosphate within the lease boundaries. BLM would have to show good cause for not allowing the rights to ultimately be exercised.

Under the No Action Alternative, there would be no direct impacts to geologic, mineral, and topographic resources of the Project Area, because the phosphate ore and overburden that were proposed for removal would not be mined at this time. This ore would be available for mining in the future.

The No Action Alternative would not result in any alteration to topography or paleontological resources at the East Smoky Panel until a M&RP is approved. It would result in currently approved Panel B topography, rather than the more ideal topography that would occur in this area under the Proposed Action, due to backfilling from the East Smoky Panel.

4.2.3 Mitigation Measures

Project design features, BMPs, and the proposed Reclamation Plan are elements of the Proposed Action and Alternative 1 designed to reduce environmental impacts to topography and paleontological resources. Additional mitigation measures specific to this Project and for geology, minerals, and paleontology have not been identified.

4.2.4 Unavoidable (Residual) Adverse Impacts

The 12 acres of unreclaimed highwall under the Proposed Action and 9 acres under Alternative 1 would present localized permanent topographic modifications that would diverge from the natural topography.

4.2.5 Relationship of Short-term Uses and Long-term Productivity

Recovery of the phosphate ore, presently determined to be an economic resource, mined from the East Smoky Panel, would be short-term use. This would result in ongoing employment and other short-term economic benefits to the local and regional economies affected by the Smoky Canyon Mine and the Don Plant in Pocatello. It would also provide fertilizer for the agricultural areas supplied by the Don Plant. It would also reduce the long-term productivity of the resource as it would no longer be available.

4.2.6 Irreversible and Irretrievable Commitment of Resources

Phosphate ore would be removed from the Smoky Canyon ore reserves, and this would be an irreversible and irretrievable commitment of mineral resources.

Impacts to the local natural topographic conditions under the Proposed Action and the Alternative 1 would be irreversible and irretrievable. Reclamation activities would restore disturbed sites to topographic contours that mimic pre-mining conditions and permanently reduce the impacts to local topography. Disturbed areas that are not regraded during reclamation would have permanent impacts to topography.

Any loss of paleontological resources that occurred under the Proposed Action or Alternative 1 would be negligible and would be considered irreversible and irretrievable. This is because any paleontological resources discovered and properly documented by the Agencies during mining would not be lost. Furthermore, without mining, the resource would likely not have been discovered.

4.3 AIR RESOURCES

4.3.1 Issues and Indicators

Issue: The Project has the potential for emission of air pollutants including those associated with airborne particulate matter from mining activities and exhaust emissions from haul trucks and other mining equipment.

Indicators:

- Increase in emissions of air pollutants including fugitive dust (airborne particulate matter) from proposed mining activities and exhaust emissions from haul trucks and other mining equipment.

Issue: The Project has the potential to increase emissions from construction and operation and release greenhouse gas (GHG) emissions including CO_2, N_2O, and methane (CH_4) from proposed mining activities.

Indicators:

- Increase in emissions of GHG including CO_2, N_2O, and CH_4 from proposed mining activities.

4.3.2 Direct and Indirect Impacts

4.3.2.1 Proposed Action

Air Quality

Air quality impacts associated with the Proposed Action would primarily be due to the emission of air pollutants resulting from mining in the East Smoky Panel. Mining activities would include drilling, blasting, excavation, materials handling, vehicle operations, haul road use, and ore/overburden transportation. Additional emission sources associated with the Proposed Action that would cause air quality impacts include wind erosion; construction of haul roads, topsoil stockpiles, material borrow areas, stormwater ponds and ditches, and a dewatering pipeline (if needed); relocation of two existing power lines; and additional backfill in a portion of the Panel B pit.

Emissions from these types of sources are controlled by fugitive dust control plans per IDAPA 58.01.01.799 (Rules for Nonmetallic Mineral Processing Plant Fugitive Dust Best Management Practice) and, for vehicles, regulated by manufacturer's emission standards. Fugitive dust emission standards are based on the SIP and adherence to IDAPA 58.01.01.650 (Rules for the Control of Fugitive Emissions), which are regulated based on visible emissions standards.

The current Smoky Canyon Mine operations and facilities provide the infrastructure that would be needed for the Proposed Action. All necessary facilities, utilities, equipment, staff, and procedures are present to recover the phosphate ore reserves in the East Smoky Panel. The ore in the East Smoky Panel is readily accessible to the existing operations through the extension of the mining operation east from the trend of the previously and currently mined ore bodies in Panels A through E. Due to the use of existing facilities and equipment, mining activities associated with the Proposed Action would be similar to current operations and therefore emissions are expected to be comparable.

The Proposed Action would result in the emission of the following regulated air pollutants: (a) PM_{10}; (b) $PM_{2.5}$; (c) CO; (d) NO_X; (e) SO_2; and (f) VOC. The majority of emissions are and would continue to be from fugitive dust and mobile equipment (tailpipe) sources. Processing the ore at the mill produces very little particulate matter. The ore usually has moisture content greater than 15 percent and enters the wet process through a below-grade grizzly. The mill operates at an annual rate of 2.7 million tons per year. Annual emissions from the mill would remain essentially constant for the Proposed Action.

Estimated controlled air emissions for the Proposed Action are presented in **Table 4.3-1**. The emissions totals are for the entire duration of the Proposed Action. The emissions were estimated to be equal to the emission estimates presented in Smoky Canyon Mine's 2007 EIS for Panels F and G, which were calculated assuming adherence to the State of Idaho's IDAPA 58.01.01.651 and 799 for fugitive dust controls. Most of the emissions associated with the Proposed Action are fugitive in nature. These include mining, transportation activities, and blasting. These sources of emissions are controlled by implementing BMPs and adhering to all applicable requirements for reducing fugitive dust at the mine. This results in representative but conservative emission estimates for the Proposed Action because of the following reasons.

- The life of the Proposed Action is up to 12 years, which is less than the total life of Panels F and G (Panel F has a life of 6-7 years and Panel G has a life of 8 years). Consequently, overall emissions for the Proposed Action would be expected to be less than emissions from Panels F and G.
- There would be no disposal of overburden in external overburden piles from the Proposed Action. Instead the mined overburden would either be used for concurrent backfilling and/or low seleniferous overburden used for road construction. Panels F and G were planned to have associated external overburden placement. Emissions from the placement of the overburden back into the pit during the Proposed Action would be expected to be similar as emissions from the placement of overburden into external stockpiles. However, wind erosion emissions associated with the overburden in the pit would be expected to be less than wind erosion emissions from the external overburden stockpiles due to the overburden being located within the pit and therefore less susceptible to the effects of the wind.
- The mobile equipment that is currently used at the Smoky Canyon Mine would be redirected from current operations in Panels B, F, and G to work on the Proposed Action (i.e., no new equipment would be used for the Proposed Action). Consequently, emissions from the mobile equipment used in the Proposed Action would be expected to be comparable to emissions from the currently used mobile equipment. Although the mobile equipment would have a greater age, engine replacements, rebuilds, and preventative maintenance would result in negligible differences in emissions.
- Mining operations would continue to operate continuously (24 hours/day).
- Stationary equipment would remain in its current place during the Proposed Action with no modifications and would be used at approximately the same rates.

Table 4.3-1 Total Project Lifetime Potential Controlled Emissions, Proposed Action

POLLUTANT	TOTAL (TONS) [1]
PM_{10}	3,376
$PM_{2.5}$ [2]	506
CO	2,598
NO_X	4,354
SO_2	404
VOC	401

Source: 2007 EIS for Smoky Canyon Mine Panes F and G
[1]Units are in short tons (tons).
[2]$PM_{2.5}$ emissions are estimated to be 15% of PM_{10} emissions based on EPA air pollutant emission factors known as AP-42 (EPA 2009) for mining operations.

The air emissions would occur only during active operations. A large percentage of the fugitive particulate emissions generated from mining and transportation activities would settle out quickly near their point of generation. The intensity of the air emission impacts would be minor at the site-specific perspective and negligible at the local and regional perspective.

The air emission estimates shown in **Table 4.3-1** are also comparable to those estimated for the mining operations at the Smoky Canyon Mine in the Final Supplemental EIS for Panels B and C (BLM and USFS 2002b). The EPA-approved Industrial Source Complex Short Term, Version 3 (ISCST3) model was used in 2002 to determine the ambient air impacts from mining activities. The only difference between the modeled mining activities and those for the Proposed Action is that the Proposed Action mining activities would be located further east and southeast. Thus, the local ambient air impacts and associated effects to air quality as determined for Panels B and C would be approximately the same as for the Proposed Action, only relocated further east and southeast.

Air quality impact modeling conducted for the Smoky Canyon Mine EIS for Panels B and C (2002) indicated that particulate matter effects at 5-mile radius receptors from the operations were approximately 6 percent of the NAAQS. With the annual emission estimates for the Proposed Action being similar to the annual quantity of modeled emissions, it is unlikely that the NAAQS thresholds (**Table 3.3-1**) would be approached. The same modeling indicated that Class I PSD increments were not exceeded for the annual and 24-hour averaging periods at the nearest Class I Area (Grand Teton National Park). Due to the proximity of the Proposed Action operations to the Smoky Canyon Mine Panel B and C operations that were evaluated in the 2002 EIS and the similarity in emission rates between the two, the modeling results for the 2002 EIS are considered applicable to the Proposed Action mining operations and are considered to be short-term and negligible. Furthermore, all Federal Class I Areas are greater than 70 miles from the Proposed Action. Consequently, the air quality impacts to these Class I Areas do not require evaluation in more details than what has already been presented given the previous analysis (2007 Panels F and G). Only “very large sources” require further analysis in accordance the Federal Land Managers Guidance. The Smoky Canyon Mine is not considered “very large” as no emissions are changing from 2007.

Metal and other potential pollutants (i.e., selenium) would make up a small percentage of the dust generated from mining operations. A review was completed in 2006 to determine what the effects would be to the environment and potential human health due to the addition of the contaminants

(JBR 2006). Calculations were made using local COPC concentrations in ore and overburden. It was determined that the addition of selenium to surface runoff, the soil profile, and vegetation would be negligible to minor for Smoky Canyon Mine's Panel G and even less for Panel F. Given local selenium and mercury concentrations, resultant dust was determined to be 3.5% of the 0.2 milligrams per cubic meter (mg/m^3) health standard for selenium and 0.017% of the allowable Association Advancing Occupational and Environmental Health threshold limit value (ACGIH TLV) for mercury (0.025 mg/m^3). These effects were considered to be insignificant. Due to the similarity of the Proposed Action mining operations to the Panel F and G mining operations, it is assumed that the Proposed Action would have similar insignificant effects.

Climate

GHG emissions associated with the Proposed Action would be generated from combustion of fossil fuels in mining and support equipment and include CO_2, CH_4, and N_2O. Total GHG emissions are expressed as carbon dioxide equivalent (CO_2e), which is a standard unit for measuring carbon footprints. Each gas has its own global warming potential (GWP) as a relative measure of warming impacts compared to CO_2. CH_4 has a GWP of 25, such that 1 unit of CH_4 has a CO_2e of 25 units. N_2O has a GWP of 298, such that 1 unit of N_2O has a CO_2e of 298 units. CO_2 has a GWP of 1.

In Idaho, the total CO_2 emissions from all combustion sources are approximately 37 million metric tons (IDEQ 2008). Mining in Idaho represents less than 1 percent of total CO_2 emissions from industrial sources (CCS 2008).

The Proposed Action anticipates identical GHG-emitting sources as the current operations of the Smoky Canyon Mine. There would be periods before, during, and after the active mining period of the Proposed Action to account for construction activities and final reclamation. However, because the Proposed Action does not require any additional fuel burning equipment or activities, there would be no increase to the annual GHG emissions. Instead, the current annual level of GHGs emitted would be extended by approximately 3 years.

Haul truck operations at the Smoky Canyon Mine require approximately four million gallons of diesel fuel annually. Estimated GHG emissions on an annual basis for the Proposed Action haul truck operations are presented in **Table 4.3-2**. Emissions are calculated using emission factors from 40 CFR Part 98, Tables C-1 and C-2 for Distillate Fuel Oil No. 2. Other fuel combustion sources associated with the Proposed Action would also contribute to GHG emissions, but are expected to make up a small fraction of total emissions compared to the diesel fuel combusted in the haul trucks.

In a recent Supreme Court decision, Utility Air Regulatory Group v. EPA, No. 12-1146 (June 23, 2014), the majority opinion held that the CAA does not compel a GHG-inclusive interpretation of the term "any air pollutant" that automatically triggers PSD and Title V permitting requirements. The Court held that the PSD and Title V programs must be read so that their applicability is triggered only by potential to emit of conventional pollutants (i.e., SO_2, PM, NO_2, CO, O_3, and Pb) at levels above the 100- to 250-ton-per-year thresholds specified in the CAA. No conventional pollutants associated with the Proposed Action were found to exceed the statutory CAA thresholds for potential to emit (100 to 250 tons per year).

Table 4.3-2 Annual Potential GHG Emissions, Proposed Action

POLLUTANT	TOTAL (TONS/YEAR) [1, 2]
CO_2	45,003
CH_4	1.83
N_2O	0.37
CO_2e	45,157

[1]Units are in short tons per year (tons/yr).
[2]Not accounted for in the table is the effect of vegetation (some of which would be forest) and soil removal from the Project Area on GHG emissions as the mine is developed. Vegetated areas are CO_2 sinks, and forests sequester more carbon than grasslands, so even after revegetation to a non-forest cover over most of the disturbed area there would be a net loss to the carbon stock from this activity. Although difficult to quantify with precision, this amount would likely be a minor component of the total GHG Project effects.

Indirect GHG emissions due to the Proposed Action result from further processing of the phosphate ore at Simplot's existing fertilizer manufacturing plant (i.e., Don Plant). Currently, the phosphate ore from the Smoky Canyon Mine is pumped through a buried pipeline to the Don Plant. This reduces greenhouse gas emissions, as there is no need to transport the ore via truck or rail. GHG emissions from the Don Plant would not be affected by the Proposed Action. Alternate sources of phosphate ore needed for continuous operation of the Don Plant would be located, as necessary.

The effects of the Proposed Action on GHG emissions and climate change would continue after the mine is closed as a result of the long (estimated 100 years) residence time for certain GHGs in the atmosphere. The effects of the Proposed Action on climate change would be long-term and negligible.

Because current climate models for the northwestern United States indicate that warmer winter temperatures will shift the average timing of snowmelt and surface water runoff to earlier in the year, precipitation causing runoff and infiltration into the proposed store and release cover system is expected to occur earlier in the year. Climate models predict an increase in storms with precipitation greater than 1 inch. This change is predicted to increase the average volume of runoff and infiltration generated by individual storms and may increase the total volume of runoff and infiltration during an average year. These trends are projected starting several decades in the future and extending to the end of the century (i.e. southeastern Idaho is predicted to have a 5 percent increase in precipitation for the years 2075 to 2099). The duration of the Proposed Action would be up to 12 years, which corresponds to approximately three additional years to the overall life of the Smoky Canyon Mine. Projected changes in climate over this period would not be expected to have appreciable impacts on the operation of the mine or initial reclamation activities.

An increase in average annual precipitation may increase the percolation rate of meteoric water into the seleniferous overburden beneath the store and release cover system. However, increased infiltration would also increase groundwater recharge and flux, resulting in greater dilution of the soluble selenium compounds mobilized and transported to surrounding areas. For a decrease in average snowpack under assumed global climate change, the overall rate of precipitation infiltrating the store and release cover system may be lower, but it may be offset by the increased percentage of storms with precipitation of more than 1 inch. Long-term changes in the frequency and timing of precipitation and snowmelt could affect how the Proposed Action store and release cover system performs and could cause adjustments in the plant community. These long-term changes are expected to be moderate.

4.3.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

This alternative would have impacts to air quality and GHGs that would be indistinguishable from those described for the Proposed Action. There could be fewer overall emissions under this alternative due to the decrease in acres disturbed compared to the Proposed Action, although these potential reduced emissions could be off-set by the increase in equipment operations needed for deepening the pit under this alternative.

4.3.2.3 No Action Alternative

Under the No Action Alternative, impacts to air quality and climate would not occur. Consequently, air quality and the climate in the analysis area would remain at the current ambient levels until the Smoky Canyon Mine concludes operation or federal phosphate leases are developed or modified under a different mine plan.

4.3.3 Mitigation Measures

Under the Proposed Action and Alternative 1, EPMs (**Section 2.5**) would be applied to reduce or avoid impacts to air quality. Particulate emissions would be mitigated by application of water (via water trucks) and/or chemical dust suppressants, such as magnesium chloride or calcium chloride, as necessary. The remaining emissions associated with the Proposed Action or Alternative 1 would be controlled by operating equipment according to manufacturers' emission-related written instructions.

The Proposed Action and Alternative 1 includes reclamation activities designed to stabilize disturbed areas which would reduce the potential for emission of particulate matter due to wind erosion. Reclamation activities include backfilling; placing appropriate covers over seleniferous and non-seleniferous backfills; grading to return disturbed areas to more natural contours; removing all mine equipment and facilities; reestablishing drainage patterns; and revegetation. The reclamation activities would apply to both the East Smoky Panel and Panel B portion of the Proposed Action.

4.3.4 Unavoidable (Residual) Adverse Impacts

For the Proposed Action and Alternative 1, unavoidable residual adverse impacts to air quality would only occur if revegetation efforts were not successful. Unsuccessful revegetation would result in a greater potential for emission of particulate matter due to wind erosion. Unavoidable residual adverse impacts on climate change are not expected to occur because climate change impacts would cease when the mining activity is complete.

4.3.5 Relationship of Short-term Uses and Long-term Productivity

Air emissions and the generation of GHGs, during Project operations would be short-term impacts and uses of the environment, but these uses would not affect the long-term productivity, since when mining ceases, air quality would return to natural conditions. Long-term productivity of the land in the Project Area would not be affected by the mining air emissions and generation of GHGs. Following the completion of the mining activities and subsequent reclamation activities, air quality would return to the current ambient levels.

4.3.6 Irreversible and Irretrievable Commitment of Resources

The Proposed Action would include new surface disturbances of 730 acres, plus 119 acres of redisturbance, and Alternative 1 would newly disturb 78 fewer acres. The disturbed areas could potentially generate fugitive dust emissions from wind erosion. To mitigate irreversible air quality impacts from these areas, reclamation activities for the Proposed Action include backfilling, covering, and revegetation of the disturbed areas. Vegetation on the surface of the disturbed areas would reduce the potential of fugitive dust emissions resulting from wind erosion while also minimizing irreversible air quality conditions. Following completion of the mining and subsequent reclamation activities, the air quality would potentially be restored to its natural state. There are no implications leading to irreversible and irretrievable commitment of the air quality.

Due to low GHG emissions, the Proposed Action or Alternative 1 is expected to have negligible impact to irreversible and irretrievable commitments on climate change.

4.4 NOISE

4.4.1 Issues and Indicators

Issue: Noise impacts from mine operations, mine traffic on haul roads, and traffic on access roads may affect Project Area residents and wildlife.

Indicators:

- Predicted noise levels (decibels) from mining operations, haul truck traffic, access road traffic, and blasting and the proximity of the noise sources to sensitive receptors.

4.4.2 Direct and Indirect Impacts

Sound travels out uniformly from sources unless it is blocked by a solid surface or until it is attenuated (decreased) by passage through geometric divergence, refraction, atmospheric absorption, or ground and vegetation absorption between the source and receptor. The noise impacts from activity during operation of the Project would primarily be generated by drilling, blasting, equipment operation, haul truck, and other vehicle use. The level of noise impact would be similar to the current noise impacts from the existing Smoky Canyon Mine. Neither Caribou County, Idaho nor Lincoln County, Wyoming have direct regulations or ordinances in regard to noise from the Project.

Mining operations would occur 24 hours per day, 7 days per week. Hauling ore to the mill would occur on the same schedule as mining. Blasting would occur only during daylight, typically every 2 to 3 days. However, blasting could occur any day of the week except Sundays and typically around noon or early afternoon. Shift changes for the current mine crew, mill crew, and administration/engineering staff occur at different times during the day. Shift changes for the mine crew occurs at 5:30 AM and 3:30 PM, 7 days per week. Hours for the administration/engineering staff are approximately 7 AM to 4 PM, Monday through Friday. Each of these shift changes would be accompanied by personal vehicle traffic along the access roads to the mining operations. Vendor and visitor vehicles can arrive at the operations at any time but mostly during daylight hours Monday through Friday.

Noise from drilling, blasting, equipment operation, and other vehicle use can affect the environment for humans and wildlife. This includes affecting the quality of the recreational user's experience on a given property. The noise impacts could potentially diminish the quality of that property for a particular endeavor. Noise may also affect wildlife usage of a given property. Chronic or episodic noise-related disturbance may result in wildlife movement away from the source of disturbance. Additionally, noise impacts could affect the quality of wildlife-based recreation for hunting, trapping, and nature study.

The EPA has identified outdoor noise limits to protect against effects on public health and welfare. The noise limits are represented using an L_{eq}, which is an average measure over a given time. Outdoor noise is generally acceptable to most people if they are exposed to levels of 65 dBA L_{eq} or less. Outdoor noise is potentially unacceptable if people are exposed to levels of 65 to 75 dBA L_{eq} and unacceptable if exposed to levels of 75 dBA L_{eq} or more (EPA 1981). Since the EPA last issued guidance in 1981, most federal agencies relating to transportation (Federal Highway Administration - FHWA, Federal Transit Administration, Federal Railroad Administration) have generally upheld the EPA guidance with some refining exceptions. For example, the FHWA sets no impact threshold for land uses in the Project Area specific to undeveloped lands or for mining uses. Most people, under optimal listening conditions, can perceive an increase in noise of 3-5 dBA.

To determine whether or not noise from an activity is causing an undesirable impact at a sensitive receptor location, the existing baseline sound levels at the receptor and the sound level at the receptor due to the activity must be compared. If the sound levels of the noise at the receptor are similar to the baseline sound level, the noise does not affect the receptor. If the noise exceeds the baseline sound level, the degree of impact depends on the amount of the exceedance. Sound quality also affects the impact on receptors. For this evaluation, all sound is referred to as "noise", although it is recognized that noise from wind is usually considered an acceptable noise, while the same noise level from a haul truck engine may be unwanted noise.

Predicted noise levels from mining are considered adverse if they are higher than the EPA guideline of 55 dBA L_{eq} at sensitive receptors. Noise levels experienced at outdoor areas where people spend widely varying amounts of time are also considered potentially adverse if they are higher than the EPA guideline of 55 dBA L_{eq} and are considered adverse if they are higher than the EPA threshold of 65 dBA L_{eq}.

4.4.2.1 Proposed Action

To predict noise levels associated with the Proposed Action, baseline noise level measurements were made at five sensitive receptors. These baseline measurements are described in **Section 3.4.5**. Additionally, as part of Smoky Canyon Mine's 2007 EIS for Panels F and G, noise measurements were made at the facility for access road traffic, open pit mining, haul truck traffic, and blasting (**Table 4.4-1**). For the Proposed Action, similar types of noises sources would be applicable.

Table 4.4-1 Sound Levels Associated with Existing Smoky Canyon Mine Activities

SOURCE	L_{EQ} DBA	L_{MAX} (DBA)	DESCRIPTION
Access Road Traffic	47.4	66.6	120 feet from edge of road
Open Pit Mining	81.7	85.9	130 feet from drill
Haul Truck Traffic	70.4	87.5	120 feet from haul truck
Blasting	NA	74.4	3,200 feet from blast

The impacts of the identified noise sources at the sensitive receptors were calculated by mathematically propagating the measured noise levels, using a standard calculation known as the Inverse Square Law of Noise Propagation. This formula states that noise decreases by approximately 6 dBA with every doubling of the distance from the source. The accuracy of this estimation approach depends on intervening vegetation, topography, atmospheric conditions, and noise barriers. Even without attenuation of noise by natural or man-made barriers such as intervening topography, structures or other obstructions, noise levels would be lower than the EPA guideline of 55 dBA L_{eq} for each sensitive receptor at their respective locations. Consequently, the noise effects from the Proposed Action would be short-term and negligible or minor at the closest sensitive receptor due to the distance from the mine.

4.4.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

The noise effects would be similar under Alternative 1 as those predicted for the Proposed Action.

4.4.2.3 No Action Alternative

Under the No Action Alternative, noise associated with the Proposed Action would not occur. Consequently, current ambient noise levels would remain unchanged in the analysis area until the Smoky Canyon Mine concludes operation or federal phosphate leases are developed or modified under a different mine plan.

4.4.3 Mitigation Measures

Under the Proposed Action or Alternative 1, mitigation measures to reduce or avoid noise impacts include using physical attachments on individual noise sources. Mufflers on engines, shields on particular pieces of equipment, and enclosures surrounding specific operation areas are all examples of mitigation measures for noise that are currently being implemented as part of current operations at the Smoky Canyon Mine. The mine utilizes hearing protection equipment and other methods to protect hearing of miners and operators.

4.4.4 Unavoidable (Residual) Adverse Impacts

For the Proposed Action and Alternative 1, unavoidable residual adverse impacts on noise are not expected to occur because noise impacts would cease when the mining activity is complete.

4.4.5 Relationship of Short-term Uses and Long-term Productivity

Noise impacts associated with the Proposed Action and Alternative 1 would be temporary. Following the completion of the mining activities and subsequent reclamation activities, no noise impacts would be expected.

4.4.6 Irreversible and Irretrievable Commitment of Resources

Noise impacts from the Proposed Action or Alternative 1 are expected to be short-term and negligible or minor at the closest sensitive receptors to the mine. Once the mining activity is complete, the noise condition would be restored to its natural state, and there would be no irreversible and irretrievable commitment of resources.

4.5 WATER RESOURCES

4.5.1 Issues and Indicators

Issue: Impacts may occur from further deposition of selenium into the environment. Impacts may occur from the potential for increased selenium rich runoff from all aspects of the site – roads, stockpile areas, and active and reclaimed surfaces.

Indicators:

- Predicted changes in water quantity and quality based on water and contaminant transport modeling.

Issue: The mining operations and related transportation activities may cause changes to the quantity and quality of surface water or groundwater in the Project Area and within the affected watershed area.

Indicators:

- Current status of groundwater and surface water quantity and quality in the Project Area.
- Acreage and percentage of hydrologic disturbance within the affected watershed (i.e., those portions of the 6th level HUC watersheds in the Study Area that are on NFS lands).
- Predicted changes to quantity and quality of groundwater and surface water from the Project.
- Predicted performance of cover systems and resulting impacts to water quality and quantity.

Issue: The Project could influence the production of natural springs, the water resources of the area, and the supporting hydrology to fully assess the potential impacts of the Project on the adjacent springs and streams as well as groundwater recharge.

Indicators:

- Identification of springs and streams that would be impacted by the Project.
- Predicted changes to the quantity and quality to springs and streams.

Issue: The Project may result in water rights being obtained and impacted and potential water diversions.

Indicators:

- Water rights are described and compliance of the Project with rights determined.
- Analysis of impacts from any water diversion. Estimated flows at key locations.

Issue: The Project may result in: (1) changes in the volume and timing in surface runoff water caused by the operations; (2) increases in selenium, temperature, sediment, turbidity, and contaminants of concern in downgradient streams, ponds, and other surface waters, with regards to applicable surface water quality standards; (3) reduction in available groundwater to supply existing baseline flow of streams and springs in the Project Area from pumping water supply well(s).

Indicators:

- Changes in the volume and timing in surface water runoff caused by the Project.
- Increases in suspended sediment, turbidity, and COPCs in downgradient streams, ponds, and other surface waters, with regards to applicable surface water quality standards.
- Reduction in available groundwater to supply existing baseline flow of streams and springs in the Project Area from pumping of any water supply well(s).
- Project-related impacts affecting the 303(d) listing and TMDLs.

4.5.2 Direct and Indirect Impacts

The Proposed Action and Alternative 1 could potentially impact water resources within the Project Area and beyond by disturbance of geologic materials that influence groundwater flow and quality to downgradient groundwater, springs and streams due to mining and related activities. These potential direct and indirect impacts to water resources include: groundwater flow to open pits, groundwater recharge/infiltration rates, alterations to streamflow and baseflow, changes to stormwater runoff configurations and quality, infiltration through reclaimed mine panels and potential mobilization of COPCs to downgradient groundwater and surface water bodies.

To evaluate potential impacts to surface water and groundwater resources from the Project, a computer model was used to simulate groundwater recharge and flow (HGG 2018). The model was also used to predict the change in groundwater chemistry over time for the Proposed Action and Alternative 1 caused by the addition of COPCs to the groundwater that are leached from the pit backfills. Consistent with the 2015 Plan of Study (HGG 2015), groundwater flow modeling was completed using a public domain version of the computer code MODFLOW-NWT (Niswonger et al. 2011). Fate and transport modeling was completed using MT3D-USGS (Bedekar et al. 2016). Initially, deterministic modeling was used to estimate preliminary groundwater flow and contaminant fate and transport (Stantec 2017d; 2017e). Deterministic models are inherently based on a single set of model parameters and predict a single outcome. Because of the wide variability in possible scenarios for the model parameters based on the existing data and the desire to test several percolation rates for both the Proposed Action and Alternative 1, a stochastic modeling approach was used to evaluate water quality impacts for the EIS. The stochastic modeling approach was used to predict the fate and transport of selenium, sulfate, TDS, and manganese using approximately 2,000 individual fate and transport simulations to evaluate stochastically the projected impacts associated with potential leaching into the underlying aquifers as a result of proposed mining operations. These four constituents were COPCs that exceeded the groundwater standard as described in the Chemistry Seepage discussion below. The selenium standard is the only one of the four that is a primary groundwater standard protective of human health; the other three (sulfate, TDS, and manganese) are secondary groundwater standards reflecting aesthetic qualities. A stochastic modeling approach is one where model parameters that are not well defined (e.g., storage, longitudinal dispersivity, ratio of horizontal transverse dispersivity to longitudinal dispersivity, and ratio of vertical transverse dispersivity to longitudinal dispersivity) are varied randomly within a reasonable range based on known conditions, and the results from multiple model runs are analyzed statistically.

The stochastic approach included evaluation of two different flow calibration models, three percolation rates (2 inches, 7 inches, and 15 inches) over a period of 300 years for the four COPCs, and for two different saturated thicknesses for the Wells Formation (approximately 200 and 800-1000 feet). The two calibration models represent end members of the allowable water balance that still meets the model calibration requirements, with the main difference being that one of the models basically allows more groundwater to enter the model across the East Sage Valley Branch Fault in order to account for differing interpretations of available information. This results in slightly different water impact plume development, which is expected based upon resultant mixing characteristics. Separate model runs were used to represent the Proposed Action and Alternative 1 for the three percolation rates and using both calibration models. The results of all these model runs were combined to support the statistical evaluations of the stochastic modeling approach.

The stochastic modeling approach generates many outcomes; therefore, the final results were presented using a statistical approximation based on the 95% upper confidence limit (UCL). The 95% UCL values were based on the arithmetic mean of COPC concentrations in the Wells Formation groundwater and calculated using the Student's-t statistic, assuming a normal data distribution. The UCL is the value that when calculated for a random data set equals or exceeds the true mean 95% of the time, and is therefore, inherently conservative. For environmental assessments, the 95% UCL of a data set is commonly used for comparison to regulatory levels and during evaluations conducted for risk assessments under EPA guidance (EPA 2014). The results of the modeling are provided in the Numerical Model Report, dated January 2018 (HGG 2018). A summary of the results is provided below.

Regardless of the Action Alternative selected, the IDEQ would require Simplot to establish and monitor Point(s) of Compliance outside the active mining area for the East Smoky Panel as part of its compliance with the Idaho Ground Water Quality Rule (58.01.11.401). Monitoring wells were chosen by IDEQ after evaluating the hydrogeological characteristics of the mining area and surrounding land, while considering the potential contaminants and their impact on groundwater quality and public health effects, and based upon an application from Simplot for a Point(s) of Compliance determination. GW-24 was chosen as the Wells Formation Point of Compliance well and ES-MW7, GW-27, GW-29, and GW-30 were chosen as Wells Formation indicator wells should one of the Action Alternatives be selected (IDEQ 2020).

4.5.2.1 Proposed Action

Groundwater

Groundwater Flow to Open Pits

Groundwater data suggest there are five geologic units that are variably saturated within some portions of the Study Area, including: the Wells Formation, Dinwoody Formation, Salt Lake Formation, Rex Chert Member of the Phosphoria Formation, and Quaternary Alluvium. The Salt Lake Formation, Rex Chert, and Quaternary Alluvium are thought to be limited in their area of saturation, have limited ability to transmit large fluxes of groundwater, and/or are generally separated from the saturated geologic units that would receive direct recharge during and after mining (Stantec 2016d). Drilling records indicate that measurable groundwater was typically not encountered while drilling through the uppermost geologic units in the vicinity of the proposed pit. Several monitoring wells that intercepted fault zones in the Phosphoria Formation shale encountered groundwater within the Rex Chert member (**Figure 3.5-1**). The relatively low hydraulic conductivity and the perched water table elevations measured in the monitoring wells indicate that some minor perched groundwater flow in the Alluvial system could occur from the hanging walls of the proposed pit excavation. This flow would be observed as small seeps along the highwalls that are thought to drain isolated fractures and perched saturated zones near the highwalls, if present. The amount of water added to the open pits from these potential seeps is considered to be negligible compared with the net percolation through the surface of the pit backfills.

The Smoky Canyon Mine has continuously conducted open pit mining operations in the same formations and similar hydrogeologic conditions since 1985, and has not encountered any sustained, measurable groundwater inflow to the open pits from the highwalls. This is expected to also be the case for the East Smoky Panel.

Changes in flow in the Alluvial, Dinwoody, and Phosphoria Formation groundwater systems within the Project Area and across the East Sage Valley Branch Fault are expected during the period of pit disturbance. Because outcrops and thus recharge areas to these systems would be removed during pit excavation, groundwater flow is expected to be reduced and could potentially impact the flow of springs downgradient from the Project Area. However, the degree of impact of the younger groundwater systems by the pit disturbance is unknown because of the isolated and perched nature of the groundwater systems but is likely negligible as previously stated.

Data collected during exploration drilling and from groundwater monitoring wells in comparison to the pit base contours provided by Simplot for the Proposed Action (Simplot 2013; 2015) indicate that the bottom of the proposed mine pit disturbance would be about 110 to 170 vertical feet above the Wells formation aquifer in the majority of the Project Area, so groundwater from the regional aquifer would not flow into the open pits. However, during mining of the lower benches of Phases 6 and 7, pit excavation could seasonally intersect the saturated portion of the Wells Formation where mean groundwater elevations at Wells GW-16 and GW-29 are within 5 to 10 feet below the base of the proposed pit excavation. See **Figure 3.5-4** for these mean groundwater elevations, which, per the figure footnote, were based upon manual measurements obtained during the two-year baseline study. In this limited situation, a small amount of groundwater could be encountered and then pumped out of the mining area in a closed pipe system (welded HDPE pipe with little potential for pipeline spills) to the tailings pond. This water would then be recycled to the mill along with the other tailings water. Once the pit is backfilled, the relative percentage of pit backfill that would be exposed to direct contact with groundwater would be very small compared to the entire volume of pit backfill such that the effect on predicted flushing of COPCs from the backfill material would be negligible.

Groundwater Recharge

The areas identified for pit disturbance for the Proposed Action are primarily within the existing outcrop area of the Phosphoria Formation and overlying Salt Lake Formation and Alluvium. Wells Formation outcrops are also within the pit disturbance area on the western portion of the Project Area to the west of the West Sage Valley Branch Fault. As described in **Section 3.5.1**, the Meade Peak member of the Phosphoria Formation is considered to be an aquitard that covers the underlying Wells Formation and Brazer Limestone, and essentially limits recharge from areas overlying the base of the Meade Peak. Limited amounts of groundwater in the Meade Peak member are known to occur within fractures in the shale, but these yield little groundwater to wells or mine pits (Ralston 1979).

Removal of Phosphoria Formation rocks in the footprint areas of the proposed pit would remove the aquitard formed by these rocks. Removal of the aquitard would allow additional groundwater recharge of the Wells Formation to occur in the proposed open pit area (303-acres for the Proposed Action). This would be approximately a 3 percent increase in the local recharge area (10,536 acres) of the Wells Formation and Brazer Limestone.

To reduce potential impacts to groundwater resources, a store and release cover over the top of the pit backfill would be used as part of the Proposed Action. The intent of the cover is to reduce the infiltration rate of precipitation into the pit backfills and thus, the amount of water contacting the backfill material. This, in turn, would reduce the potential for COPCs to leach from the backfill and eventually impact the underlying groundwater quality. The groundwater modeling utilized National Oceanic and Atmospheric Administration precipitation data for the eastern highlands of Idaho and for the period of 2000 to 2012 (HGG 2015). These data show an annual average precipitation of 15.44 inches which correlates well to the Soda Springs data shown in **Table 3.3-4**. Further, climate change was included in the evaluation of the Proposed Action cover performance and is found in Section 6.1.9 of the cover modeling report (Stantec March 2017f). The narrative in that section describes that a 6 degree increase in local temperature, along with a 5% increase in annual precipitation would result in an increase in annual percolation rate through the cover.

The proposed pit disturbance intersects the western edges of the outcrops for the Dinwoody, Rex Chert, and younger units, and the eastern edge of the Wells Formation. All the materials within the boundaries of the open pit would be removed during mining. This would eliminate the potential for groundwater in the Dinwoody Formation, Rex Chert, and younger units to flow into the open pit from the west, in addition to the perched or isolated nature of the groundwater flow in these units. Groundwater recharged in the Rex Chert and younger units (Dinwoody, Salt Lake Formation, Alluvium) likely supports a number of small springs (URS, ESS-1, ESS-2, LinS) downgradient of the pit area (**Figure 3.5-13**). Potential effects of reduced recharge to these springs are discussed in the Surface Water impacts section below.

Groundwater Extraction

The Proposed Action conservatively assumes that the existing industrial well (GW-IW) would continue to be used for mine operations at a pumping rate of 500 gpm. This rate was used for the groundwater modeling predictions. Although GW-IW has been pumping at 300 gpm for the past 2-3 years and pumping will continue to satisfy the processing needs of the mill at the Smoky Canyon Mine. However, based on the fate and transport model predictions, pumping of the industrial well does not significantly impact the migration of the COPCs. Pumping of the culinary well is not expected to impact groundwater flow for the East Smoky Panel because it is being pumped from the Dinwoody Formation. Both of these wells would continue to pump as they currently do.

Percolation through Reclaimed Mine Panels

Infiltrating precipitation into the overburden pit backfill can cause leaching of COPCs and potentially impact underlying Wells Formation groundwater. The total backfill volume includes a range of solid particle sizes packed together with open space (pores) between the particles where water can flow. The total volume of this open space is called a “pore volume”. There is some uncertainty in the net infiltration rate through the Proposed Action store and release cover for the East Smoky Panel pit backfill as described in the cover modeling report, "Unsaturated Flow Modeling for the East Smoky Panel Mine Proposed Action Cover" (Stantec 2017f). As reported in that document, unsaturated flow modeling conducted in 2015 and 2016, using a range of measured material characteristics for the earth materials that would be used to construct the cover, indicated that percolation through the Proposed Action store and release cover would range from about 2 to 3 inches per year up to about 6 to 7 inches per year. These rates are for a Proposed Action cover design of 12 inches of topsoil over 3 feet of Salt Lake Formation material at 85% relative compaction, over 2 feet of chert. In addition, HGG (2018) used a more conservative percolation rate of 15 inches per year to represent annual recharge if there was a total failure of the store and release cover, thereby assuming just topsoil storage of water.

The stochastic modeling approach allows a range of many simulations to be produced that can be used to test the sensitivity of the results for a range of percolation rates while holding the chemistry of the recharge to the groundwater constant. Using the stochastic modeling approach, three annual percolation rates (2-inch, 7-inch, and 15-inch) through the pit backfill covers were evaluated for the Proposed Action store and release cover. The 2-inch percolation rate is the lowest annual percolation rate that is potentially achievable for the Proposed Action cover, and the 7-inch percolation rate is considered to be the reasonably foreseeable long-term average percolation rate for that cover.

As described in the October 2017 source term memorandum (Stantec 2017g), column testing was conducted to determine the chemistry of percolating water after it has moved through the overburden material packed in the columns. The column testing of the different overburden lithologies and ROM column, were conducted as sequential cycles of wetting followed by drainage. The different cycles were related to volumes of water equivalent to the pore volumes (PVs) of the samples in the columns. The time required for each PV of water to transit the solid material in the test columns was measured in days. To relate the findings of the column testing to the field scale it is necessary to determine the time calculated for a PV of recharge water to transit the field-scale pit backfills. Based on cross sections provided in the M&RP for the East Smoky Panel, the average depth of the Proposed Action backfill across the entire East Smoky Panel is approximately 289 feet.

Following the convention established by the Agencies, it is assumed that approximately 15 percent of the total backfill volume at the field scale will support unsaturated water flow and be subject to leaching. This is because infiltrating water at the field scale is known to develop preferential flow paths such that only a fraction of the total solid volume actually comes in contact with percolating water. The time for each PV to pass through the backfill depends on the water recharge rate into the top surface of the backfill, which is the same as the percolation rate through the cover (see above). The time for each PV for each of the percolation rates is calculated by:

$$(289 \text{ feet} \times 0.15)/(\text{inch per year percolation rate}/12)$$

The calculated times for the PVs to transit the pit backfill for each percolation rate are shown in **Table 4.5-1**.

Table 4.5-1 Calculated Pit Backfill Transit Times

PERCOLATION RATE (INCH/YEAR)	PORE VOLUME TRANSIT TIME (YEARS)
2	260
7	74
15	35

Further, adding more overburden on top of the currently permitted backfill in Panel B would increase the duration of each pore volume at the field scale. Using the proposed average depth of additional overburden to be added to the top of the Panel B backfill (about 130 feet) and using the same approach to estimating pore volume timing for a 7-inch percolation rate as described previously, the duration of each pore volume through the added overburden layer would be about 33 years. This would be added to the pore volume duration of the currently approved Panel B backfill of 91 years. This is not considered to be a significant increase in pore volume duration for the Panel B backfill.

Following the convention established by the Agencies, the chemistry of each PV was held constant during the fate and transport modeling for the length of time calculated for the PV to transit the backfill and the modeling was conducted for a total period of 300 years.

Seepage Chemistry

The chemistry of the seepage through the East Smoky Panel backfill was determined by leaching columns of drill hole cuttings of the overburden lithologies from the East Smoky Panel site. The methods and findings of this testing are described in the Final East Smoky Panel Baseline Geochemistry Study Report (Whetstone 2017). Per that report, the recommended leachate chemistry to be used for the East Smoky Panel, Proposed Action pit backfill is that for the ROM columns. Whetstone provided the results of the column leaching for use in determining the chemistry component of the source term (Stantec 2017g).

A lengthy list of potential water chemistry solutes was included in the laboratory analyses of the column leaching solutions. This list was based on past practices with other phosphate mining EISs in Idaho. The results of all these laboratory analyses were reported in the Geochemistry Study Report (Whetstone 2017). Samples of the column leachates were taken at specified aliquots that are related to pore volume of the solid material in the columns. These aliquots are the same as the previously described PVs. Based on past practice, it was known that concentrations of solutes typically become very low and nearly constant by three pore volumes (PV3) so analyses were terminated with PV3, except for the ROM columns where an additional, confirmatory PV sample was obtained. The concentrations of all the solutes in the various PVs were then compared to applicable standards for protection of groundwater and surface water in Idaho. The only solutes that were found to exceed any such standards in any of the PVs were sulfate (250 mg/l), TDS (500 mg/l), cadmium, manganese (0.05 mg/l), nickel (0.052 mg/l), selenium (0.005 mg/l), and thallium (0.00024 mg/l). The surface water standard for cadmium is based on hardness of the water. For a Hoopes Spring water hardness of 247 mg/l (the lowest, and thus most conservative, hardness reported during the baseline study) the surface water standard would be 0.0096 mg/l. Cadmium, selenium, and nickel standards are surface water criteria for the protection of aquatic life. Sulfate, TDS, and manganese standards are secondary groundwater standards that reflect aesthetic values. The thallium standard is a surface water criterion established as protective of human consumption of fish. Note that groundwater standards for metals reflect total recoverable concentrations while surface water standards for metals reflect dissolved concentrations except for selenium, which reflects a total recoverable concentration. These seven solutes were then considered potential COPCs for the groundwater modeling.

These potential COPCs for the groundwater impact modeling and their concentrations are shown in **Table 4.5-2**. The values for the Proposed Action are measured from a ROM column that contained a mixture of the different waste rock lithologies in the same proportion as the material balance in the M&RP. This set was run for four full PVs. The values for the other combinations of lithologies are weighted averages calculated with the relative proportions of the lithologies in the mixtures and based on the leachate chemistry of the monolithologic test columns of these different lithologies. These columns were run for three sequential PVs. Shading in **Table 4.5-2** marks values greater than the lower of either the groundwater or surface water standard for the analyte.

Table 4.5-2 COPCs for Groundwater Modeling, Proposed Action and Alternative 1

COLUMN	PV	SO_4[1]	TDS[1]	CD	MN[1]	NI	SE	TL
Proposed Action								
ROM-U1	1	261	813	0. 0004	2. 1320	0. 0227	0. 0760	0. 0001
ROM-U1	2	55	312	0. 0001	1. 7143	0. 0086	0. 0060	0. 0001
ROM-U1	3	17	229	0. 0002	1. 8370	0. 0100	0. 0031	0. 0001
ROM-U1	4	10	236	0. 0002	1. 8015	0. 0081	0. 0021	0. 0001
Alternative 1								
SLF-U1+REX-U1+MPW-U1+LST-U1	1	117	715	0. 0019	0. 8431	0. 042	0. 0526	0. 0003
SLF-U1+REX-U1+MPW-U1+LST-U1	2	15. 4	285	0. 0008	0. 5205	0. 019	0. 0081	0. 0002
SLF-U1+REX-U1+MPW-U1+LST-U1	3	16. 8	225	0. 0009	0. 6378	0. 022	0. 0062	0. 0002

All concentrations in mg/L. All metal concentrations are totals. Shaded values exceed a GW or SW standard.
SO_4=sulfate; TDS=total dissolved solids; Cd=cadmium; Mn=manganese; Ni=nickel; Se=selenium; Tl=thallium
[1] The relevant standard for this constituent is a secondary standard.

The initial overburden mined from the East Smoky Panel would be backfilled within the Panel B pit. The impact of mine overburden on the underlying Wells Formation aquifer in the Panel B area was previously evaluated in the Panels B&C EIS (BLM and USFS 2002a) and will not be remodeled in this effort. The effect of adding the East Smoky Panel overburden to the top of the already permitted B-Panel backfill was evaluated by comparing the column testing results for the Panels B&C EIS with the recent results from Whetstone for the East Smoky Panel. The PV concentrations of selenium and cadmium for the Panels B&C backfill is compared to the overburden from the East Smoky Panel in **Table 4.5-3**.

Table 4.5-3 Comparison of PV Concentrations – Selenium and Cadmium

MATERIAL SOURCE	SELENIUM (MG/L), PV 1, 2, 3	CADMIUM (MG/L), PV 1, 2, 3
Panels B&C Weighted Avg.	0.181, 0.064, 0.047	0.0023, 0.001, 0.0008
East Smoky Proposed Action	0.0760, 0.0060, 0.0031	0.0004, 0.0001, 0.0002
East Smoky Alternative 1	0.0526, 0.0081, 0.0062	0.0019, 0.0008, 0.0009

Concentrations are total recoverable.

As can be seen from **Table 4.5-3**, the selenium and cadmium leach column concentrations for the East Smoky Panel overburden are significantly lower than for the previous Panels B&C project. The main reason for this difference is the high-angle or overturned nature of the rock bedding in the East Smoky Panel pit which results in a dramatically different overburden mixture containing much less Meade Peak member compared to the other mine panels at the Smoky Canyon Mine. Consequently, the selenium and cadmium concentrations of the backfill itself are less than other mines so the column leachate concentrations are also lower. Additionally, the Meade Peak material in the East Smoky Panel may be more weathered than the other panels, which typically results in lower selenium concentrations in the column leachates.

Adding overburden from the East Smoky Panel Proposed Action or Alternative 1 to the Panel B backfill would not increase the selenium or cadmium concentrations of seepage through the Panel B backfill, so additional groundwater impact analysis of this change to the Panel B backfill is not required.

The manganese column test results for the Panels B&C EIS and the East Smoky Panel are shown in **Table 4.5-4**. The manganese column test results for the East Smoky Panel Proposed Action are greater than the Panels B&C results.

Table 4.5-4 Comparison of PV Concentrations - Manganese

MATERIAL SOURCE	MN (MG/L), PV 1, 2, 3
Panels B&C Weighted Avg.	0.164, 0.102, 0.054
East Smoky Panel Proposed Action	2.132, 1.7143, 1.8370
East Smoky Panel Alternative 1	0.8431, 0.5205, 0.6378

Concentrations are total recoverable.

The currently permitted Panel B backfill volume is 20.9M loose cubic yards (LCY). The volume of the proposed East Smoky Panel overburden to be added to the Panel B backfill from the East Smoky Panel Proposed Action is 9.1M LCY. The effect of these added concentrations to the Panel B backfill were evaluated by looking at the weighted average concentration of manganese in the column leachates as described below (**Table 4.5-5**).

Table 4.5-5 Weighted Average Manganese Concentrations in Panel B Backfill

PROPOSED ACTION – WEIGHTED MN CONCENTRATIONS					
Material Source for Panel B Backfill	M LCY	%	PV1	PV2	PV3
Panels B&C	20.9	69.67	0.114	0.071	0.037
East Smoky Panel	9.1	30.33	0.647	0.520	0.557
Total	30	100	0.761	0.590	0.594
REDUCED PIT SHELL ALTERNATIVE – WEIGHTED MN CONCENTRATIONS					
Panel B	20.9	62.39	0.102	0.064	0.034
East Smoky Panel	12.6	37.61	0.317	0.196	0.240
Total	33.5	100	0.419	0.26	0.274

Concentrations are total recoverable.

The weighted average concentrations for manganese in the Panel B leachate for the Proposed Action is greater than that already analyzed in the Panels B&C EIS because there would be an additional source coming from the East Smoky Panel. However, manganese has a secondary groundwater standard of 0.05 mg/L, which is related to aesthetics, not human health.

For the Proposed Action, neither cadmium or thallium concentrations in the column leachates exceeded any applicable standards and so are not recommended for that groundwater modeling scenario. The concentrations of these solutes in all PVs of Alternative 1 are well below the applicable groundwater standards and slightly above their surface water standards for PV1 only. Because of the relative closeness of these PV1 leachate concentrations to the applicable standards and the fact that their concentrations were below the standards for the subsequent PVs it can be assumed that adding these low concentrations to the underlying groundwater will result in mixed concentrations below the applicable surface water standards.

For all the reasons stated above, the COPCs carried forward for groundwater fate and transport modeling for the Proposed Action and Alternative 1 are sulfate, TDS, manganese, and selenium.

Potential Mobilization of COPCs/Impact to Wells Formation

The primary potential pathway of contamination to the Wells Formation aquifer would be vertical percolation of recharge via the pit backfills. The fate and transport modeling establishes changes in groundwater chemistry over time caused by the addition of COPCs to the groundwater that leaches from the pit backfills. Fate and transport of COPCs was evaluated for the Proposed Action and Alternative 1 at the three percolation rates described above for the stochastic modeling approach. The potential impacts under Alternative 1 are described in **Section 4.5.2.2**.

Model-simulated impacts to groundwater quality in the Wells Formation are generally greatest near the backfilled pit excavations. Away from the pit backfilling, these impacts diminish. Flatter water table gradients, such as the case for the Project Area, slow the mixing of COPCs and groundwater, minimizing the dilution of contaminant concentrations within the impact plume. Overall, local gradients emanating from the groundwater recharge mound influence peak concentrations in close proximity to open pits; whereas the regional gradients have more influence on the overall shape and extent of water quality impacts and maintain a level of control on reducing concentrations within the plume (HGG 2018). Some northern transport of COPCs is evident in the modeling results with some very low concentration selenium plumes migrating in the Wells Formation aquifer as far north as Salt Lick Creek. As previously described, there is no flow connection between the Wells Formation aquifer and these northern streams so there is no risk of water quality impacts to these streams from the modeled plumes.

For the East Smoky Panel stochastic analysis, multiple model results for each COPC in the Wells Formation over a period of 300 years were generated (HGG 2018). COPC concentrations were evaluated at six monitoring locations: two generated by the model (OBS-1, OBS-2), one downgradient monitoring well (GW-27), the industrial well (GW-IW), and two surface water monitoring locations Hoopes Spring (HS) and Lower South Fork Sage Creek Springs (LSS) (**Figure 4.5-1**). A summary of the results for the stochastic analysis is provided in the following sections. Plume maps for the 100-year and 300-year time periods are included for selenium (**Figures 4.5-2** and **4.5-3**) and manganese (**Figures 4.5-4** and **4.5-5**) for reference. Additionally, only the reasonably foreseeable conditions of the 7-inch percolation rate is considered relevant for presentation of potential impacts from the Proposed Action for the EIS. The HGG modeling report provides the full range of results for all scenarios (HGG 2018).

The stochastic results of the fate and transport model estimates for COPC concentrations in the Wells Formation under the reasonably foreseeable 7-inch percolation rate for the Proposed Action is summarized at selected time steps in **Table 4.5-6** at the groundwater model observation points and two other downgradient monitoring wells that are closer to the pit backfills than observation point GW-27.

Table 4.5-6 Model Predictions of COPC Concentrations – Proposed Action, Groundwater

COPC GROUNDWATER	STANDARD	YEARS	MODEL OBSERVATION POINTS (ONLY GROUNDWATER LOCATIONS)*				OTHER LOCATIONS OF INTEREST	
			OBS-1	OBS-2	GW-27	GW-IW	GW-16	GW-24
Selenium, total (mg/L)	0.05	10	0.000	0.007	0.000	0.000	0	0
		50	0.015	0.034	0.001	0.000	0	0
		100	0.012	0.023	0.003	0.000	0	0
		200	0.008	0.017	0.002	0.000	0	0
		300	0.006	0.014	0.002	0.000	0	0
Manganese, total (mg/L)	0.05	10	0.006	0.205	0.000	0.000	0.003	0
		50	0.409	0.964	0.032	0.000	0.009	0.003
		100	0.456	1.045	0.073	0.000	0.008	0.003
		200	0.493	1.151	0.093	0.000	0.008	0.003
		300	0.508	1.195	0.101	0.000	0.008	0.003
Sulfate, total (mg/L)	250	10	1	25	0	0	3	0.2
		50	50	118	4	0	7	2
		100	43	89	10	0	3	1
		200	30	64	8	0	2	0.5
		300	25	53	7	0	1	0.5
Total Dissolved Solids (mg/L)	500	10	2	78	0	0	11	0.7
		50	156	369	12	0	22	7
		100	146	313	30	0	13	5
		200	124	274	28	0	10	3
		300	114	258	27	0	9	3

Notes:

* Surface Water Monitoring Points HS and LSS are not included in this table; see **Table 4.5-8**.

1) COPC concentrations are the 95% upper confidence limit based on the population mean as predicted by the model.

2) Shaded cells have concentrations that exceed the applicable groundwater standard (note that manganese exceedances are above the secondary standard governing aesthetics, not health).

3) Observation Locations:

OBS-1 & OBS-2 are model-derived observation points.

GW-27 is an existing Wells Formation monitoring well located approximately downgradient of the proposed pit excavation.

GW-IW is the existing industrial well located to the west of the proposed pit excavation that would be used for water supply, estimated at 500 gpm.

4) Other Locations of Interest:

GW-16 is an existing Wells Formation monitoring well located downgradient and just outside the proposed pit excavation.

GW-24 is an existing Wells Formation monitoring well located between GW-16 and the observation point GW-27.

At about 90 years, selenium concentrations of 0.001 mg/L arrive at Hoopes Spring, and this concentration stabilizes there until about 180 years when values begin to decrease reaching 0.0008 mg/L at the end of the simulation. These concentrations are well below any Clean Water Act standards for Sage Creek downstream of Hoopes Spring but are shown to indicate the numerical value of the negligible impacts predicted by the modeling. No impacts were observed at Lower South Fork Sage Creek Springs during the entire simulation. Hoopes Spring and Lower South Fork Sage Creek Springs are not shown in **Table 4.5-6** but are discussed further in the Surface Water section and shown in **Table 4.5-8**.

As described previously, the explanation for these relatively low concentration groundwater impacts is that the column leachate selenium concentrations for East Smoky Panel are much less than for prior Smoky Canyon mine panels.

Manganese

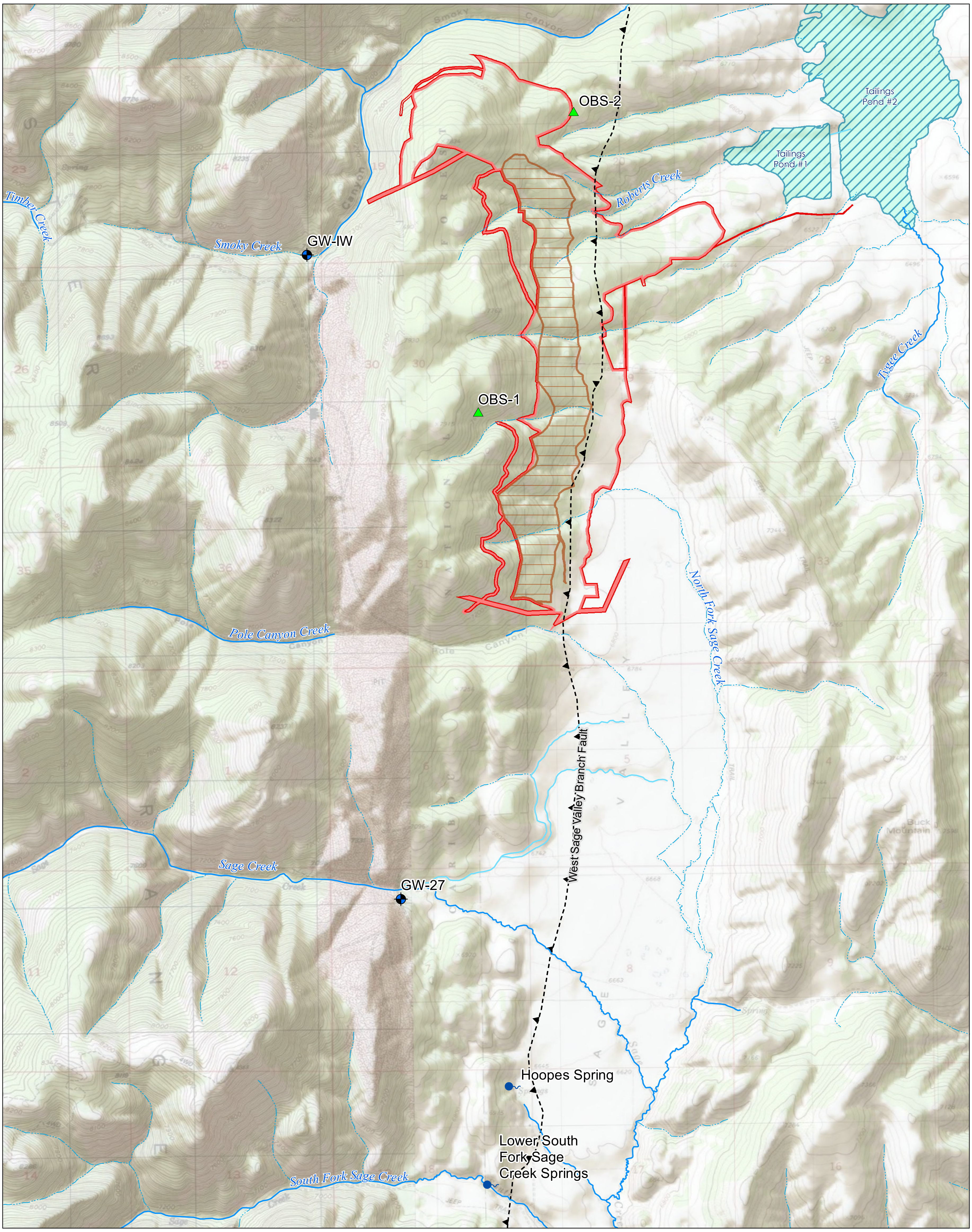
Fate and transport modeling for the East Smoky Panel backfill for the Proposed Action (7-inch percolation rate) showed a large manganese plume greater than the existing condition of 0.004 mg/L at the observation point GW-27 and the groundwater secondary standard of 0.05 mg/L extending from the East Smoky Panel west under much of Panel B and down to Hoopes Spring. The >0.05 mg/L plume for manganese in the Wells Formation developed rapidly below and south of the pit backfill and then gradually continued to move south during the simulation. Predicted groundwater concentrations were greater than the groundwater secondary standard (0.05 mg/L) at the end of the 300-year simulation at both of the model observation points and at the downgradient monitoring well, with a concentration of 0.101 mg/L at GW-27. The maximum manganese concentration at Hoopes Spring was 0.047 mg/L at the end of the 300-year modeling simulation. No impacts were observed at Lower South Fork Sage Creek Springs during the entire simulation.

Because manganese is prevalent in the waste rock leachates of all the pit backfills at Smoky Canyon, and the secondary standard for manganese is relatively low, it is likely that a wide area of Wells Formation aquifer would be impacted above the groundwater secondary standard in the Smoky Canyon Mine area. The addition of the East Smoky Panel overburden to the Panel B backfill volume does not change this impact.

It should also be noted that the groundwater standard for manganese is a secondary standard, not based on protection of human health like a primary standard, but instead based on aesthetics, specifically water color, staining household fixtures, and taste.

Sulfate

For most of the modeled simulations for sulfate, groundwater concentrations in the Wells Formation are much less than the existing condition of 26 mg/L at the observation point GW-27 and the 250 mg/L groundwater secondary standard. The maximum sulfate concentration of about 250 mg/L is observed under the pit backfill at about 75 years at the end of PV1 and then gradually decreases thereafter. By 150 years, the concentration under the backfill is about 100 mg/L and decreases to about 50 mg/L at the end of the 300-year modeled period.



Legend

Thrust Fault

Stream/River

Intermittent Stream

Other Waterway

Existing Tailings Pond

Project Area Boundary

Proposed Pit Disturbance

Observation Location

Wells Formation Groundwater Monitoring Well Location

Model Observation Location

Spring/Seep

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet

2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed

Sources: Esri, USGS, NOAA

3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.

4: Project Location: T8S R46E, T9S R46E

Caribou County, Idaho

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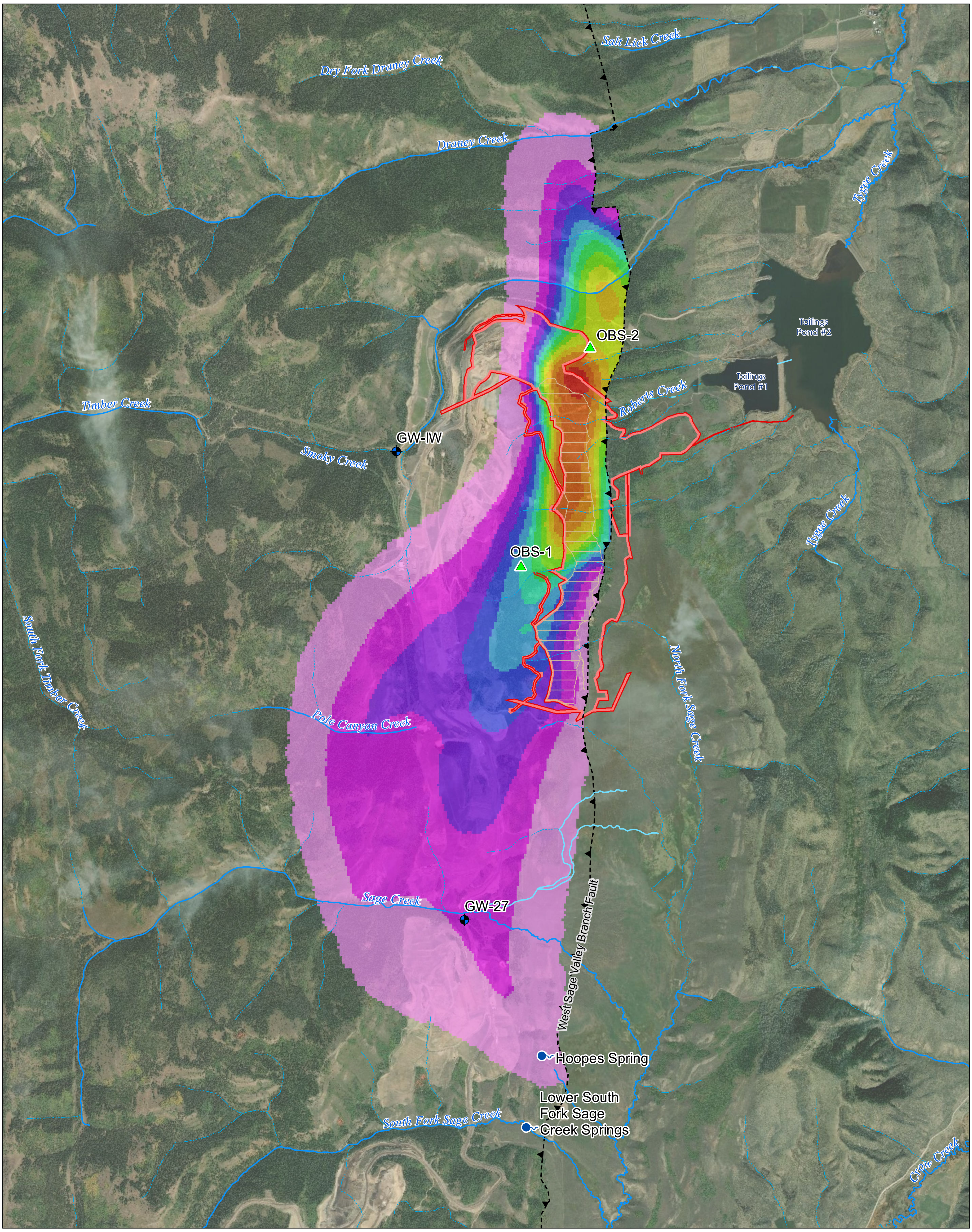
Figure 4.5-1

Model Observation Locations

East Smoky Panel Mine EIS



Legend

Stream/River

Intermittent Stream

Other Waterway

Thrust Fault

Project Area Boundary

Proposed Pit Disturbance

Observation

Wells Formation Groundwater Monitoring Well Location

Model Observation Location

Spring/Seep

Model-Predicted Selenium Concentrations at 100 Years milligrams per Liter (mg/L)

0.05

0.025

0.015

0.007

0.001

Note: Primary groundwater standard for selenium is 0.05 mg/L.

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet

2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.

4: Project Location: T8S R46E, T9S R46E Caribou County, Idaho

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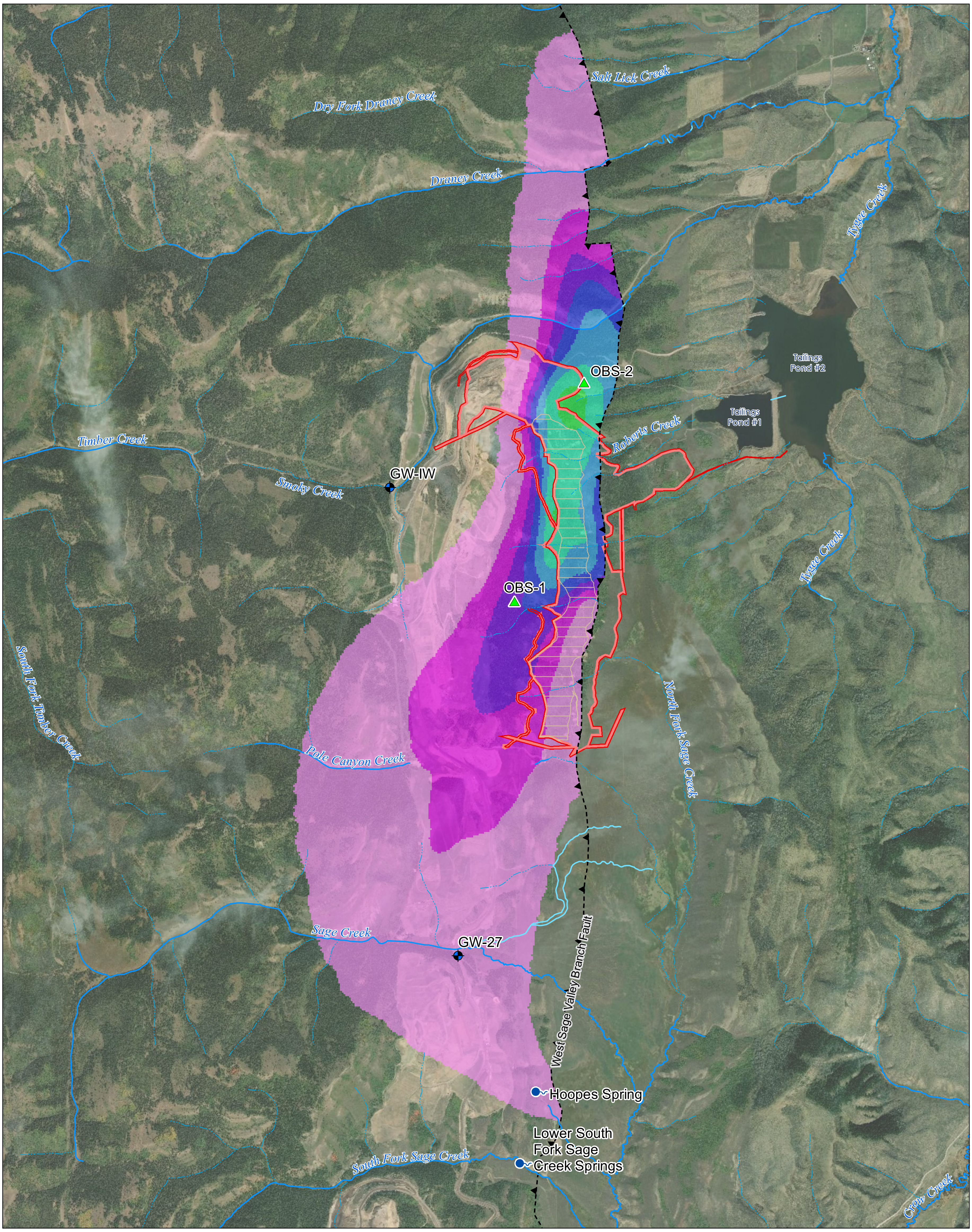
Figure 4.5-2

Proposed Action, Model-Predicted Selenium Concentrations at 100 Years East Smoky Panel Mine EIS



Legend

- Stream/River
- Intermittent Stream
- Other Waterway
- Thrust Fault
- Project Area Boundary
- Proposed Pit Disturbance

Observation Location

- Wells Formation Groundwater Monitoring Well Location
- Model Observation Location
- Spring/Seep

Model-Predicted Selenium Concentrations at 300 Years
milligrams per Liter (mg/L)

0.05
0.025
0.015
0.007
0.001

Note: Primary groundwater standard for selenium is 0.05 mg/L.

Notes
1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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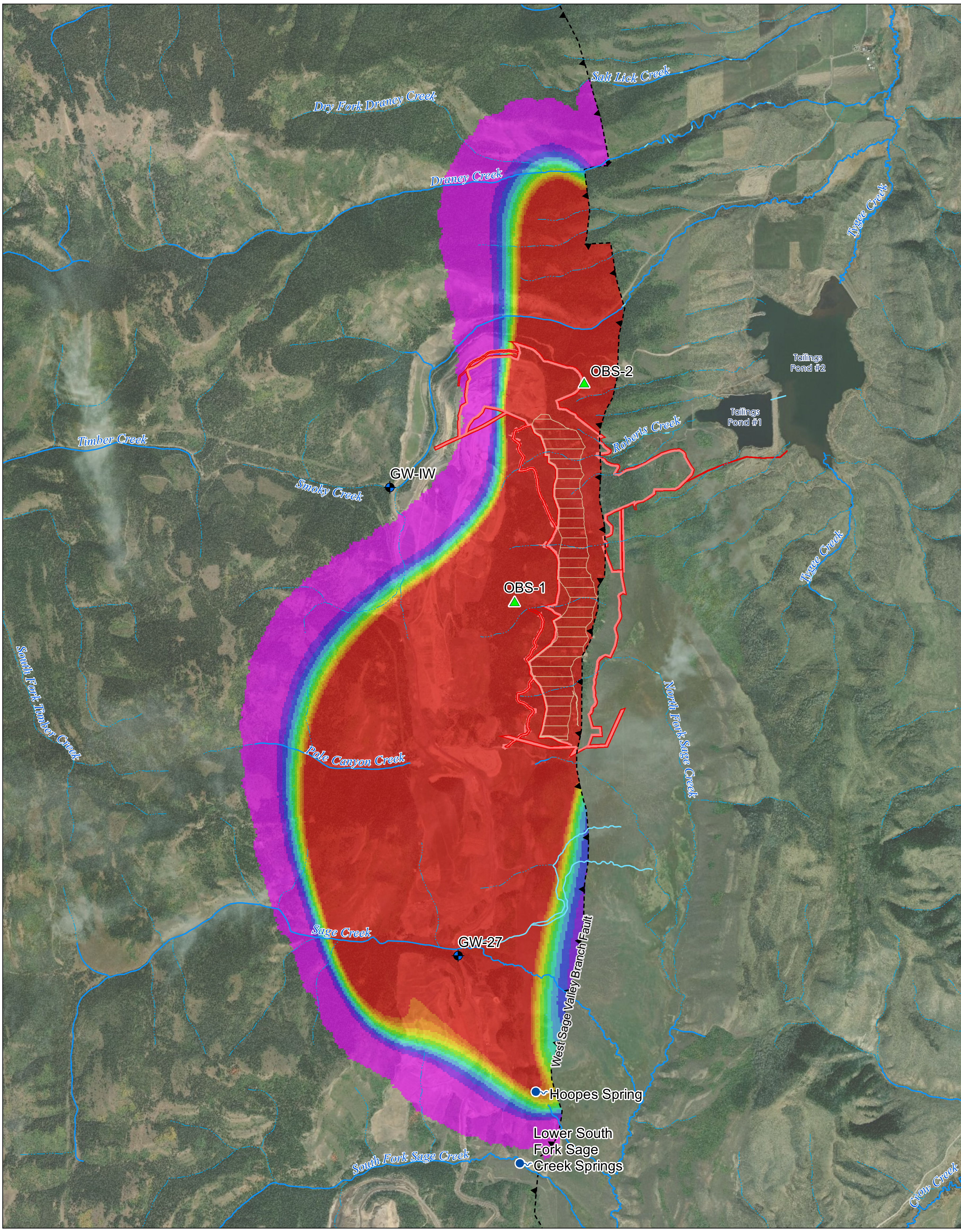
Figure 4.5-3
Proposed Action, Model-Predicted Selenium Concentrations at 300 Years
East Smoky Panel Mine EIS



Legend

Stream/River

Intermittent Stream

Other Waterway

Thrust Fault

Project Area Boundary

Proposed Pit Disturbance

Observation

Wells Formation Groundwater Monitoring Well Location

Model Observation Location

Spring/Seep

Model-Predicted Manganese Concentrations at 100 Years milligrams per Liter (mg/L)

0.05

0.025

0.015

0.007

0.005

Note: Secondary groundwater standard for manganese is 0.05 mg/L.

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet

2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.

4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

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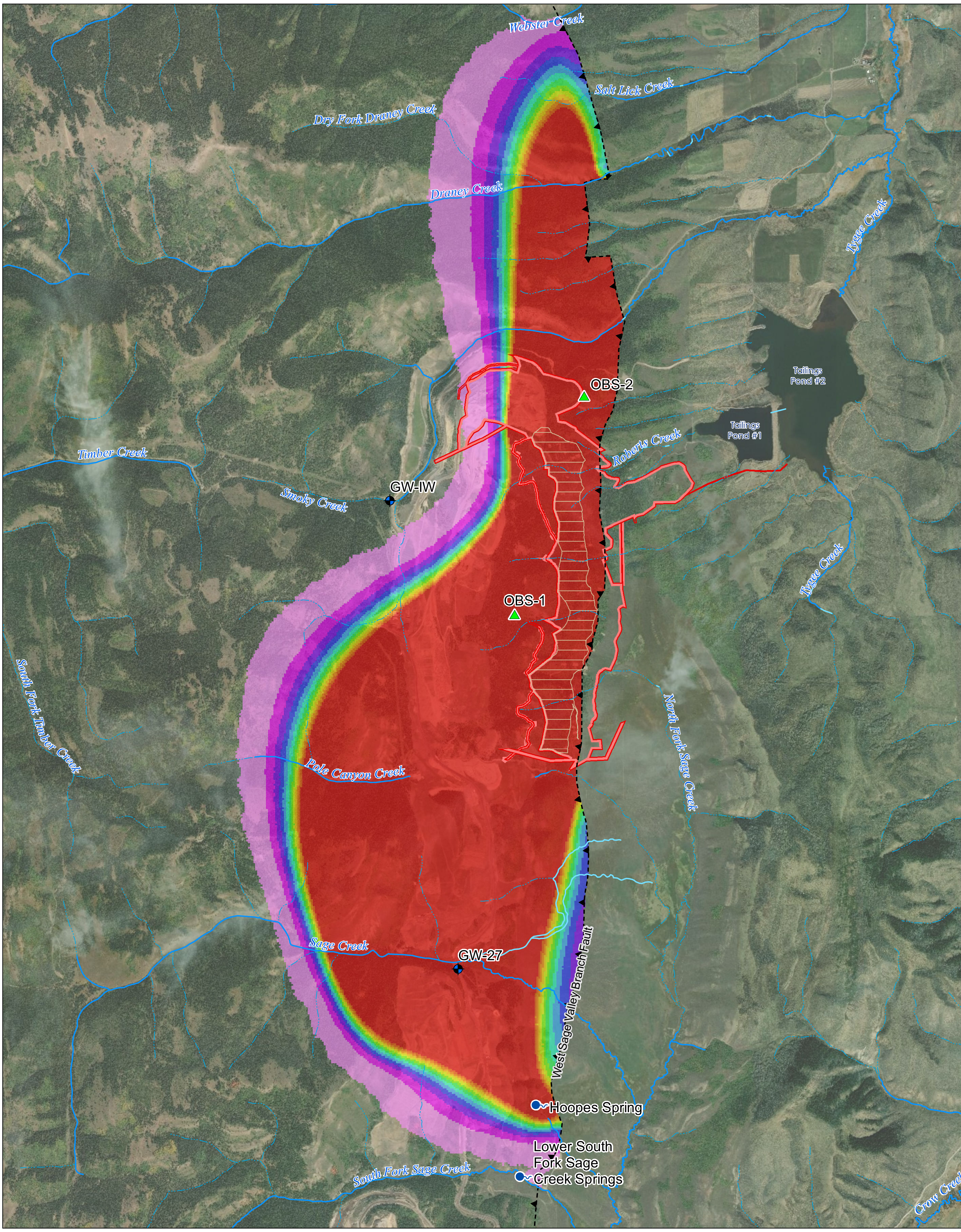
Figure 4.5-4

Proposed Action, Model-Predicted Manganese Concentrations at 100 Years

East Smoky Panel Mine EIS



Legend

Stream/River

Intermittent Stream

Other Waterway

Thrust Fault

Project Area Boundary

Proposed Pit Disturbance

Observation

Wells Formation Groundwater Monitoring Well Location

Model Observation Location

Spring/Seep

Model-Predicted Manganese Concentrations at 300 Years milligrams per Liter (mg/L)

0.05
0.025
0.015
0.007
0.005

Note: Secondary groundwater standard for manganese is 0.05 mg/L.

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E Caribou County, Idaho

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Figure 4.5-5
Proposed Action, Model-Predicted Manganese Concentrations at 300 Years East Smoky Panel Mine EIS

Sulfate concentrations of about 1 mg/L reach Hoopes Spring at about 50 years and increase to about 4 mg/L at 100 years after which time the concentration stabilizes to between 3 and 4 mg/L for the rest of the simulation. No impacts were observed at Lower South Fork Sage Creek Springs during the entire simulation. The groundwater standard for sulfate is a secondary standard, not based on protection of human health like a primary standard, but instead based on aesthetics, specifically water color, staining household fixtures, and taste.

<u>*Total Dissolved Solids*</u>

TDS concentrations in Wells Formation groundwater are typically much less than the existing condition of 352 mg/L at the observation point GW-27 and the 500 mg/L groundwater secondary standard during the model-simulated time period. However, initially by about 20 years, a greater than 500 mg/L plume has begun to develop under the pit backfill. This plume increases in size for about 70 years after which it begins to degrade due to ongoing recharge through the cover. By about 100 years, the concentrations under the backfill decrease to less than 500 mg/L and continue to gradually decrease, reaching 400 mg/L by about 150 years and around 300 mg/L by the end of the simulation of 300 years.

Groundwater concentrations of about 1 mg/L reach Hoopes Spring by about 40 years, increase to about 13 mg/L at about 170 years, and then decrease to about 12 mg/L at the end of the simulation. No impacts were observed at Lower South Fork Sage Creek Springs during the entire simulation.

The groundwater standard for TDS is a secondary standard, not based on protection of human health like a primary standard, but instead based on aesthetics, specifically water color, staining household fixtures, and taste.

Water Rights and Groundwater Use

As described in the Water Resources Technical Report (Stantec 2016d), within the Smoky Creek, Roberts Creek, and Pole Canyon watersheds, there are three water rights associated with groundwater. All three of these groundwater rights are for industrial use, owned by Simplot, and associated with the Smoky Canyon Mine. As such, predicted changes in groundwater quality would not be considered an impact to these water rights. Further, as described in Stantec (2016d), there are several wells not included in the water rights records: four wells are described as domestic wells, one well is described as a domestic/stock well, and one well does not have a specific recorded use. These are located at least three miles to the northeast and upgradient of the East Smoky Panel Project Area. Flow modeling conducted as part of the groundwater modeling effort for the East Smoky Panel has shown that the mining would not impact groundwater levels to any noticeable degree, thus there would be no impact to these wells.

The surface water and groundwater directed to the tailings pond for the duration of mining activities would be available for ongoing use in the processing mill and pipelines instead of pumping groundwater from the existing industrial well.

No new rights to groundwater, and no changes to existing groundwater rights (such as place of use, point of diversion, or nature of use) would be needed.

<u>**Surface Water**</u>

Watershed Area Disturbance

The Proposed Action would create disturbances on NFS lands in two HUC 6 watersheds. As described in **Section 3.5.2.1**, no more than 30 percent of NFS lands within a watershed or subwatershed should be in a hydrologically disturbed condition. The Proposed Action would add to the already existing and defined disturbances given in **Table 3.5-2**. **Table 4.5-7** provides this information. Once reclamation has been successfully completed, the amount of hydrologically disturbed mining areas associated with the Project would be greatly reduced over time. This impact is considered minor but long-term.

Table 4.5-7 Hydrologically Disturbed Areas

WATERSHED	HUC	TOTAL AREA (ACRES)	HUC AREA ON NFS LANDS (ACRES)	PROPOSED DISTURBED (ACRES)	PERCENT OF TOTAL HUC DISTURBED WITH PROPOSED ADDED	PROPOSED DISTURBED (ACRES) ON NFS LANDS	PERCENT OF HUC DISTURBED ON NFS WITH PROPOSED ADDED
Tygee Creek	170401050204	24,284	13,012	495	15.5	414	11.8
Sage Creek	170401050103	15,149	10,617	354	16.4	114	20.3

In general, the better condition a watershed and its stream channel are in, the more resilient it is to the effects of disturbance. As described in **Section 3.5.2.1**, the CNF RFP EIS (USFS 2003b) considered the Salt River watershed (4th scale HUC) overall to have a "low vulnerability to additional stressors such as pollutant loadings." This could indicate that the Salt River watershed as a whole may have a better ability to absorb the proposed disturbances than would a different watershed with a higher vulnerability rating.

However, the Tygee and Sage creeks 6th level HUCs, according to a different, more recent assessment (USFS 2017a) known as the WCF, indicates that these two basins are at risk. As noted in **Section 3.5.2.1**, the WCF classed both the Tygee Creek basin and the Sage Creek basin as impaired. Given that rating, these two individual HUCs likely have a lower "ability to absorb the proposed disturbances" than the Salt River watershed as a whole.

Streamflow Alterations

On a local scale, streamflows in several smaller basins would potentially be altered compared to current conditions. These basins include Smoky Creek, Roberts Creek, North Sage Valley, and Pole Canyon Creek. Streamflow effects could occur due to: (1) reductions or increases in stormwater runoff due to rerouting and/or capture in open pits and sedimentation ponds; and/or (2) reduction in baseflows due to disruption of springs or other groundwater discharges such as gaining stream reaches. Each of these is discussed below.

The Proposed Action would not physically alter any perennial stream channels so Stream Alteration Permits would not be required. Predicted effects on water rights due to stormwater runoff routing or baseflow reductions are discussed under the *Water Rights and Water Use* heading, below.

<u>*Stormwater Runoff Changes*</u>

During operations, runoff from precipitation that falls up-gradient of the East Smoky Panel would be collected and rerouted around the disturbances via a run-on diversion. Depending upon the phase of mining, some of this runoff would be released to a different drainage area than where it originated because the run-on diversions are designed to direct stormwater southward along the west side of the pit before releasing it to continue eastward (**Figure 2.4-1**). In addition, precipitation falling within the footprint of open pits would not contribute to stormwater runoff because it would be confined within the pit. Runoff generated from precipitation falling within the other Project disturbance areas would be directed to - and retained in - constructed stormwater ponds. These ponds would contain the expected runoff from storm events up to the 100-year, 24-hour precipitation depth. The net effect of the diversions and containments would be to alter the contributing watershed areas of the four drainages listed above, which in turn would alter expected runoff amounts.

All four basins are already subject to flow alterations from existing mining disturbances. Runoff has been withheld from approximately 880 acres of the 4,200-acre Smoky Creek drainage (i.e., about 22 percent). The Proposed Action would reduce Smoky Creek's contributing area by another 125 acres (3 percent). Runoff has already been withheld from approximately 180 acres of the 1,600-acre Robert's Creek drainage (i.e., about 11 percent). The Proposed Action would reduce Robert's Creek's contributing area by another 530 acres (33 percent). Runoff has already been withheld from approximately 150 acres of the 2,000-acre North Sage Valley drainage upstream of the confluence with Pole Canyon Creek (i.e., about 8 percent). The Proposed Action would reduce the North Sage Valley's contributing area by another 335 acres, but it would also add to it by redirecting flows into this drainage from the north via the run-on diversion, for a net effect of increasing the watershed area by about 120 acres (i.e., about 6 percent). Last, a negligible amount of Project runoff would be generated in the Pole Canyon Creek watershed and contained by stormwater ponds, but runoff from about 260 acres to the north would be directed into Pole Canyon Creek via a run-on ditch. In addition, note that the drainage area between Smoky and Roberts creeks that contributes flow to the existing tailings pond would also be reduced, but that is not relevant here because the tailings pond is a closed system that does not function as a water resource.

Changes in contributing areas suggest a similar change in runoff peak or volume. Once reclamation has been successfully completed, ditches would generally remain, but ponds would be removed, allowing the disturbed and reclaimed areas to again function as part of the watershed and regularly contribute runoff to streams. In general, the impacts to runoff are considered to be minor to moderate, local, and have long-term durations limited to the mining period.

<u>*Baseflow Reductions*</u>

Streamflows that are supported at least partially by groundwater discharge from aquifers that are predicted to be affected by the Proposed Action could be reduced. Impacts to aquifers were discussed in the groundwater section above. Wells Formation, Dinwoody Formation, Salt Lake Formation, and alluvium all support springs or stream reaches in the vicinity of the East Smoky Panel (**Section 3.5.3**).

Smoky Creek is located very close to Project disturbances and is supported by Dinwoody Formation groundwater (BLM and USFS 2002). However, as described in the groundwater section above, contributions to Smoky Creek from that aquifer are not predicted to be diminished. Thus, Smoky Creek baseflows would not likely be impacted by the Proposed Action, nor would there be injury to any water rights on Smoky Creek.

Roberts Creek flows appear to originate from alluvium, Salt Lake Formation groundwater, and/or Dinwoody Formation groundwater, primarily via discharge from a spring designated as URS (**Figure 3.5-13**). However, the source of water for the spring is not well understood and is thought to consist of perched groundwater in the Salt Lake or Dinwoody Formations. If the water for the spring is flowing from the north, the opening of the East Smoky Panel would have negligible impact on the spring. If the water flow is from the west, the impact described in the current narrative would be possible and would be more serious than if the water flow is from the north.

URS, as well as other nearby alluvium/Salt Lake Formation springs ESS-1, ESS-2, and LinS, would likely lose some or all flow with the disruption of much of the up-gradient area. Given the reduction in their recharge areas as well as reduction in their watershed areas, the assumption for this analysis is that URS, ESS-1, ESS-2, and LinS would all cease to flow. Because all four of these water sources contribute to Tygee Creek via the Roberts Creek Diversion, it is further assumed that Tygee Creek flows would be diminished to some extent due to these spring flow losses. These losses are quantified as follows. This analysis would be a conservative assessment if URS and Roberts Creek are supported solely by Dinwoody Formation groundwater to the north. The implication of potential losses to water rights is discussed in a later subsection called *Water Rights and Water Use*.

According to water monitoring data collected during the two-year baseline study for this EIS (**Section 3.5.2.2**), URS, ESS-1, and ESS-2 flow perennially. LinS flowed until midway through the monitoring period but dried up at the source after the water right holder installed new piping and performed earthwork; it has been excluded from this evaluation of Project-related flow decreases. While the presence of flows was noted and samples were collected at URS, ESS-1, and ESS-2, flow rates were generally not measurable due to lack of a confined channel to convey the flow, a diffuse flow path, and/or other prohibitive condition. In contrast, UR-3 is located a short distance downstream of URS and flows were always measurable. Therefore, UR-3 is used as a stand-in for URS flow data. In addition, UR-3 data were used to estimate baseflow rates at ESS-1 and ESS-2.

Considering the September and November flow measurements at UR-3 to represent baseflow conditions (average 0.27 cfs) and the May and July measurements as high flow conditions (average 0.31 cfs), the ratio of the average high flow to the average baseflow is 1.12. Applying that ratio to the high flow measurements at ESS-1 and ESS-2 (0.10 and 0.09 cfs, respectively), the combined estimated baseflow rate of these two springs is 0.17 cfs. In total, the estimated baseflow loss from URS, ESS-1, and ESS-2 that would no longer contribute to Tygee Creek is 0.44 cfs (0.27 + 0.17). Tygee Creek downstream of the mouth of the Roberts Creek diversion (**Figure 3.5-13**; LT-3) had an average baseflow of 0.56 cfs during the two-year baseline monitoring study. Subtracting 0.44 cfs from 0.56 cfs, the estimated impact to Tygee Creek as a result of the loss of flow in the aforementioned springs is a 79 percent reduction in flow at LT-3. Downstream of LT-3, Tygee Creek receives flow from several tributaries (Smoky, Draney, Salt Lick, Webster Canyon, and Spring creeks). At the mouth of Tygee Creek, baseflow is estimated at 13.23 cfs (based upon data collected at LT-6). A reduction of 0.44 cfs at this location has an estimated impact of a 3 percent decrease in baseflow. At LT-3 this impact would be significant, but at LT-6, negligible. Note that these estimates are based upon data collected during a two-year study, which may not reflect longer term flow conditions. Note that the flow estimate methods represent estimates only and may under- or overestimate the actual flows at ESS-1 and ESS-2. Also note that Simplot has a prior continuing water right that allows them to divert flows from Roberts Creek to the tailings pond, which presumably also causes near-dewatering at LT-3 at times.

Stream flows in Pole Canyon are supported by runoff, springs, and groundwater contributions from the west and up-gradient of Project groundwater flow impacts. The majority of this flow is conveyed in the existing by-pass pipeline that conveys flow from the upstream part of the drainage around the ODA and releases it downstream of the of the mine disturbance. Thus, Pole Canyon baseflow would not be altered by the Proposed Action.

Sediment and TSS in Runoff

There are no numeric TSS criteria for aquatic life or other beneficial uses given in Idaho's Water Quality Standards. However, as noted in **Section 3.5.2.3**, sediment/siltation is a stressor that can be the basis of a beneficial use impairment under Idaho's 303(d) list, and TMDLs can be developed for sediment. In addition to - or instead of - TSS concentrations, turbidity measurements and/or streambed substrate pebble counts can be used to indicate sediment impairment (IDEQ 2017b). Turbidity and TSS are typically correlated, and the turbidity water quality standard of 25 nephelometric turbidity units above background was used in IDEQ's TMDL for the Salt River Basin (IDEQ 2017b) to derive a TSS target of 44.5 mg/L for the Smoky Canyon Mine WLA. **Table 3.5-5** notes several Study Area streams that are listed for sediment/siltation impairment in the 2014 Integrated Report (IDEQ 2017a), including Smoky Creek and Tygee Creek. TMDLs were subsequently developed and Simplot was assigned a Smoky Creek TSS wasteload allocation that varies by month (IDEQ 2017c), as described in **Section 3.5.2.3**. The allocation is managed through Simplot's stormwater permit. Under the Proposed Action, potential sediment contributions to Smoky Creek would not increase because stormwater management features route flows to other drainages (**Figure 2.4-1**).

Erosion and sediment transport related to the proposed mine disturbances, including during the construction of miscellaneous disturbances such as the power line, pipeline, roads, and the like, would be minimal, due to numerous BMPs and other controls. The SWPPP would be updated to include the East Smoky Panel. **Section 2.5.5** lists numerous BMPs and EPMs that would reduce or eliminate erosion and manage runoff such that sedimentation of downstream waters would be controlled. Further, as noted in **Section 2.4.9.4**, temporary re-vegetation of areas disturbed by construction would occur, also reducing or eliminating erosion. With these controls in place, erosion would likely be minimal at most, with consequent stream sedimentation unlikely.

As noted in **Section 2.4.5.2**, stormwater ponds would be constructed and operated to retain sediment and runoff generated from mining disturbance (excluding roads) from all events up to and including the 100-year, 24-hour precipitation depth. Stormwater ponds would discharge in a controlled manner when full, as allowed under the stormwater permit and Simplot's associated SWPPP. In addition, stormwater ditches and diversion channels would be designed to dissipate energy as needed in steep sections, transitions, etc. so that erosion would be minimized in these areas. Thus, it can be assumed that in normal circumstances, most sediments would have settled out of the runoff and be retained in the stormwater ponds (**Section 2.5.5**).

Any discharge from the stormwater ponds treating the north half of the Project Area would either flow toward the tailings pond (which does not discharge) or the existing Roberts Creek Diversion. Sediments deposited upstream of or in the tailings pond would not continue downstream to reach Tygee Creek. Sediments conveyed to the Roberts Creek Diversion would have to be conveyed around the tailings pond in the very low gradient and two-plus mile-long diversion channel before reaching Tygee Creek. Any discharge from the stormwater ponds treating the south half of the Project Area would flow into North Sage Valley. Sediments would have to be conveyed across the valley and into the low-gradient channel on the east side of the valley before continuing south into the main Sage Creek channel.

Given these physical characteristics, combined with the operational management of stormwater runoff, sediments generated from the Proposed Action mining disturbance (including the backfilling of Panel B) during operations would not likely increase sedimentation levels in either Tygee Creek or Sage Creek. Once closure and reclamation occurs, on-site sediment sources would be reduced as revegetation and stabilization take place and most ponds would no longer be needed and would be removed. While Panel B would be backfilled to a higher elevation than under the approved plan, the resultant surface would be stabilized and revegetated to the same degree.

Further, sediment monitoring would continue to be required of Simplot as part of their stormwater permit conditions. The mineral mining sector-specific monitoring requirement is that stormwater discharges be sampled and analyzed for TSS. The related TSS benchmark is 100 mg/L. This is not a regulatory effluent limit; instead it allows Simplot to assess the effectiveness of its stormwater management and controls and make improvements if the benchmark is not met. In addition, under the recently approved TMDL (IDEQ 2017b), Simplot must comply with the established WLA for sediment by meeting load requirements.

In sum, sediment and TSS impacts downstream of the stormwater ponds would be negligible and short term.

Selenium and other COPCs in stream flow

As described under the groundwater section, the groundwater model under the Proposed Action was evaluated for three percolation rates through the final overburden cover: 2-, 7-, and 15-inches per year. Unsaturated model analysis, and experience with geologic store-and-release cover (or similar evapotranspiration cover) monitoring at the Smoky Canyon Mine suggests that the 7-inch per year percolation rate through the Proposed Action cover is reasonably foreseeable and the groundwater impact modeling for this percolation rate has been selected to evaluate impacts to downgradient surface water. The stochastic results of the fate and transport model estimates for COPC concentrations at the two groundwater model observation points located at the primary spring discharge locations (Hoopes Springs and South Fork Sage Creek Springs) under the reasonably foreseeable 7-inch percolation rate for the Proposed Action are summarized at selected time steps in **Table 4.5-8**.

For the 7-inch percolation rate, the model predicts that the 95% UCL selenium concentration contribution from the Proposed Action would increase to 0.001 mg/L at Hoopes Spring at about 80 years after mining. It would remain at that concentration until at least 300 years after mining. This value represents only the selenium concentration at Hoopes Spring that would be transported in groundwater from beneath the East Smoky Panel. Hoopes Spring receives additional Wells Formation groundwater from other sources, including groundwater that has already been impacted from previous mining activities (Pole Canyon ODA, Panel D, and Panel E). **Table 3.5-6** in **Section 3.5.2.3** reports that during the two-year baseline study for the Project, selenium concentrations at Hoopes Spring ranged from 0.108 mg/L to 0.134 mg/L. The model predicts that no selenium from the East Smoky Panel would reach South Fork Sage Creek Springs (Site LSS) under the 7-inch percolation rate condition for the Proposed Action. **Table 3.5-6** in **Section 3.5.2.3** reports that during the two-year baseline study for the Project, selenium concentrations ranged from 0.013 mg/L to 0.021 mg/L at South Fork Sage Creek Springs.

Table 4.5-8 Model Predictions of COPC Concentrations – Proposed Action, Surface Water

COPC	STANDARD	YEARS	MODEL OBSERVATION POINTS (ONLY SPRING DISCHARGE LOCATIONS)*	
			HOOPES SPRINGS	SOUTH FORK SAGE CREEK SPRINGS
Selenium, total (mg/L)	0.0167	10	0.000	0.000
		50	0.000	0.000
		100	0.001	0.000
		200	0.001	0.000
		300	0.001	0.000
Manganese, total (mg/L)	0.05	10	0.000	0.000
		50	0.010	0.000
		100	0.029	0.000
		200	0.042	0.000
		300	0.047	0.000
Sulfate, total (mg/L)	250	10	0	0
		50	1	0
		100	4	0
		200	4	0
		300	3	0
Total Dissolved Solids (mg/L)	500	10	0	0
		50	4	0
		100	12	0
		200	13	0
		300	13	0

Notes:
* Groundwater observation points are not included in this table; see **Table 4.5-6**.
1) COPC concentrations are the 95% upper confidence limit based on the population mean as predicted by the model.
2) No concentrations exceed the water quality standard used for comparison. Of the four constituents shown, only selenium has a surface water standard, which is for aquatic life and the value shown is the approved water column concentration element from the applicable SSSC. The other three constituents use the groundwater or drinking water standard for comparison (note that manganese exceedances are above the secondary standard governing aesthetics, not health).

To evaluate the direct and indirect impacts of selenium releases at Hoopes Spring 80 years after the onset of mining in the East Smoky Panel, the Year 2050 selenium concentrations that were predicted by the RI/FS (Formation Environmental 2014) were selected for the baseline condition at the springs. By 2050, the RI/FS predicted that the selenium concentration would have already peaked and essentially would have reached near steady-state condition. The RI/FS-predicted equilibrium selenium concentrations are approximately 0.025 mg/L for Hoopes Spring and approximately 0.005 mg/L for South Fork Sage Creek Springs (Formation Environmental 2014). The applicable water column SCCC for selenium at these locations is 0.0167 mg/L.

The East Smoky Panel model-predicted selenium concentrations were added to the RI/FS predictions to derive a combined concentration. For Hoopes Spring, the resulting concentration after the Proposed Action groundwater is added would be 0.026 mg/L (0.025 + 0.001), a very small increase. For South Fork Sage Creek Springs, the concentration would be 0.005 mg/L (0.005 + 0.000), or no increase. Therefore, under the aforementioned assumptions, the Proposed Action would have a minor selenium impact at Hoopes Spring and no selenium impact at South Fork Sage Creek Springs. Based upon the model-predicted selenium concentrations and with implementation of the AMP described in **Section 4.5.3** and provided in **Appendix 4B**, the East Smoky Panel Project itself would be in compliance with the Clean Water Act. Selenium concentrations at South Sage Fork Creek Springs would be expected to continue to be within the applicable water column SSSC; selenium concentrations at Hoopes Spring would be expected to continue to be well above the SSSC.

Discharges from Hoopes Spring and South Fork Sage Creek Springs each continue downstream, eventually joining Sage Creek. The mouth of Sage Creek is represented by LSV-4 in both the Project baseline data and the RI/FS. Sage Creek flows into Crow Creek and two sites downstream of that confluence are considered (CC-1A and CC-WY-01). The baseline monitoring study reported LSV-4 selenium concentrations ranging from 0.023 mg/L to 0.051 mg/L (**Table 3.5-6** in **Section 3.5.2.3**) and the RI/FS reported Year 2050 equilibrium selenium concentrations of 0.014 mg/L during the low-flow scenario (18.02 cfs) and 0.006 mg/L during the high-flow scenario (40.46 cfs) (Formation Environmental 2014). Of these values, the RI/FS low-flow selenium concentration (0.014 mg/L) was chosen to represent the baseline condition at LSV-4. The analogous selenium values for the two Crow Creek sites are 0.006 mg/L at CC-1A and 0.005 mg/L at CC-WY-01. (The high-flow values represent a less conservative, short-term seasonal condition so they were not considered further.) **Table 3.5-6** shows that selenium concentrations measured at these two Crow Creek sites during the low flow seasons of the two-year baseline study were approximately 0.02 mg/L.

In sum, the current selenium concentrations at LSV-4 are above the applicable water column SSSC of 0.0167 mg/L but the chosen predicted Year 2050 concentration would be below that value. Both the current and predicted 2050 selenium concentrations at CC-1A are above the applicable water column SSSC of 0.0042 mg/L. With or without the addition of the Proposed Action load, Crow Creek concentrations would remain above the SSSC for the long term due to loading from past mine operations that would continue. At the Idaho-Wyoming State Line (CC-WY-01), the RI/FS equilibrium condition predicted a selenium concentration of 0.005 mg/L would remain essentially unchanged with the addition of the Proposed Action loading. As noted in **Section 3.5.2.3**, Sage Creek and Crow Creek are currently on the 303(d) list as impaired for selenium. IDEQ would need to determine the implications of allowing the addition of incremental selenium from the East Smoky Panel Project based upon the conditions in place at that time. Presumably, this would entail assessing the impairment status under 303(d), any TMDLs completed, and/or the effectiveness of any CERCLA remedies in place at that time, as well as ensuring that the appropriate level of Antidegradation Review is conducted to comply with Idaho's Antidegradation Policy at IDAPA 58.01.02.051 and 58.01.02.052.

In addition to selenium, HGG (2018) modeled the fate and transport of sulfate, TDS, and manganese. However, the RI/FS (Formation Environmental 2014) modeling focused solely on selenium. That effort did not include other COPCs because the RI found selenium to be the principal COPC at the Smoky Canyon Mine and an indicator for other COPCs. Therefore, the

HGG predictions are only compared to baseline data collected over the two-year monitoring program for the East Smoky Panel (Stantec 2017a) to assess surface water impacts from the Project. Further, there are no Idaho aquatic life criteria for these three constituents. Although not strictly applicable to the area streams, the same EPA secondary drinking water standards that are used for the groundwater analysis were used as a means of comparison for baseline surface water quality data in **Section 3.5** and are referenced below as well. These were used to provide a measure of conservatism as well as continuity with the groundwater analysis.

Under the Proposed Action 7-inch percolation rate condition, HGG (2018) predicted no sulfate, TDS, or manganese load reaching Lower South Fork Sage Creek Springs from the Project over the model simulation period of 300 years. That same analysis predicted a maximum added sulfate concentration of 4 mg/L, a TDS concentration of 13 mg/L, and a manganese concentration of 0.047 mg/L at Hoopes Spring. Comparing the first two values to Hoopes Spring sulfate and TDS concentrations measured during the two-year baseline monitoring program, as shown in **Figure 3.5-17** and **Table 3.5-3**, indicates that the Proposed Action contribution of those two constituents to Hoopes Spring would be a 4 to 5 percent increase over current concentrations. There are no surface water quality standards for sulfate or TDS.

For manganese, the predicted 0.047 mg/L concentration contributed from the Proposed Action to Hoopes Spring at 300 years represents a greater increase over the baseline condition than sulfate or TDS. As reported in Stantec (2017a), the baseline manganese concentration for Hoopes Spring ranged from 0.00021 mg/L (between the detection limit of 0.000019 mg/L and the reporting limit of 0.001 mg/L) to 0.003 mg/L. Thus, the predicted concentration arriving at 300 years at Hoopes Spring from the Project is one or more orders of magnitude greater than the measured manganese values at Hoopes Spring over the past two years. Further downstream, at the mouth of Sage Creek (LSV-4), manganese concentrations ranged from 0.0068 mg/L to 0.0159 mg/L during the baseline study (Stantec 2017a). Because of the predicted added manganese at Hoopes Spring, manganese concentrations in Sage Creek would likely increase. However, the maximum baseline manganese concentration of 0.0159 mg/L at LSV-4 and the predicted concentration of 0.047 mg/L at Hoopes Spring are both less than EPA's secondary drinking water standard of 0.05 mg/L and there is no aquatic life standard for manganese. No exceedance of an EPA or state water quality standard is predicted to result from the increased manganese load coming from Hoopes Spring.

Other Pollutants

Accidental releases of materials associated with mining such as oils and chemicals represent potential impacts to surface water quality during the life of the mining activity.

Potential hydrocarbon-related effects to water quality would be minimized through non-structural BMPs in the SWPPP and secondary containment and other procedures in Simplot's SPCC Plan. Vehicle accidents, which would presumably be rare, could also release fuel, oil, or other substances to the road drainage network. In the event of any such releases, standard response and cleanup practices would occur, but there could be some short-term effects on water quality and biotic stream components if spilled materials reached nearby streams. The potential for such spills to occur would be low and the potential for stream impact even less so. These impacts are considered to be negligible to minor, site-specific, and short-term.

Water Rights and Water Uses

There are two ways in which water rights to surface waters could be affected: by reducing or eliminating spring discharge or streamflows; or by impacting water quality in a manner that would preclude the beneficial uses for which the right is granted. USFS's Smoky Creek stockwater rights (#24-10097, #24-10098) would not be affected as there are no impacts predicted to that stream's water quantity or quality. Roberts Creek water rights are held by Simplot and thus any loss of flow would be borne by them and not considered a water right impact. Pole Canyon water rights down gradient of the East Smoky Panel (#24-4078) are held by Simplot and thus any water quality degradation would be borne by them and not considered a water right impact.

LinS is a spring sourced in the alluvium and/or Salt Lake Formation downgradient of the East Smoky Panel pit. It has a water right (#24-7183) held by Crow Creek Ranches for stock watering. Water at the source dried up mid-way through the baseline monitoring study due to earthwork initiated by the water right holder, presumably to develop and direct more spring flow to their place of use. LinS was therefore not included in the previous prediction of decreases in flow to Tygee Creek. However, it is possible that this water right could be impacted by the Proposed Action and may require mitigation as discussed in **Section 4.5.3**.

A stockwatering right (#24-10389) is held by BLM in Tygee Creek downstream of the Roberts Creek diversion and upstream of Smoky Creek. It is for 0.02 cfs and based upon the impact noted above for this reach of Tygee Creek, could be negatively impacted by the Proposed Action.

Simplot would not need to obtain any new surface water rights, nor would any changes to their existing surface water rights (such as place of use, point of diversion, nature of use) be needed.

Regarding water use that may be affected, the RFP (USFS 2003a) states that "Loss of available surface water sources for uses such wildlife or grazing, as a consequence of mining operations shall be replaced or mitigated…". This statement implies that Simplot would have to replace all lost waters that have such uses, even if they are unattached to a water right. Thus, mitigation measures described in **Section 4.5.3** would need to be implemented and result in impacts to water rights being minor, site-specific, and short-term.

4.5.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

Groundwater

Alternative 1 includes steeper pit slopes than the Proposed Action which would allow mining activities to avoid including Cherty Shale overburden in the pit backfill. Geotechnical evaluation (CNI 2017) has indicated that these steeper slopes should be stable. However, in the unexpected case where some slope instability was experienced on the east side of the pit, it may be necessary to layback the unstable part of the slope which could, in turn, require mining the Cherty Shale in the affected area. Depending on the amount of Cherty Shale that would be involved in the layback, the relative amount of Cherty Shale incorporated into the pit backfill would range between the amount included in the Alternative 1 (0%) to that of the Proposed Action (2.7%) (Stantec 2017e). Further, the material balance for Alternative 1 contains relatively less Salt Lake Formation, Dinwoody Formation, and Rex Chert than the Proposed Action. It also contains relatively more Meade Peak Waste and Limestone than the Proposed Action.

As noted in **Section 4.5.2** and **4.5.1.1**, the same modeling approach and methodology were used for Alternative 1 as for the Proposed Action. As with the Proposed Action modeling, three annual percolation rates (2-inch, 7-inch, and 15-inch) through the pit backfill covers were evaluated for Alternative 1 (soil only cover over overburden) using the stochastic modeling approach. The cover modeling indicated the annual percolation rate was about 13 to 14 inches per year for the case where high permeability sand was located below the topsoil layer. The 15-inch percolation rate is, in effect, the rate applicable to a simple soil layer over the overburden and is considered the reasonably foreseeable long-term average percolation rate for Alternative 1 based upon ongoing monitoring that Simplot conducts. Based on this, it was concluded that an annual recharge under Alternative 1 of 15 inches per year would be the basis for impact assessment, compared to 7 inches per year for the Proposed Action.

A conservative evaluation of the impact of this occurrence to groundwater quality and on Hoopes Spring was done by modeling the effect of a 15-inch per year percolation rate on the Proposed Action. The water quality results of this model are compared to the model results for Alternative 1 in **Table 4.5-9**.

Table 4.5-9 Comparison of 15-inch Percolation for Proposed Action and Alternative 1

ALTERNATIVE 1 WITH 15-INCH PERCOLATION		
Max Se at Hoopes Spring	0.0007 mg/L	80 years
Max Se Under Pit	0.051 mg/L	35 years
PROPOSED ACTION WITH 15-INCH PERCOLATION		
Max Se at Hoopes Spring	0.002 mg/L	60 years
Max Se Under Pit	0.07 mg/L	74 years

Continued flushing of the pit backfills reduces the selenium concentrations over time. The peak selenium concentrations under the pit backfill for Alternative 1 decreases to less than 0.03 mg/L by around 40 years and continues to decrease to below 0.02 mg/L by 50 years. For the 15-inch percolation case with the Proposed Action pit backfill, the selenium concentration under the pit is less than 0.04 mg/L by 40 years and below 0.02 mg/L by 60 years.

Based on the above analysis, if there was a need to mine Cherty Shale under Alternative 1 as a result of unexpected pit slope stability and an associated layback on the east side of the pit, and that Cherty Shale were incorporated into the pit backfill, the maximum selenium concentration under the pit backfill would range from 0.05 and 0.07 mg/L. Under this same scenario, the selenium contribution to Hoopes Spring would range from 0.0007 mg/L and 0.002 mg/L.

The benefit of Alternative 1 largely derives from eliminating the contribution of selenium and manganese from the Cherty Shale (PV1: 2.07 and 9.13 mg/L, respectively) to the backfill mix relative to the Meade Peak Waste (PV1: 0.1448 and 0.83 mg/L, respectively). However, the increased percentage of Meade Peak Waste under the Alternative 1 material balance (33.6 percent compared to 25.55 percent) does contribute additional amounts of other COPCs compared to the Proposed Action, most notably total cadmium and thallium. For reasons described previously under the Proposed Action *Seepage Chemistry* subsection, cadmium and thallium were not carried through for fate and transport modeling due to the closeness to the applicable standard for PV1 only.

Groundwater Flow to Open Pits

Based on the information provided by Simplot (2017), the pit base contours for Alternative 1 would range from about 30 to 140 vertical feet above the Wells Formation aquifer in the Project Area, so groundwater from the regional aquifer would not flow into the open pits. However, during mining of the deeper benches of Phases 6 and 7, pit excavation could seasonally intersect the upper portion of the Wells Formation where mean groundwater elevations at wells GW-16 and GW-29 are within 5 to 10 feet of the base of the proposed pit excavation. This is similar to the Proposed Action and the water would be handled in the same manner, although the timing, duration, and quantity of intercepted groundwater could differ. See **Figure 3.5-4** for these mean groundwater elevations, which, per the figure footnote, were based upon manual measurements obtained during the two-year baseline study.

Similar to the Proposed Action, because of the relatively low hydraulic conductivity and the perched water table conditions in the shallow groundwater systems that would be intercepted during the pit disturbance for Alternative 1, the amount of water added to the open pits from potential seeps is considered to be negligible compared with the net percolation through the surface of the pit backfills. Also, similar to the Proposed Action, because of the pit disturbance, groundwater flow in the shallow systems is expected to be reduced and could potentially reduce flow in springs downgradient from the Project Area, although the degree of the impact is unknown due to the uncertainty of groundwater flow direction supporting these springs.

Groundwater Recharge

For Alternative 1, the footprint of the pit disturbance decreases approximately 78 acres compared to the Proposed Action. The reduction is accomplished by steepening the pit wall slopes, as provided in Simplot's mining alternative memorandum (Simplot 2017). By decreasing the footprint of the pit, the total recharge area is also reduced thus contributing less infiltration into the underlying groundwater system compared to the Proposed Action. Groundwater recharge of the Wells Formation in the proposed pit area would be approximately a 2 percent increase in the local recharge area (10,536 acres) of the Wells Formation and Brazer Limestone from current conditions, and about 1 percent less than the recharge area for the Proposed Action (303 acres).

Groundwater Extraction

Pumping of the industrial well and culinary well are expected to be the same for Alternative 1 as for the Proposed Action.

<u>Seepage Chemistry</u>

The chemistry of the seepage through the East Smoky Panel backfill under Alternative 1 was determined as described for the Proposed Action. **Tables 4.5-2**, **4.5-3**, **4.5-4**, and **4.5-5** provided results for both the Proposed Action and Alternative 1, so that the two could easily be compared. As with the Proposed Action, adding overburden from Alternative 1 to the Panel B backfill would not increase the selenium or cadmium concentration of seepage through the Panel B backfill (**Table 4.5-3**), so additional groundwater impact analysis of this change to the B-Panel backfill is not required for this Alternative either. The manganese column test results in **Table 4.5-4** for Alternative 1 are greater than the Panels B&C results. Last, the volume of Alternative 1 overburden to be added to the Panel B backfill from the East Smoky Panel is 12.6M LCY (**Table 4.5-5**).

Potential Mobilization of COPCs/Impact to Wells Formation

As with the Proposed Action, the stochastic model generated multiple model results for each COPC in the Wells Formation over a modeled period of 300 years for Alternative 1 (HGG 2018). Plume maps for the 100 year and 300 year-time periods are included for selenium (**Figures 4.5-6** and **4.5-7**) and manganese (**Figures 4.5-8** and **4.5-9**) for reference. Additionally, as mentioned earlier, only the reasonably foreseeable condition (15-inch percolation rate for Alternative 1) is considered relevant for presentation of potential impacts for the EIS. The HGG (2018) modeling report provides the full range of results for all scenarios.

The stochastic results of the fate and transport predictions for COPC concentrations in the Wells Formation under the reasonably foreseeable condition of the 15-inch percolation rate for Alternative 1 is summarized at selected time steps in **Table 4.5-10** below at the groundwater model observation points.

<u>Selenium</u>
Selenium does not exceed the groundwater standard (0.05 mg/L) at any time during the 300-year model simulation time frame for the Alternative 1 simulation (15-inch percolation rate).

Selenium concentrations exceed 0.03 mg/L after 10 years directly beneath the pit backfill and continue to increase for the duration of PV1. After 35 years, selenium concentrations decrease rapidly as a result of continued percolation and by 50 years all concentrations under the backfill are less than 0.04 mg/L. At 80 years, concentrations under the backfill have decreased below 0.01 mg/L and continue to decrease in concentration for the duration of the 300-year simulation. By the end of the modeled period, concentrations under the backfill are about 0.007 mg/L.

Throughout the plume, selenium concentrations decrease with time with the exception of the very lowest concentration (0.001 mg/L), which continues to spread southward and northward. The selenium concentration peaks at just over 0.0007 mg/L at Hoopes Spring at 80 years and then gradually decreases. During the entire simulation, the selenium concentration at Hoopes Spring remains at less than 0.001 mg/L. No impacts were observed at Lower South Fork Sage Creek Springs during the entire simulation. Hoopes Spring and Lower South Fork Sage Creek Springs are not shown in **Table 4.5-10** but are discussed further in the Surface Water section and shown in **Table 4.5-11**.

Table 4.5-10 Model Predictions of COPC Concentrations – Alternative 1, Groundwater

COPC GROUNDWATER	STANDARD	YEARS	MODEL OBSERVATION POINTS (ONLY GROUNDWATER LOCATIONS)*				OTHER LOCATIONS OF INTEREST	
			OBS-1	OBS-2	GW-27	GW-IW	GW-16	GW-24
Selenium, total (mg/L)	0.05	10	0.001	0.016	0.000	0.000	0.000	0.000
		50	0.012	0.022	0.001	0.000	0.000	0.000
		100	0.008	0.016	0.002	0.000	0.000	0.000
		200	0.006	0.013	0.001	0.000	0.000	0.000
		300	0.006	0.012	0.001	0.000	0.000	0.000
Manganese, total (mg/L)	0.05	10	0.009	0.259	0.000	0.000	0.006	0.001
		50	0.242	0.503	0.020	0.000	0.011	0.005
		100	0.251	0.525	0.033	0.000	0.012	0.005
		200	0.264	0.556	0.040	0.000	0.012	0.005
		300	0.268	0.565	0.042	0.000	0.012	0.005
Sulfate, total (mg/L)	250	10	1	36	0	0	1	0
		50	26	49	3	0	1	0
		100	17	36	3	0	0	0
		200	14	31	3	0	0	0
		300	13	28	3	0	0	0
Total Dissolved Solids (mg/L)	500	10	7	220	0	0	5	1
		50	184	368	17	0	7	3
		100	151	314	25	0	5	2
		200	135	285	25	0	5	2
		300	128	271	24	0	5	2

Notes:

* Surface Water Monitoring Points HS and LSS are not included in the table; see **Table 4.5-11**.

1) COPC concentrations are the 95% upper confidence limit based on the population mean as predicted by the model.

2) Shaded cells have concentrations exceed the applicable groundwater standard (note that manganese exceedances are above the secondary standard governing aesthetics, not health).

3) Observation Locations:

OBS-1 & OBS-2 are model-derived observation points.

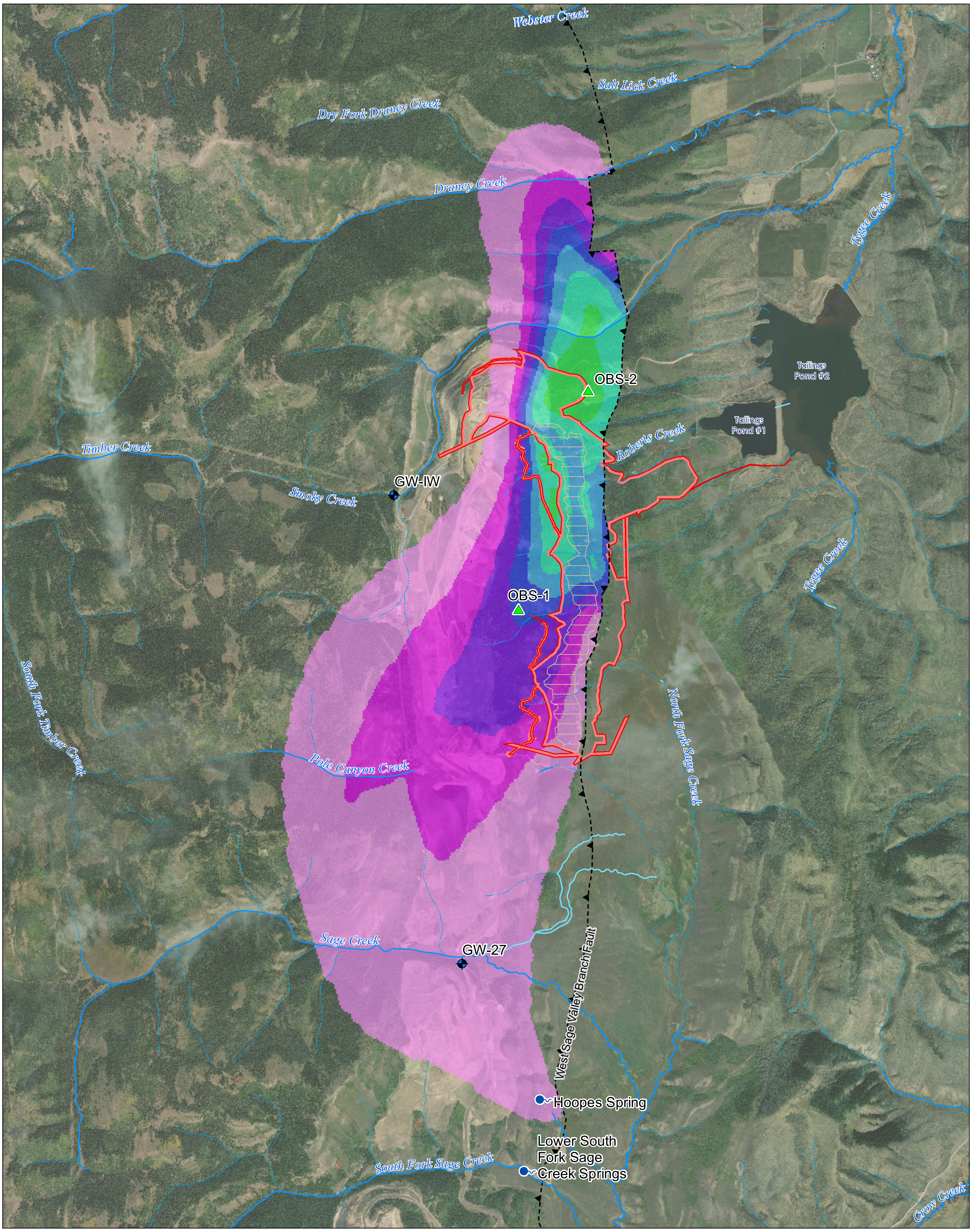
GW-27 is an existing Wells Formation monitoring well located approximately downgradient of the proposed pit excavation.

GW-IW is the existing industrial well located to the west of the proposed pit excavation that would be used for water supply, estimated at 500 gpm.

4) Other Locations of Interest:

GW-16 is an existing Wells Formation monitoring well located downgradient and just outside the proposed pit excavation.

GW-24 is an existing Wells Formation monitoring well located between GW-16 and the observation point GW-27.



Legend

Stream/River

Intermittent Stream

Other Waterway

Thrust Fault

Project Area Boundary

Alternative 1 Pit Disturbance

Observation

Wells Formation Groundwater Monitoring Well Location

Model Observation Location

Spring/Seep

Model-Predicted Selenium Concentrations at 100 Years milligrams per Liter (mg/L)

0.05

0.025

0.015

0.007

0.001

Note: Primary groundwater standard for selenium is 0.05 mg/L.

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet

2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.

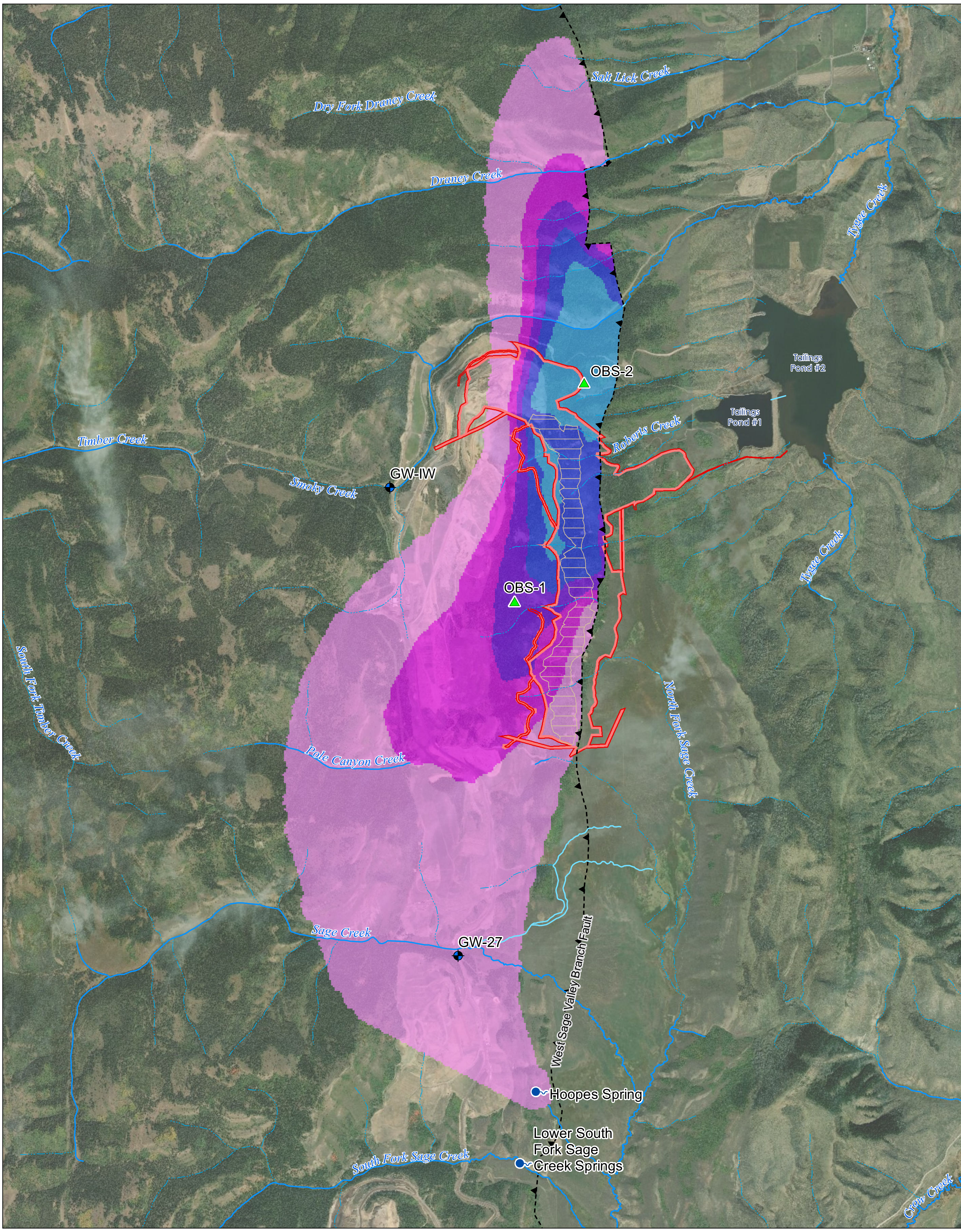
4: Project Location: T8S R46E, T9S R46E Caribou County, Idaho

0 0.5 1 Mile

1:44,000 (at original document size of 11x17)

N

Figure 4.5-6
Alternative 1 - Reduced Pit Shell, Model-Predicted Selenium Concentrations at 100 Years
East Smoky Panel Mine EIS



Legend

- Stream/River
- Intermittent Stream
- Other Waterway
- Thrust Fault
- Project Area Boundary
- Alternative 1 Pit Disturbance

Observation

- Wells Formation Groundwater Monitoring Well Location
- Model Observation Location
- Spring/Seep

Model-Predicted Selenium Concentrations at 300 Years milligrams per Liter (mg/L)

0.05
0.025
0.015
0.007
0.001

Note: Primary groundwater standard for selenium is 0.05 mg/L.

Notes

1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

0 0.5 1
Mile
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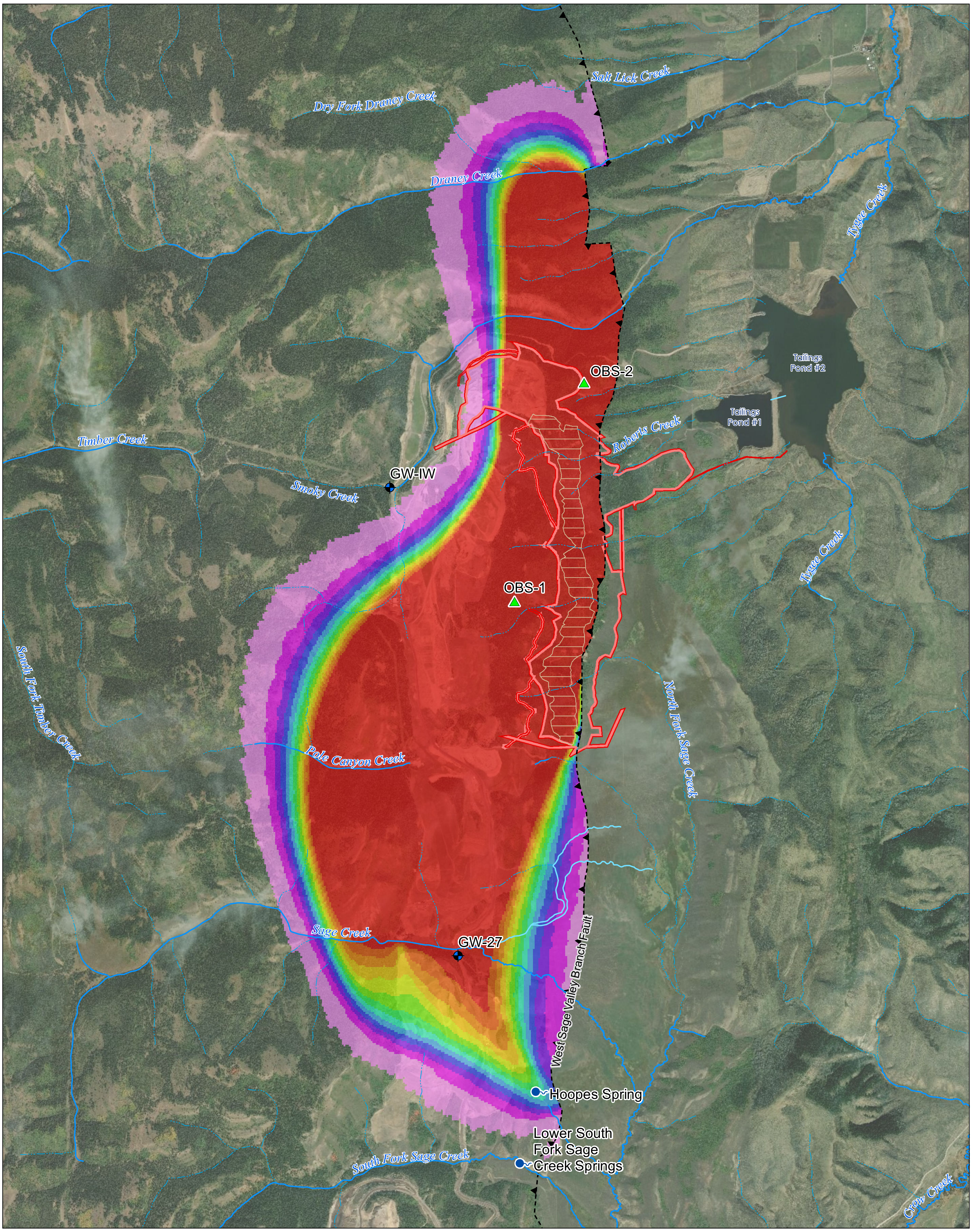
N

Figure 4.5-7
Alternative 1 - Reduced Pit Shell, Model-Predicted Selenium Concentrations at 300 Years East Smoky Panel Mine EIS



Legend

- Stream/River
- Intermittent Stream
- Other Waterway
- Thrust Fault
- Project Area Boundary
- Alternative 1 Pit Disturbance

Observation

- Wells Formation Groundwater Monitoring Well Location
- Model Observation Location
- Spring/Seep

Model-Predicted Manganese Concentrations at 100 Years
milligrams per Liter (mg/L)

0.05
0.025
0.015
0.007
0.005

Note: Secondary groundwater standard for manganese is 0.05 mg/L.

Notes
1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E Caribou County, Idaho

0 0.5 1
Mile
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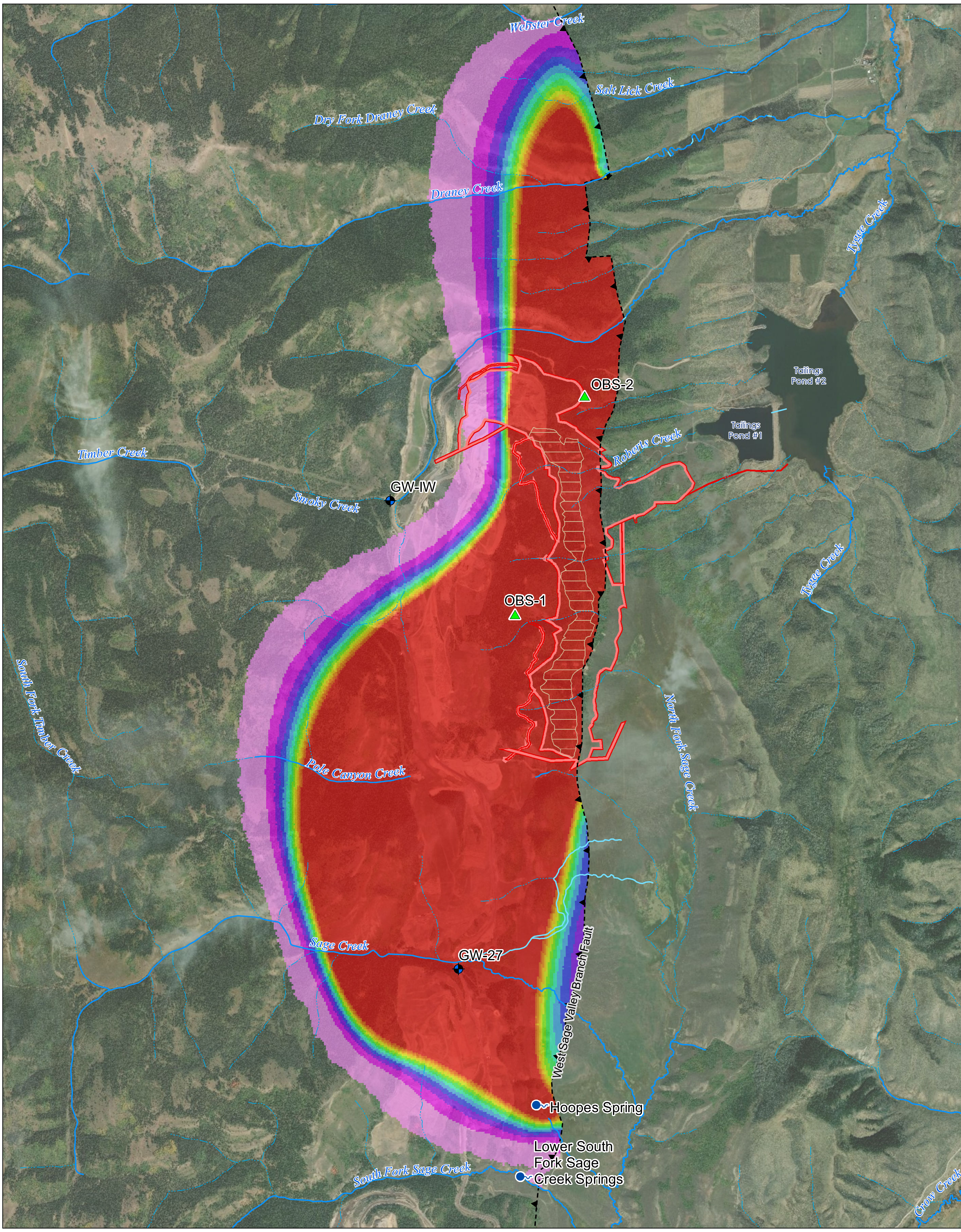
N

Figure 4.5-8
Alternative 1 - Reduced Pit Shell, Model-Predicted Manganese Concentrations at 100 Years
East Smoky Panel Mine EIS



Legend

- Stream/River
- Intermittent Stream
- Other Waterway
- Thrust Fault
- Project Area Boundary
- Alternative 1 Pit Disturbance

Observation

- Wells Formation Groundwater Monitoring Well Location
- Model Observation
- Spring/Seep

Model-Predicted Manganese Concentrations at 300 Years
milligrams per Liter (mg/L)

0.05
0.025
0.015
0.007
0.005

Note: Secondary groundwater standard for manganese is 0.05 mg/L.

Notes
1. Coordinate System: NAD 1983 StatePlane Idaho East FIPS 1101 Feet
2. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3: Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4: Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

0 0.5 1
Mile
1:44,000 (at original document size of 11x17)
N

Figure 4.5-9
Alternative 1 - Reduced Pit Shell, Model-Predicted Manganese Concentrations at 300 Years
East Smoky Panel Mine EIS

Manganese
For the Alternative 1 simulations, manganese concentrations in Wells Formation groundwater exceed 0.6 mg/L after 10 years beneath the pit backfill and move to the south, southwest and north over the simulation period. Manganese concentrations under the backfill peak at the end of the PV1 after 35 years at 0.8 mg/L and then gradually decrease and stabilize at about 0.6 mg/L by the end of the simulation. Manganese concentrations of 0.001 mg/L reach Hoopes Spring after 35 years with the concentration gradually increasing to slightly less than 0.02 mg/L by the end of the simulation. No impacts were observed at Lower South Fork Sage Creek Springs during the entire simulation. There is no surface water standard for manganese.

Sulfate
For most of the modeled simulation for sulfate, groundwater concentrations in the Wells Formation are much less than the 250 mg/L groundwater standard. By 10 years, a 200 mg/L sulfate plume develops under the pit backfill. After 35 years at the end of the PV1, the concentration under the backfill rises above 250 mg/L, but then decreases to less than 50 mg/L by the 100-year time period. Concentrations under the pit continue to reduce for the duration of the simulation to about 20 mg/L at 300 years. The sulfate concentration at Hoopes Spring peaks at 2 mg/L in years 80 and 90 and then drops to 1 mg/L for the remainder of the simulation period. No impacts were observed at Lower South Fork Sage Creek Springs during the entire simulation. There is no surface water standard for sulfate.

Total Dissolved Solids
TDS concentrations in Wells Formation groundwater are typically much less than the 500 mg/L groundwater standard during the model-simulated time period. However, initially at about 10 years, TDS concentrations exceed 500 mg/L beneath the pit backfill and peak at 670 mg/l after 35 years. By 50 years, the plume under the backfill is mostly less than 400 mg/L and continues to decrease in concentration, reaching less than 300 mg/L by 100 years and about 250 mg/L by the end of the simulation.

TDS concentrations of 1 mg/L reach Hoopes Spring after 35 years. The concentration at Hoopes Spring increases to about 11 mg/L at 210 years, after which it gradually decreases for the duration of the simulation. No impacts were observed at Lower South Fork Sage Creek Springs during the entire simulation. There is no surface water standard for TDS.

Surface Water

Impacts to surface water resources in regard to watershed disturbances, flow alterations, sediment and TSS loading, accidental release of pollutants such as hydrocarbons, water rights, and water uses, would be similar in level as predicted for the Proposed Action. Surface water impacts from groundwater release from the East Smoky Panel area to Hoopes Spring and Lower South Sage Creek Springs is assessed using the 15-inch percolation rate considered in groundwater modeling to reflect the use of a topsoil-only cover. The model predicted slightly less selenium loading (but equal at the thousandth decimal place) at Hoopes Spring and Lower South Sage Creek Springs as predicted for the Proposed Action 7-inch percolation rate. That same analysis predicted a maximum added sulfate concentration of 1 mg/L, a TDS concentration of 11 mg/L, and a manganese concentration of 0.019 mg/L at Hoopes Spring, which are all slightly lower than under the Proposed Action condition. The stochastic results of the fate and transport model estimates for COPC concentrations at the two groundwater model observation points located at the primary spring discharge locations (Hoopes Springs and South Fork Sage Creek Springs) under the 15-

inch percolation rate for Alternative 1 are summarized at selected time steps in **Table 4.5-11**. The weighted average concentrations for manganese in the Panel B leachate for either of the East Smoky Panel action alternatives is greater than that already analyzed in the Panels B&C EIS.

Table 4.5-11 Model Predictions of COPC Concentrations – Alternative 1, Surface Water

COPC	STANDARD	YEARS	MODEL OBSERVATION POINTS (ONLY SPRING DISCHARGE LOCATIONS)*	
			HOOPES SPRINGS	SOUTH FORK SAGE CREEK SPRINGS
Selenium, total (mg/L)	0.0167	10	0.000	0.000
		50	0.000	0.000
		100	0.001	0.000
		200	0.001	0.000
		300	0.001	0.000
Manganese, total (mg/L)	0.05	10	0.000	0.000
		50	0.009	0.000
		100	0.014	0.000
		200	0.018	0.000
		300	0.019	0.000
Sulfate, total (mg/L)	250	10	0	0
		50	1	0
		100	1	0
		200	1	0
		300	1	0
Total Dissolved Solids (mg/L)	500	10	0	0
		50	4	0
		100	10	0
		200	11	0
		300	11	0

Notes:

* Groundwater observation points are not included in this table; see **Table 4.5-10**.

1) COPC concentrations are the 95% upper confidence limit based on the population mean as predicted by the model.

2) No concentrations exceed the water quality standard used for comparison. Of the four constituents shown, only selenium has a surface water standard, which is for aquatic life and the value shown is the approved water column concentration element from the applicable SSSC. The other three constituents use the groundwater or drinking water standard for comparison (note that manganese exceedances are above the secondary standard governing aesthetics, not health).

4.5.2.3 No Action Alternative

Groundwater

Existing conditions would continue for the foreseeable futures, which includes elevated selenium concentrations in groundwater at various locations associated with the Smoky Canyon Mine and at downstream locations. No impacts to groundwater from mining the East Smoky Panel would occur as it would not be approved.

Surface Water

No impacts to surface water from mining the East Smoky Panel would occur as it would not be approved and existing conditions in Project Area would continue in the short term. Beyond those already addressed, predicted, or occurring due to other already permitted activities at the Smoky Canyon Mine, there would be no new changes to watershed boundaries, stream flow alterations, sediment or TSS loading; no new potential for hydrocarbon or other chemical spills; and no implications for water rights or existing water uses. At least initially, the surface waters that currently have elevated selenium concentrations due to the Smoky Canyon Mine would continue to have elevated levels. Total selenium concentrations would continue to be above the applicable water column SSSC at numerous sites, based upon the baseline study results. Selenium exceedances reported during the baseline study (Stantec 2017a) were shown in **Table 3.5-6** and are further detailed as follows. Eight samples collected at Hoopes Spring (HS) had total selenium concentrations that ranged from 0.108 to 0.134 mg/L and the single sample collected at Hoopes Spring Creek (HS-3) had a total selenium concentration of 0.094 mg/L. The eight samples from Lower Sage Creek below Hoopes Spring (LSV-2) had total selenium concentrations between 0.028 and 0.074 mg/L; the eight from LSV-3 ranged between 0.024 and 0.051 mg/L; and the eight from LSV-4 ranged from 0.023 and 0.051 mg/L. Eight samples were also collected from Lower South Fork Sage Creek (LSS), with total selenium ranging from 0.013 to 0.021 mg/L. Total selenium concentration in Crow Creek below Sage Creek (CC-1A) ranged from 0.011 to 0.023 mg/L in eight samples; eight samples collected downstream at the Wyoming State line (CC-WY-01), had total selenium concentrations ranging from 0.01 to 0.022 mg/L. While there is no known available selenium data downstream of the State line, it can be assumed that selenium remains elevated for some unknown distance in Crow Creek downstream into Wyoming.

According to the Smoky Canyon Mine RI/FS (Formation Environmental 2014), selenium concentrations in these surface waters are predicted to peak between 2015 and 2018 and are projected to decrease markedly from 2018 until approximately 2030, when they are expected to decline more gradually. Concentrations at modeled locations HS-3, LSS, LSV-3, LSV-4, CC-1A, and CC-WY-01 are predicted to level off and stabilize by 2050 at much lower than current levels, but still generally higher than the current chronic aquatic life standard at some locations, particularly under low-flow conditions. Specifically, the 2050 predicted HS-3 and LSS year-round selenium concentrations are 0.025 and 0.005 mg/L, respectively, with an applicable SSSC water column concentration of 0.0167 mg/L. The 2050 predicted low-flow selenium concentrations at the modeled downstream sites are: 0.015 mg/L (LSV-3); 0.014 mg/L (LSV-4); 0.006 mg/L (CC-1A); and 0.005 (CC-WY-01). The applicable SSSC water column concentration for LSV-3 and LSV-4 is 0.0167 mg/L and for CC-1A and CC-WY-01 is 0.0042 mg/L. These declines are predicted based upon the anticipated effectiveness of various Pole Canyon remedial actions (e.g., bypass pipeline, infiltration basin, run-on diversions, ODA capping) and decreasing source contributions (e.g., Panel A, Pole Canyon ODA, Panel D, and Panel E). Pole Canyon Creek selenium concentrations have already been greatly reduced due to the 2006 remedial actions (Formation Environmental 2014). In addition, while Hoopes Spring and South Fork Sage Creek Springs are considered the largest contributors of selenium to local surface waters, including Crow Creek via Sage Creek, additional potential minor sources are Pole Canyon alluvium and accumulated selenium residing in North Sage Valley (Formation Environmental 2014).

In addition to the remedial actions described above, Simplot proposed in 2014 to perform a pilot treatability study at the Smoky Canyon Mine to reduce the selenium concentration of the water discharged at Hoopes Spring and South Fork Sage Creek Springs to improve the water quality of the receiving streams. The proposal included collecting water from the two spring complexes and piping it to a central water treatment pilot plant (WTPP) where selenium would be removed from the influent water prior to it being discharged to Sage Creek. The water quality of the WTPP effluent would need to meet the water quality criteria established by the regulatory agencies for Sage Creek.

Several water treatment technologies were preliminarily considered and some of them were tested between 2009 and 2013 at the site including: active anaerobic biological reduction, zero-valent iron, reverse osmosis, and semi-passive biological treatment. Based on this evaluation, Simplot proposed in 2014 to pilot test an active anaerobic fluidized bed reactor (FBR) to complete a biological reduction process with additional polishing of water quality to control ammonia, biological oxygen demand (BOD), chemical oxygen demand (COD), phosphorus, and total organic carbon in the WTPP effluent. The FBR system removes selenium from the water via biological activity in a chemically reducing environment and the precipitated non-hazardous elemental selenium and biosolids are periodically backwashed to a settling tank. The sludge from the settling tank is periodically transferred to a sludge storage tank before being transported offsite for disposal.

The Phase 1 treatability study was for 250 gpm in 2014 with plans to increase flow to 1,000 to 2,000 gpm (Phase 2) if the FBR technology was proven to be effective at the site. The proposed Phase 1 pilot plant incorporated a number of treatment technologies that have proven track records in other applications including: filtering, pH control, anaerobic FBR, sulfide oxidation, phosphorus precipitation, settling, and sludge handling.

The Phase 1 treatability study started up in late 2014 and treated 200 to 250 gpm on and off during start-up and troubleshooting and effectively operated beginning in March 2015. Between March 2015 and March 2017 plant effluent selenium concentrations ranged from 0.005 to 0.010 mg/L with a mean of 0.0083 mg/L (all concentrations expressed as total selenium). The influent selenium concentration ranged from 0.113 to 0.138 mg/L with a mean of 0.126 mg/L, resulting in an average decrease in selenium concentrations of 93 percent.

Based on the Phase 1 results, Simplot proposed in early 2015 to add ultra-filtration (UF) and Reverse Osmosis (RO) systems and finalize designs to construct and operate the Phase 2 treatability study intended to treat 2,000 gpm. To increase treatment flows and efficiencies in the FBR step, the treatment plant was augmented with an additional FBR unit identical to the Phase 1 FBR unit (2 units total) and the influent water was proposed to be pretreated through UF membranes followed by RO membrane treatment (3 units each). The UF step removes fine particulates that could foul the RO membranes while the RO step separates the remaining 2,000 gpm of filtered influent into about 1,500 gpm of very low selenium RO permeate (<0.0006 mg/l) and 500 gpm of high selenium RO concentrate. The RO concentrate feeds the two FBR units for selenium removal while the RO permeate is mixed with the treated effluent from the FBR and polishing systems.

Treated water from the two FBR units is pumped to a post-treatment polishing system that first aerates the sulfides and COD in the FBR discharge water and then removes the resulting solids with a gravity clarifier and sand filters. Phosphorus and any carryover biological solids are also removed with alum or ferric chloride addition. The thickened solids from the clarifier are pumped to the sludge storage tank until it is transported for offsite disposal. Effluent from the post-treatment polishing system is combined with the RO permeate in an effluent blending tank and aerated again before discharge to the plant outfall on Sage Creek.

Simplot is now operating the Phase 2 treatability study with a treatment capacity design of up to 2,000 gpm. The Phase 2 WTPP operations have been functional since mid-February 2018. From February 2018 through December 2018, average monthly flow rates through the plant ranged from 1,546 to 1,870 gpm and the average of these monthly values was 1,700 gpm. Selenium removal efficiency rates ranged from approximately 80 to 90 percent, except for a period in the spring where there was a problem with a component of the system due to contractor work on the WTPP. Once the problem was discovered and repaired the system recovered quickly. While the Phase 2 study is operating well and at high removal efficiencies, effluent remains above the current chronic aquatic life criteria of 0.0167 mg/L.

The effect of the WTPP operation on the selenium concentrations in the Sage Creek drainage downstream will continue to be evaluated during the future monitoring of the WTPP and downstream locations. Based on the data collected in 2018, it is reasonably foreseeable that the operation of the Phase 2 WTPP will continue to reduce selenium concentrations in the receiving streams. However, it is important to note that neither this WTPP nor another similar plant has been selected as a CERCLA remedy.

4.5.3 Mitigation Measures

Springs currently in use that are disrupted by mining under the Proposed Action or Alternative 1 would be replaced with alternate, permanent, and generally equivalent water sources by Simplot, in accordance with the RFP requirements and as described below. Springs that were predicted to potentially be lost were described under the Baseflow Reductions heading above, and include URS, ESS-1, ESS-2, and LinS. These feed Roberts Creek, Roberts Creek Diversion, and/or Upper Tygee Creek, which could experience reduced flows.

This replacement would be done for springs that are affected either during (short-term) or after (long-term) mining operations. The specific type of water source replacement would be determined on a case-by-case basis in concert with the appropriate resource specialists (hydrology, range, wildlife), and if necessary, grazing permittees, as applicable if on NFS land. Depending upon the location and the existing use of a water source, its replacement plans may need to consider wildlife other than just the large mammals (i.e., insects, amphibians, birds). The projects would be designed by Simplot, reviewed and approved by the USFS (as applicable for projects on NFS land), constructed (and operated) by Simplot, and monitored for effectiveness by Simplot. Monitoring results would be submitted to the CNF on a regular basis (as applicable for projects on NFS land). In some cases, supplemental NEPA analysis may also be required. Water rights may need to be acquired or modified following Idaho State rules, laws, and regulations. These spring mitigation measures would not necessarily restore the original functions and values of any wetlands at the native springs that are being replaced; these measures and their duration would be determined by USFS on a case-by-case basis.

Replacement options that would be considered include, but are not limited to:

1. Supplying new water tanks with water hauled and/or piped by Simplot;
2. Improving water flow or retention (ponding) at springs near the disturbed area to compensate for springs disrupted within the disturbed area, and/or fencing them (while considering the ramifications of fencing on specific species such as bats);
3. Building new livestock/wildlife watering ponds;
4. Building guzzlers, some of which could accommodate various species by using alternate guzzler designs such as ramps, etc. (i.e., gallinaceous guzzlers);
5. Designing some mine runoff and sediment retention ponds to be available to livestock and wildlife, while monitoring water quality to ensure it is suitable for their consumption;
6. Drilling small water wells into local aquifers with windmills to supply water tanks; and,
7. Enhancing nearby existing stock ponds that typically dry up early in the summer with bentonite sealing of the bottom, thereby extending their season of usefulness.

Water resources monitoring sites pertaining to this Project would be added to the current water monitoring program at Smoky Canyon Mine.

Roads would be designed, constructed, and operated to prevent a fuel or oil spill from entering a nearby stream by implementing suitable BMPs to contain such an event.

Middle waste and cherty shale material would not be used as construction materials for building haul roads, ditches, or any other miscellaneous mining features associated with the Project.

Last, an AMP has been prepared for this Project. It focuses on water management facilities and the means by which the quality of surface water downstream and down gradient of the Hoopes Spring would be adequately protected. The AMP (**Appendix 4B**) documents objectives, agency relationships, water management practices, a Simplot commitment to treat water as needed, and the Hoopes Spring condition and related response if the condition is not met.

4.5.4 Unavoidable (Residual) Adverse Impacts

4.5.4.1 Groundwater

Unavoidable adverse effects to groundwater conditions at the site after mining ceases, and after any mitigation and/or final reclamation has occurred, would be mainly from water quality impacts. Since it has been determined that infiltration of precipitation through seleniferous overburden has the potential to affect groundwater quality by releasing selenium, manganese and other COPCs into the groundwater regime, residual effects would still be likely to remain and be ongoing after proposed reclamation actions have been completed. Over hundreds of years, the concentration of contaminants in the infiltrating water are expected to increase, then decrease, as demonstrated by the model results.

4.5.4.2 Surface Water

Unavoidable adverse effects to surface water quantity would include reduction or elimination of water supplying the alluvial or Salt Lake Formation springs east of the Project Area beyond the mining timeframe. Even if Simplot provided another source of water to supply upper Tygee Creek, it would not likely be at the same locations or provide the same values as these small surface water sources.

Unavoidable adverse effects to surface water quality would be incremental increases in COPCs in Hoopes Spring, Sage Creek, and Crow Creek beyond the mining timeframe.

4.5.5 Relationship of Short-term Uses and Long-term Productivity

Some short-term use of surface and groundwater resources would occur from mining operations. Seepage of infiltration through seleniferous overburden and contribution of COPCs to groundwater downgradient of the areas containing seleniferous overburden would result in long-term water quality impacts of this groundwater. No exceedances of groundwater quality protection standards are expected due to the Proposed Action or Action Alternative 1, except potentially manganese, which has a secondary standard reflective of aesthetics. Where the contaminated groundwater discharges to the surface environment, the contaminants would be transferred from the subsurface to the surface environment for long periods of time. No exceedances of surface water quality standards from the Proposed Action or Action Alternative 1 are expected. Over the long term (centuries), these concentrations are expected to decrease.

4.5.6 Irreversible and Irretrievable Commitment of Resources

4.5.6.1 Groundwater

The loss of groundwater quantity that is used for mining at the industrial well during the proposed mining operations would practically all be recovered through natural precipitation and infiltration. Based on the aquifer characteristics of the formations in the area, impacts to groundwater quantity would not be irreversible or irretrievable.

Irretrievable changes in groundwater quality under and downgradient of the backfilled areas would occur. This would occur because of the long-term infiltration of water through the seleniferous overburden material placed as backfill in the pits. An area of the Wells Formation aquifer extending to downgradient discharge locations (e.g., springs) has been predicted to be impacted by COPCs. Over the modeled period, concentrations of most COPCs decrease to levels below groundwater standards, except for manganese which is regulated by secondary, non-health based standards. Therefore, these impacts to groundwater quality are considered to be irreversible and irretrievable over the 300-year time period used for the model predictions.

4.5.6.2 Surface Water

For practical purposes, streams that are negatively impacted by COPCs in groundwater discharges would be irreversible commitments of these resources. The same is true for springs that may lose water (i.e., those small springs east of the Project Area).

4.6 SOILS

4.6.1 Issues and Indicators

Issue: Soil quantity or quality may be insufficient for reclamation plans.

Indicators:

- Estimated volumes of stockpiled and direct-placed soil.

4.6.2 Direct and Indirect Impacts

The Proposed Action would impact soil resources within the Project Area by removing them from areas prior to disturbance due to mining and related activities. These direct and indirect impacts to soil resources include loss of soil during salvage, loss due to erosion of stockpiles or reclaimed areas, exposure and potential mobilization of selenium, and reduced productivity.

4.6.2.1 Proposed Action

Soil would be disturbed as part of mining preparations, as it is removed, stockpiled, and eventually replaced during reclamation activities. This process would directly result in physical and chemical changes to the soil due to mixing of horizons and soil types during initial salvage operations and when the soil is placed in stockpiles for future reclamation use. Direct physical impacts to soil resources would also include compaction and crushing. Related effects include reduced permeability, porosity, and available water holding capacity, as well as increased bulk density. Microorganisms such as bacteria and fungi, which are important in the decomposition of biological materials and the formation and improvement of soil itself, can be diminished in soils that are handled and then stored long term in large stockpiles. Combined, these can affect soil productivity and/or fertility, which could in turn affect reclamation success. Additionally, erosion potential from water and wind would also increase when soil is stockpiled.

As described in **Section 3.6.3**, eight soil map units and two miscellaneous landform units were described in the Study Area during the Order 2 Soil Survey. The two landform units are water bodies and previously disturbed mine areas, and thus do not currently contain soil resources. Over the smaller Project Area (approximately 850 acres), portions of each of the eight soil map units would be disturbed and undergo the effects mentioned previously as soil is removed, stockpiled, and stored. **Table 4.6-1** shows the acres proposed for disturbance by soil type. Considering the depths that could be salvaged within the various mapping units (**Tables 3.6-6** and **4.6-1**), this would result in approximately 1.5 million BCY of affected topsoil and 2.0 million BCY of affected subsoils.

Soil stored in stockpiles could be subject to erosion with some resultant loss that would not be available for later use in reclamation.

Reclamation would entail placing a topsoil cover and revegetating all disturbed areas except for a small section of highwall along the southeast edge of the pit on Simplot-owned land and certain stormwater features (12 acres total left unreclaimed). This would return topsoil to a productive resource use, and along with the accompanying grading and reestablishment of drainage patterns would conserve soil by reducing erosion potential.

Table 4.6-1 Topsoil and Subsoils Affected by the Proposed Action

SOIL MAP UNIT	SOIL MAP UNIT NAME	TOTAL DISTURBANCE (ACRES)	AVERAGE ESTIMATED TOPSOIL SALVAGE DEPTH (INCHES)	TOPSOIL VOLUME (CY)	AVERAGE ESTIMATED SUBSOIL SALVAGE DEPTH (INCHES)	SUBSOIL VOLUME (CY)	COMBINED TOPSOIL & SUBSOIL VOLUME (CY)
Bf	Buffork silt loam, 18-40%	86	16	184,487	40	461,217	645,704
BTS	Beaverdam-Tahquats-Swede complex, 2-18%	169	15	340,540	35	0*	340,540
Ck	Skelter silty loam, 3-12%	105	15	210,754	28	393,408	604,162
M	Mine areas	114	0	0	0	0	0
OA	ZZZ family loam, 1-3%	6	14	11,714	20	16,734	28,448
STB	Swede-Tahquats-Buffork complex, 4-25%	275	16	590,685	27	996,782	1,587,467
TS	Targhee-Swede complex, 15-60%	54	15	108,850	20	145,134	253,984
ZS	Zimmer loam, 8-35%	27	10	36,907	8	29,526	66,433
Zz	Zimmer gravelly loam, 35-60%	13	9	15,801	4	7,023	22,824
	TOTAL	848		1,499,739		2,049,824	3,549,562

*Unsuitable and should not be salvaged for use as topsoil due to the high percent clay, as described in **Section 3.6.5.1**.

The soils baseline study included a determination of reclamation suitability (**Section 3.6.5**). Some mapping unit components had subsoils that are too clayey. Some soil samples had *limiting* pH values and some localized pockets were too sandy. While selenium concentrations varied (**Section 3.6.5.16**) they were not considered limiting overall. In all these cases (clay, pH, sand, selenium), blending of different soils during the salvage and stockpiling process would render them suitable. The most limiting feature of Project Area soils is depth to bedrock. This would affect reclamation by controlling the reduced amount of topsoil and subsoil that can be salvaged and then replaced. The estimated volume of salvaged topsoil and the planned replacement depth of 16 inches minimum account for this limitation. Based upon the average topsoil depth, plus the estimated subsoil depth, this minimum depth of topsoil would be available for reclamation. It is impossible to determine the exact amount of soil that can be salvaged, so thickness may be adjusted with Agency approval if needed.

Last, as described in **Section 2.4.11.3**, topsoil would be sampled prior to placement to determine agronomic characteristics, which would then dictate fertilizer types and application rates, if any are needed.

Combined, impacts to soil resources would be minor, but long term.

4.6.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

While there would be 78 fewer acres of soils disturbed under Alternative 1 than under the Proposed Action, the types of impacts on the particular soils that would be disturbed would be similar. There would be slightly fewer acres (9 compared to 12) left unreclaimed under this alternative.

4.6.2.3 No Action Alternative

Under the No Action Alternative, Simplot's proposed detailed mining and reclamation/mitigation plans for the development of the East Smoky Panel would not be approved. Simplot would not be able to proceed with mining of the ore in this panel until such time as a mining and reclamation plan is found to be acceptable by the BLM and USFS. Local effects to soil resources in the Project Area would be eliminated since mining would not be implemented. The portion of the existing Panel B area would still be reclaimed under No Action, but it would not be subject to additional backfilling since overburden generated from the Proposed Action would not be available for backfill material. Mining and reclamation would continue on the existing, approved mine panels at the Smoky Canyon Mine.

4.6.3 Mitigation Measures

No measures beyond those stated in **Chapter 2** and those in use currently for Simplot's ongoing erosion control, seedbed preparation, and monitoring programs would be needed.

4.6.4 Unavoidable (Residual) Adverse Impacts

Native soil conditions would be lost on the disturbed areas due to the breakdown of soil structure, adverse effects to microorganisms, and discontinuation of natural soil development as a result of salvage operations. Soils salvaged and utilized in reclamation would initially demonstrate a decrease in infiltration and percolation rates, decrease in available water holding capacity, and loss of organic matter. These effects would be reversed by natural soil development over time. Successful reclamation of disturbed areas would expedite these natural processes and create an environment suitable for long-term vegetation establishment.

Approximately 12 acres of disturbance under the Proposed Action and 9 acres under Alternative 1 would consist of unreclaimed highwall areas and functioning stormwater features. Soil recovered from these areas during mining would not be replaced, but used for reclamation in other areas of the Project.

4.6.5 Relationship of Short-term Uses and Long-term Productivity

Soils would be disturbed in the short-term during mining operations and reclamation of disturbed areas would return the disturbed soil to long-term productivity by being utilized as growth medium in reseeded areas, while the unreclaimed highwall area and stormwater features under the Proposed Action would permanently eliminate 12 acres from potential production (9 acres for Alternative 1).

4.6.6 Irreversible and Irretrievable Commitment of Resources

For both the Proposed Action and Alternative 1, unreclaimed areas of soil disturbance for highwall and stormwater features would produce an irreversible and irretrievable commitment of soil resources disturbed by these features.

4.7 VEGETATION

4.7.1 Issues and Indicators

Issue: The mining operations and related transportation activities would affect vegetation patterns and productivity in the Project Area.

Indicators:

- Acres of vegetation communities that would be disturbed by the Project and also potentially subjected to an increase in weed invasion.
- Acres of disturbed areas that are planned for reclamation and the types of vegetation that would be restored.
- Acres of permanent vegetation conversion from forest to non-forest cover and predicted re-growth rate back to forest conditions.
- DSAYs lost through the Proposed Action and Action Alternative.

Issue: What is the potential for the introduction or spread of invasive, non-native, or noxious plant species?

Indicators:

- Acres of disturbed land potentially subjected to invasive plant species.

4.7.2 Direct and Indirect Impacts

4.7.2.1 Proposed Action

Vegetation

Over the life of the proposed mining activities, the Proposed Action would remove up to 728 acres of upland (non-wetland) vegetation and zero acres of wetland vegetation (composed of riparian shrub). The vegetation types and associated acreages impacted by the Proposed Action are summarized in **Table 4.7-1**.

Table 4.7-1 Vegetation Types and Estimated Affected Acreages under the Proposed Action

VEGETATION TYPE	ACRES
Forested	
Aspen	90.0
Aspen/Conifer	320.2
Aspen Dry	23.9
Douglas-fir	14.5
Dry Aspen/Conifer	87.3
Dry Conifer Mix	8.7
Lodgepole Pine	0.6
Mixed Conifer	37.8
Forested Sub-total	**583.0**
Non-Forested	
Grass/Forb	27.4
Mountain Brush	62.9
Riparian Shrub	0.0
Sagebrush	54.9
Non-Forest Subtotal	**145.2**
Total	**728.2**[1]

[1]The remaining 121.2 acres of disturbance occurs in areas already disturbed by current mining.

Following mining activities, reclamation would revegetate these areas using the seed mix shown in **Table 2.4-2**. While vegetation would re-grow in these areas, the resulting species composition and community structure would be different than before the disturbance. Therefore, direct impacts to vegetation would be long-term.

Approximately 98 percent (719 acres) of the disturbed vegetation would be reclaimed and re-vegetated. The remaining 2 percent (12 acres) would comprise bare pit walls remaining where pits are not backfilled crest-to-crest and stormwater features. For the purposes of the Habitat Equivalency Analysis (HEA) and quantifying residual wildlife habitat service losses (habitat service lost after accounting for habitat service gained from reclamation), these areas were assumed to remain unvegetated into perpetuity. Although the purpose of the HEA was to quantify wildlife habitat services lost and gained, because upland vegetation parameters were used to formulate the metric, the HEA is also useful for quantifying impacts and subsequent recovery of upland vegetation.

To determine the residual wildlife habitat service losses under the Proposed Action, the HEA required quantification of wildlife habitat services gained through reclamation. Published literature, data from other mines in the region, and the best professional judgment of Stantec and USFS botanists were used to develop recovery trajectories for reclaimed areas. A series of four measurements were used for the metrics for the HEA process. These included herbaceous vegetation production, hiding cover, thermal, cover, and vegetation structure diversity. The methodology and results for the development of recovery trajectories for reclaimed areas are presented in the East Smoky Loss Calculations (Stantec 2017h, 2015c), and the results are summarized here. Herbaceous vegetation production, also called herbage or understory production, is a key element of general wildlife habitat and generally includes browse, grasses, and forbs. The production of herbaceous vegetation generally increases in quantity and quality as overstory canopy cover decreases because the ground vegetation receives more sunlight and does not need to compete with trees for minerals and water (Jameson 1967). The production potential for herbaceous vegetation is influenced not only by canopy cover, but also by soil depth, soil moisture, geology, vegetation type, distance from vegetation patch edge, temperature regime, and fire history (Jameson 1967; Hedrick et al. 1968; Ffolliott and Clary 1975; Miller and Krueger 1976; Woods et al. 1982; Tapia et al. 1990). Hiding cover is described as vegetation capable of hiding 90 percent of a standing deer or elk at 200 feet or less and providing a visual screen where animals can spend more time foraging or resting and less energy fleeing from human disturbance or predators (USFS 1985). Thermal cover allows wildlife to conserve energy by protecting them from the stresses induced by weather (Leckenby et al. 1982). Generally, as canopy cover increases, the effectiveness of a forest stand to provide thermal cover improves (Dealy 1985). Diversity in vegetation structure, the distribution of vegetation biomass horizontally and vertically, influences the habitat services provided to wildlife. Several researchers have hypothesized that forest structure plays a role in wildlife habitat diversity (Urban and Smith 1989; Hansen et al. 1995).

According to the HEA, the Proposed Action would result in a total debit of 62,043 DSAYs during mining and before reclamation. Reclamation would result in the long-term return of 28,491 DSAYs at the mine site, which equates to 46 percent of the wildlife habitat services total debit under the Proposed Action. Therefore, under the Proposed Action, there would be a net debit of 33,551 residual DSAYs of wildlife habitat services (Stantec 2017h). DSAYs are used to quantify the value of all ecosystem services provided by one acre of land over the course of one year. This residual debit in wildlife habitat services would represent a long-term adverse impact of the Proposed Action on wildlife, and also on vegetation as measured by plant species metrics.

Some plant species would be unlikely to re-establish in reclaimed areas because these areas would exhibit different soil characteristics and would likely be drier than existing conditions. Aspen is a clonal species that primarily regenerates by sprouting from parent roots. These roots would be removed or destroyed in the mining process; therefore, without an existing root source, it would be unlikely to recover in areas where the soil had been removed (Schier et al. 1984). Therefore, the Proposed Action would result in the permanent loss of 521.4 acres of aspen or aspen mix. An additional 61.6 acres of conifer habitat would be lost.

This would also represent a permanent loss of 583 acres of snag-producing forest habitat, which, through reclamation and succession, would be replaced with grassland and shrubland. The loss of these forested stands would not adversely affect landscape-scale age class evenness of aspen forest because the stands that would be lost are all in old-mature age classes, which are over-represented on the landscape.

The management of topsoil would be critical to the success of revegetation. All topsoil deemed suitable for use would be placed directly on areas that are ready for reclamation or would be salvaged and stockpiled for later use in reclamation (**Section 2.4.11.3**).

Invasive and noxious species would have the potential to encroach in disturbed areas.

Some reclamation revegetation on historical southeastern Idaho phosphate mines has been found to accumulate selenium to levels detrimental to livestock foraging on the vegetation. Certain species, such as trees, legumes, and plants with deep roots and tap roots, are more susceptible to selenium accumulation (Mackowiak and Amacher 2003; Mackowiak et al. 2004; Zlatnik 1999; Ohlendorf 2003 as cited in BLM and USFS [2016]).

Under the Proposed Action, Simplot is proposing a store and release cover system over all locations in the Project Area receiving seleniferous overburden, which would include the Panel B additional backfill area and almost the entire East Smoky Panel (minus the unreclaimed high wall in the extreme southeastern portion of the pit), for a total of approximately 364 acres. The store and release cover system would consist of approximately two feet of chert, overlain by three feet of Dinwoody and/or Salt Lake Formation and, finally, a topsoil layer estimated at a minimum of six inches, contingent upon the topsoil availability which appears to be well above the six-inch minimum. This cover system would aid in preventing selenium uptake by vegetation.

The Proposed Action seed mix has also been developed to avoid selenium accumulator or deep-rooted species. The seed mix does not contain any trees, legumes, or plants that would extend substantial root mass to depths below the cover. The areas to be revegetated would be properly prepared to receive seeds by ripping or scarifying the surface and drilling or broadcasting seed onto the area. All revegetation efforts would be conducted either in the spring or the fall to take advantage of high ground moisture conditions. Permanent revegetation would be conducted during the first planting season following the preparation of an area to reduce the period of time a disturbed area would be exposed to erosional forces.

Appendix 4A summarizes compliance with applicable standards and guidelines from the CNF RFP (USFS 2003a) with regard to vegetation resources under the Proposed Action.

Overall effects of the Proposed Action to upland vegetation would be long-term and minor. Reclamation would eventually re-establish vegetation cover, but the species composition and community structure would be different.

Wetlands and Riparian Areas

Executive Order (EO) 11990, Protection of Wetlands, requires that federal agencies "…avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative." As stated in **Section 3.7.3**, no wetlands occur within the areas proposed for disturbance; therefore, there would be no direct impacts to wetlands from dredge or fill activities.

Sediments could also be carried into surface water by large storm events via stormwater runoff. BMPs would be designed and implemented to control stormwater runoff and the resulting sediment load at the mine. During mining, precipitation falling on disturbed areas associated with the pit, stockpiles, and haul roads would infiltrate or be retained in sediment catchment and runoff sediment basins. Runoff sediment basins for runoff water and silt would be constructed at strategic locations before mining activities occur in that area to collect and contain water exposed to mining disturbances or overburden. Collection ditches constructed along the outer perimeters of the overburden pile and stockpile sites would transfer surface water runoff from these sites and carry it to runoff sediment basins. Sediment basins are designed at a minimum to capture runoff water from a 100-year, 24-hour storm depth. The capture of runoff during active mining would minimize erosion and sedimentation from the Proposed Action to protect surface waters (and thus wetlands connecting to surface waters) adjacent to the Project Area. Additional erosion control measures would be used where needed to further reduce the potential for introduction of sediments into the watershed, including straw wattles and silt fencing, to control water and soil movement from mining disturbances and the use of erosion matting on haul road fill slopes where appropriate to control soil movement into drainages. Barriers and establishment of short-term vegetation cover would be used to control runoff from overburden piles and topsoil stockpiles.

The capture of surface runoff during active mining would decrease the quantity of water in streams and wetlands downstream of the Project Area over the short-term. As explained in **Section 4.5.2**, the reduced quantity of water may result in the localized drying of some wetlands downstream of the Study Area over the short term. Following reclamation, runoff to nearby streams and wetlands is predicted to be the same or greater compared to baseline conditions.

The Proposed Action could also indirectly impact wetlands adjacent to the Project Area. As a result of Project design, use of BMPs, the wetland and riparian indirect impacts would be local, long-term, and minor.

Noxious Weeds

EO 13112, Invasive Species, requires that a federal agency "…not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere unless, pursuant to guidelines it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm would be taken in conjunction with actions." The primary purpose of this EO is to reduce ecological and economic effects of invasive plant and animal species to agriculture, industry, recreation, and the environment.

The removal of native vegetation would increase the potential for expansion of non-native plants including noxious weeds or other invasives. Non-native plants carry a potential to colonize disturbed areas and, once established, may reduce the diversity in native plant communities. However, because of the existing low occurrence of noxious weeds in the Project Area and incorporation of BMPs into the Project, the potential for the uncontrollable infestations of noxious weeds would be minimized, and effects from noxious weeds would be long-term and minor. Weed control would extend for the life of the Project and reclamation. Project BMPs that would minimize noxious weed impacts include keeping active mining disturbances to a minimum for as short a timeframe as possible, with overburden areas and pit backfill advancing in concert with the active pit; monitoring and controlling noxious weed infestations; using certified weed-free seed, mulch, and straw; cleaning all off-road vehicles prior to entering and re-entering the Project Area; and implementing an annual noxious weed treatment plan.

Appendix 4A summarizes compliance with applicable standards and guidelines from the CNF RFP (USFS 2003a) with regard to noxious and/or invasive weeds for the Project.

Threatened, Endangered, and Sensitive Plants

As discussed in **Section 3.7.6**, there are no identified plant species listed as threatened, endangered, or proposed under the ESA in Caribou County (USFWS 2015). No CTNF sensitive plant species or CTNF Watch rare plant species are anticipated to occur or have been observed during baseline studies. Therefore, impacts to sensitive plants are not anticipated to occur and are not analyzed further.

4.7.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

Under Alternative 1, most components of the mine would remain the same. The only difference is that the pit shell footprint would be reduced by approximately 78 acres, reducing the overall disturbance to 771 acres. Additionally, under this alternative, there would be a total of nine acres that would not be reclaimed, as compared with 12 acres under the Proposed Action. According to the HEA, Alternative 1 would result in a total debit of 53,527 DSAYs during mining and before reclamation. Reclamation would result in the long-term return of 25,464 DSAYs at the mine site, which equates to 48 percent of the wildlife habitat services total debit under the Alternative 1. Therefore, under Alternative 1, there would be a net debit of 28,063 residual DSAYs of wildlife habitat services (Stantec 2017h). The vegetation types and associated acreages affected by Alternative 1 are summarized in **Table 4.7-2**.

Table 4.7-2 Vegetation Types and Estimated Affected Acreages under Alternative 1

VEGETATION TYPE	ACRES	CHANGE IN ACRES FROM PROPOSED ACTION
Forested		
Aspen	75.3	-14.7
Aspen/Conifer	282.7	-37.5
Aspen Dry	19.2	-4.7
Douglas-fir	5.9	-8.6
Dry Aspen/Conifer	64.5	-22.8
Dry Conifer Mix	8.4	-0.3
Lodgepole Pine	0.6	0.0
Mixed Conifer	32.0	-5.8
Forested Sub-total	**488.6**	
Non-Forested		
Grass/Forb	24.8	-2.6
Mountain Brush	59.1	-3.8
Riparian Shrub	0.0	0.0
Sagebrush	54.8	-0.1
Non-Forest Subtotal	**138.7**	
Total	**627.3**[1]	

[1]The remaining 143.5 acres of disturbance occurs in areas already disturbed by current mining.

All other impacts to the various components of vegetation (i.e. wetlands and riparian, noxious weeds, and sensitive plant species) would be the same as those described under the Proposed Action.

4.7.2.3 No Action Alternative

Under the No Action Alternative, the federal phosphate leases would not be developed. The No Action Alternative would result in no new impacts to vegetation resources in the Study Area. The No Action Alternative would maintain the current status of vegetation resources in and around the

Study Area. However, this does not preclude future development of the federal phosphate leases under a different mine plan.

4.7.3 Mitigation Measures

Simplot's M&RP intends to keep mining disturbances to a minimum and for as short a timeframe as possible with overburden areas and pit backfill advancing in sequence with the active pit. Additionally, the cover would be constructed incrementally as mining advances, which would also help minimize impacts. The reclamation activities for the Proposed Action are described in **Section 2.4.11**.

No mitigation measures for vegetation, above and beyond what Simplot has proposed in the M&RP and described in **Section 2.5**, have been recommended.

4.7.4 Unavoidable (Residual) Adverse Impacts

For the Proposed Action and Alternative 1, disturbed areas would constitute an unavoidable residual adverse impact to vegetation resources because existing vegetation (such as forested areas) would not be replaced through reclamation and subsequent natural succession. However, Simplot would be required to stabilize and revegetate disturbed areas in accordance with their approved M&RP. Performance bonds would be held by regulatory agencies to ensure that the site is reclaimed to land use plan standards and other established requirements. Despite reclamation efforts, the Proposed Action and Alternative 1 would have a long-term residual adverse effect on vegetation communities, as some vegetation types (such as forested areas) may never recover to baseline conditions. When vegetation encroaches naturally into disturbed or newly reclaimed areas, it is likely that some colonizing species would be noxious weeds. These areas would remain susceptible until reclamation vegetation becomes established. The longer a site is disturbed, the longer the window of opportunity and space for noxious weed seeds to invade and establish relative to sites that are reclaimed. These residual impacts on vegetation are reflected in the HEA results, which are based on vegetation metrics.

Based on the HEA, the Proposed Action would result in a net debit of 33,551 residual DSAYs of wildlife habitat services (Stantec 2017h). This means that either action alternative would have a long-term net negative impact on wildlife habitat, as measured by the vegetation metric. This debit in wildlife habitat services would constitute an unavoidable residual adverse effect from either action alternative.

4.7.5 Relationship of Short-term Uses and Long-term Productivity

The Proposed Action and Alternative 1 would implement ground-disturbing activities that would produce short- and long-term effects to vegetation while providing the short-term benefits of phosphate resources and productive employment.

4.7.6 Irreversible and Irretrievable Commitment of Resources

Under the Proposed Action and Alternative 1, the loss of forest vegetation is considered an irreversible commitment of resources. Although the M&RP would re-establish upland grassland and shrub vegetation in disturbed areas after mining operations end, it is not anticipated that forests would re-establish in the foreseeable future.

Long-term loss of vegetation would occur in areas where pit walls are not reclaimed. Over a very long time, exposed pit walls would ultimately weather to a reduced slope configuration conducive to supporting vegetative communities. Therefore, the pit walls would be considered an irreversible or irretrievable commitment of resources.

4.8 WILDLIFE RESOURCES

4.8.1 Issues and Indicators

The following are the issues and indicators for general wildlife species.

Issue: The mining operations and related transportation facilities may physically affect terrestrial wildlife (and amphibians), including MIS and significant wildlife corridors, through direct disturbance and fragmentation of their habitat, as well as reduction in amounts and quality of available water.

Indicators:

- Acres of different wildlife habitats physically disturbed over the life of the Project.
- Acres of disturbance to and the proximity of Project operations to high value habitats such as: crucial and or high value big game ranges, significant migration corridors, wetlands, and seep and spring areas.
- An analysis of the DSAYs as calculated in the HEA for both the Proposed Action and Alternative 1.

Issues: Exposure of wildlife to selenium or other harmful contaminants.

Indicators:

- BMPs or mitigation measures to prevent exposure and bioaccumulation.

The issues and indicator for Special Status species are as follows:

Issue: What is the potential for impact to threatened, endangered, or sensitive species through mortality and displacement?

Indicators:

- Disruption and displacement of threatened, endangered, or sensitive species at lek, nest, or roost sites.
- Disturbance to threatened, endangered, or sensitive species from noise and mining activity.

Issue: What is the potential to impact threatened, endangered, or sensitive species through habitat removal and alteration?

Indicators:

- Acres of habitats for threatened, endangered, or threatened species physically disturbed and reclaimed.
- Changes in predator/prey interactions for threatened, endangered, or sensitive species.

The CTNF manages forest wildlife resources and their uses according to the CNF RFP (USFS 2003a). The DFCs and objectives for wildlife resources are achieved through the implementation of the forest-wide standards and guidelines as well as the standards and guidelines for biological elements specified in the management prescriptions of the CNF RFP. Forest plans provide for the persistence of healthy wildlife communities while balancing multiple uses on Forest lands. CNF uses the planning process and ongoing monitoring, evaluation, and adjustment of fish, wildlife, and rare plant standards to prevent listing of species under the ESA and to avoid the extirpation of species (USFS 2003a).

4.8.2 Direct and Indirect Impacts

4.8.2.1 Proposed Action

Impacts of the Proposed Action on terrestrial wildlife would include: 1) immediate, direct effects in terms of wildlife mortality, disturbance, and displacement; and 2) changes in wildlife behavior and composition associated with long-term changes in land cover and reclamation.

Under the Proposed Action, one potential direct impact on terrestrial wildlife would be mortality, particularly when species are not mobile enough to avoid mining equipment or vehicles. Mortalities are likely to occur on an individual, short-term, and localized scale. The impact of these mortalities at the population or community level is, therefore, expected to be negligible. Direct impacts on large and mobile terrestrial wildlife may include disturbance and displacement. These impacts are expected to have a greater effect on intermediate- and large-sized mammals (e.g., coyote and big game) and birds. These wildlife groups may be disturbed by human presence and noise, which could lead to short-term stress and behavior modifications. As mining proceeds, terrestrial wildlife may also displace into adjacent areas to establish temporary or long-term (potentially permanent) territories and home ranges. Displacement to already occupied habitats would likely result in increased competition for available resources. Depending on the season and species, overall disturbance and displacement impacts would be short-term to long-term and negligible to moderate.

Wildlife may also be indirectly affected by exposure to COPCs in vegetation. An effective cover design over backfill and overburden, and the use of a seed mix with species that are relatively shallow-rooted and not selenium accumulators, would address issues associated with adverse COPC concentrations in reclamation vegetation. The seed mix developed for the Proposed Action includes species that are relatively shallow-rooted and are not selenium accumulators. Therefore, vegetation growing on the reclaimed areas would not create a selenium exposure pathway for any wildlife species.

The potential also exists for wildlife to have access to water that has increased COPC concentrations as a result of the Proposed Action. However, as described in **Section 4.5**, this potential is not anticipated based upon groundwater modeling results from the Proposed Action. Existing surface waters adjacent to the Project Area used by wildlife that currently have elevated COPCs would have negligible COPC concentration increases from the Proposed Action as described in **Section 4.5**.

In terms of water quantity, some available water sources that are likely currently used by wildlife within and adjacent to the Project Area would be impacted and could either be dried up or reduced, resulting in an indirect impact as described in **Section 4.5**.

Indirect effects to terrestrial wildlife populations from habitat alteration and reclamation would generally be localized and long-term. As described in **Section 4.7**, the Proposed Action would result in the loss of 728 acres of primarily forested and shrubland wildlife habitat. This includes 583 acres of disturbance to forested habitats and 145 acres of disturbance to shrubland and grassland habitats. There would be no loss of wetland or riparian areas, which are particularly high-value wildlife habitats.

The majority of disturbed habitat (98 percent) would be reclaimed with grasses and shrubs. Over the long term, reclaimed areas would likely regain the level of wildlife habitat services provided by the baseline on big sagebrush and high-elevation rangeland habitat types. However, even after reclamation, the Proposed Action would result in the net debit of 33,551 DSAYs (units that represent wildlife habitat services in the HEA; Stantec 2017h). This means that the Proposed Action would have a long-term net negative impact on wildlife habitat. Forest habitats are unlikely to re-establish in reclaimed areas because of different soil characteristics and drier conditions, as well as removal of root systems from the soil. As such, reclamation would result in a shift in some areas from forest to perennial grasses and shrubs and, therefore, would contribute to long-term fragmentation of formerly forested areas. Also, the shift in vegetation community from forest to grasses and shrubs in some reclaimed areas could change the species composition of the wildlife community as forest-dependent species locally decline in abundance while grassland, shrub, and generalist species may locally increase.

Birds

Upland Game Birds

The Proposed Action would result in the permanent loss of 583 acres of forested habitat for dusky and ruffed grouse. Indirect impacts from loss of habitat would be long-term because final reclamation would emphasize establishment of communities dominated by perennial grasses and shrubs. Although grouse would probably migrate to other suitable habitats outside the disturbed area, they may in the short term be subject to increased predation by raptors and other predators as a result of the presence of people and machinery. Existing power lines in the Project Area have been there for many years and would only be slightly relocated, so no new opportunities of providing perching platform for raptors to make it easier for them to prey on grouse would occur from the Proposed Action. Noxious weed and invasive plant introductions could indirectly impact upland game birds over the long term through a reduction in habitat quality or changes in trophic structure. The potential for noxious weeds and invasive species to spread would be highest in newly disturbed areas. However, impacts from noxious weeds and invasive species are anticipated to be minimal because of the use of BMPs to control them. Because of the localized scale of land disturbance, overall impacts on upland game birds are expected to be minor. Impacts to greater sage-grouse and Columbian sharp-tailed grouse are discussed later in this section.

Migratory Birds

The Proposed Action would result in the short-term loss of 728 acres of migratory bird habitats. Of this, there would be no impacts to riparian areas or wetlands, 54.9 acres of disturbance to sagebrush, and 90 acres of disturbance to aspen woodlands (does not include aspen/conifer sites). As discussed in **Section 3.8.3.2,** these have been identified as high priority habitats for migratory birds in Idaho. Most of these areas would be reclaimed, but the post-reclamation habitat structure and composition would change toward a grassland-dominated community (initially), which would develop into upland shrubland over the long term. Birds that use shrubland and forest communities would likely decrease in abundance in the Study Area after mining, whereas those that are generalist species or that use grasslands may remain at levels similar to baseline or increase. Bird species associated with forest, sagebrush, high-elevation rangeland, habitats would be the most affected.

Potential direct effects could include direct mortality (trampling, vehicle collision, and powerline collision), forced movement, and stress related to increased noise and human activity. Removal of trees and other ground-clearing activities would not be allowed to take place during migratory bird nesting season, unless surveys described in **Section 2.5.6** were conducted and no active nests are found. Simplot would plan ground-clearing activities during the non-nesting season as much as possible to minimize potential impacts to nesting birds. Indirect effects could include increased competition among displaced individuals and resident birds.

Many species of migratory birds are susceptible to collision with power lines, especially during inclement weather, when the lines may be harder to see (Loss et al. 2014; Manville 2005). A recent study estimated that there is an average of 29.6 collision-caused avian mortalities per km of power line per year in the U.S. (though this collision rate varies widely depending on a number of factors such as habitat and the species involved; Loss et al. 2014). However, because the two power lines in the Project Area have been there for many years and would only be slightly relocated from their current location, an increase in the current level of impacts from collisions is not anticipated. To help minimize collisions, Simplot would implement BLM's guidelines for powerlines (**Section 2.5.6**).

The Proposed Action would also result in habitat fragmentation: the division of blocks of contiguous habitat into smaller, isolated patches. The effects of habitat fragmentation on bird communities may depend on the scale of analysis (Fahrig 2003). On a landscape scale, fragmentation of shrub steppe habitats in the Intermountain West has been linked to range-wide declines in several bird species, including Brewer's sparrows, western meadowlarks, and horned larks (Knick and Rotenberry 2002). However, on a more localized scale (such as the Study Area), vegetation characteristics within habitats seem to have a larger influence on productivity and survival of individual birds than the juxtaposition of those habitats on the landscape (Knick and Rotenberry 2002). Also, evidence suggests that birds breeding in naturally patchy landscapes may be relatively tolerant of habitat fragmentation (Berry and Bock 1998). The habitats in the Study Area are naturally patchy; therefore, the effects from additional fragmentation caused by the Proposed Action are anticipated to be minor. Additionally, no impacts are anticipated at the landscape scale as the impacts from the Proposed Action comprise a small portion of the overall habitat available.

Studies have shown that bird populations, particularly breeding birds, may be negatively impacted by elevated noise levels (Reijnen and Foppen 2006; Bayne et al. 2008; Ortega 2012). Noise from traffic and other mining activities could affect bird populations in a number of ways.

Acoustic interference from noise could hamper the detection of mating songs, making it more difficult for birds to establish and maintain territories, attract mates, or maintain pair bonds (Reijnen and Foppen 1994, Habib et al. 2007, Swaddle and Page 2007 as cited in Reijnen and Foppen 2006; Ortega 2012). Thus, noisy habitats may reduce breeding success.

Because birds may avoid areas close to noise sources, noise may effectively extend habitat disturbance beyond the actual facility footprint. The effects of traffic noise on nesting birds may extend more than 300 meters on both sides of roadways (Ortega 2012). McClure et al. (2013) found a negative relationship between recorded traffic noise and the abundance of 13 species of migratory birds at a site in Idaho. In a study of songbirds near energy facilities in Alberta, Canada, songbird density was 1.5 times higher near noiseless facilities than near noise-producing facilities (Bayne et al. 2008), indicating that birds avoided the noisy areas.

Migratory birds using the Study Area could be subject to indirect impacts of selenium, which include impaired reproduction and survivorship, although based upon reclamation practices and groundwater modeling results (**Section 4.5**), these sorts of potential impacts are not anticipated. Further, significant population-level effects of COPCs on migratory birds have not been observed for birds in the Idaho phosphate patch, even at historical mines that were constructed without a cover. In 1999 and 2000, Ratti et al. (2006, as cited in BLM and USFS 2016) tested selenium levels in 544 bird eggs from mine and reference sites in southeastern Idaho, and in 2001, the authors monitored the nest success of 623 American robin and red-winged blackbird nests at these sites. The authors concluded, “On a population level, American robin and red-winged blackbird reproductive success in southeastern Idaho was not impaired by existing levels of selenium in avian eggs. Based on our multi-species data ... and more-specific data on American robins and red-winged blackbirds, we conclude that there are no negative effects on reproductive success of the general avian community at this time.” The authors go on to acknowledge that negative effects may be occurring in some bird species immediately adjacent to some historical mine sites, where high selenium concentrations (>10 micrograms per gram [μg/g]) were observed in eggs (Ratti et al. 2006, as cited in BLM and USFS 2016).

Overall, impacts of the Proposed Action on migratory birds would be long-term and minor.

Raptors

Raptors that occur in the Study Area could be directly and indirectly affected by the Proposed Action. Raptors could be subject to mortality and could be directly disturbed by noise and activity associated with the mining activities. Raptors are sensitive to noise and human presence near their nests and may become agitated and ultimately abandon nests located near disturbance. The distance at which raptors are sensitive to disturbance varies by species, habitat, topography, and even the habituation of individual birds to humans (Richardson and Miller 1997). Simplot would plan ground-clearing activities during the non-nesting season to the extent possible to minimize potential impacts to nesting birds. In the event that ground-disturbing activities must take place during the nesting season, biological surveys would be conducted to identify any active nests and avoidance plans would be developed as necessary. To minimize impacts to nesting raptors, Simplot would implement appropriate mitigation measures, such as buffer zones around occupied nests, during the nesting season.

Raptors often perch and nest on power line poles and could be at risk of electrocution. To address this issue, Simplot would implement BLM’s powerline guidelines (**Section 2.5.6**). Raptors may also collide with the power line, but because the two power lines in the Project Area have been there for many years and would only be slightly relocated from their current location, an increase in the current level of impacts from collisions is not anticipated.

Indirect disturbances would include loss of foraging habitat, reduction or alteration of prey base, and loss of nesting habitat. Over the short term, the Proposed Action would reduce habitat for a number of prey species, including mice, voles, ground squirrels, and rabbits. However, abundant foraging habitat exists adjacent to the Study Area, which would limit the potential effects of the Proposed Action. In addition, reduced plant cover on disturbed areas following reclamation may make prey species that colonize those areas more visible to raptors.

With implementation of avoidance plans as necessary (**Section 2.5.6**) around active raptor nests if discovered during pre-ground clearing (logging) surveys and use of BLM measures on the re-located power lines, overall impacts on raptors under the Proposed Action are expected to be short-term and minor.

Special Status Species

<u>Bald Eagle</u>
As shown in **Table 3.8-1**, baseline surveys observed one bald eagle at the tailings pond in 2013 but did not find any nests in the Project Area (JBR 2013), nor are any expected within the Study Area or immediately adjacent areas. Known nest sites near the Project Area include along the Snake River and Palisades Reservoir (north of the Study Area), along the Blackfoot River (West of the Study Area; Sallabanks 2006), near Thayne, Wyoming (east of the Study Area; USFS 2003b). Additionally, there are four known winter roost sites within the CTNF, with the nearest along Crow Creek, approximately five miles south of the Project Area.

Noise and activity from the Proposed Action may influence bald eagles to temporarily avoid some areas of the mine footprint during active mining. Bald eagles could be directly impacted as a result of mortality from collision with aboveground structures (such as the overhead power lines) and moving vehicles., but this has not occurred during the more than 20 years of the mine's existence. Numerous studies have been conducted and published on the interactions between raptors (including bald eagles) and transmission lines, and raptor electrocution continues to be a concern of state and federal agencies (USGS 1999b; Lehman 2001; Erickson et al. 2005; Manville 2005; Mojica et al. 2009). To minimize these potential impacts, Simplot would implement BLM's power line guidelines (**Section 2.5.6**).

No direct impacts to bald eagle habitat from the Proposed Action are anticipated. The Proposed Action may have a minor impact on the prey base for bald eagles as there may be a decrease in their potential prey. However, this impact would be short-term as after mining has ended, the prey base is anticipated to return to pre-disturbance levels. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on raptors, would have negligible impacts on individuals or habitat over the long term.

<u>Boreal Owl</u>
If boreal owls are nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. However, boreal owls are relatively tolerant of noise and human presence near their nest sites and are unlikely to abandon nests as a result of these factors (Hayward 1994). Activities could also result in the direct removal of boreal owl nests. No boreal owl nests have been found within the Study Area or vicinity. Even so, ground-disturbing activities would be planned outside of the avian nesting season (~March 1 to August 31) as much as possible. If ground-disturbing activities must extend into the nesting season, a nest clearance survey using agency-approved methods would be conducted within a 0.5-mile buffer of disturbance areas and any active nests discovered would be allowed to fledge out before being disturbed.

Noise and activity from the Proposed Action may influence boreal owls to temporarily avoid areas near the Proposed Action during active mining. Boreal owls could also be directly impacted as a result of mortality through mechanisms, such as collision with above ground structures (such as the overhead power lines) and moving vehicles, particularly at night. Simplot would implement BLM's power line guidelines (**Section 2.5.6**).

Approximately 583 acres of potentially suitable boreal owl habitat (forested habitat) would be removed under the Proposed Action, or 38 percent of the forest habitat in the Study Area. In addition to direct habitat loss, habitat removal could indirectly impact boreal owls by altering prey base and potentially increasing abundance of predators that are more tolerant of human activity, such as great horned owls. Most of the disturbed area would be reclaimed as soon as the area was no longer needed; however, reclaimed areas would not function as suitable habitat for boreal owls and would likely support a different prey community (favoring rodent species that are habitat generalists or grassland/shrubland species as opposed to mature forest species).

As a result of the relatively small area of mature forest that would be impacted, and lack of indication from baseline studies for a robust boreal owl population in the Study Area, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on raptors, may result in negligible to minor impacts on individuals or habitat over the long term.

Brewer's Sparrow

Primary impacts to Brewer's sparrows under the Proposed Action may include direct removal of active nests and nesting habitat and disruption of nesting activity from noise and human activity.

If mine construction were to occur during the nesting season, active Brewer's sparrow nests could be inadvertently destroyed (and eggs, chicks, and brooding adults could be killed) by construction equipment. To comply with the Migratory Bird Treaty Act (MBTA), Simplot would minimize the potential for direct mortality of migratory birds by clearing vegetation from potential nesting habitat outside of the nesting season or conducting nest clearance surveys during the nesting season. If Brewer's sparrows are nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. As discussed in **Section 4.8.2.1**, noise can negatively impact small birds by interfering with acoustic communication and eliciting an avoidance response.

Approximately 55 acres of potentially suitable Brewer's sparrow habitat (big sagebrush shrubland) would be removed under the Proposed Action, or 13 percent of the habitat in the Study Area. The majority (98 percent) of this habitat loss would be temporary because most areas would be reclaimed once mining had ceased and would eventually recover to big sagebrush shrubland and again provide potential habitat for Brewer's sparrows over the long-term.

Under the Proposed Action, the power lines may provide a hunting perch for predators such as raptors and ravens. The power lines would be constructed in compliance with BLM's guidelines for power lines (**Section 2.5.6**).

Because of the relatively small area of big sagebrush habitat that would be impacted, as well as reclamation practices that would return much of the disturbed habitat back to big sagebrush habitat after cessation of mining, direct and indirect impacts under the Proposed Action are not expected to have population-level effects on Brewer's sparrows. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on migratory birds, may result in long-term but negligible to minor impacts on individuals or habitat.

Columbian sharp-tailed grouse

As described in **Section 3.8.3.3**, no Columbian sharp-tailed grouse leks or nesting grounds were confirmed in the Study Area during baseline surveys. Additionally, no records of Columbian sharp-tailed grouse exist within 10 miles of the Study Area (IDFG 2014a). A study found that sharp-tailed grouse hens can move up to 1 mile from the lek to nest, and that mean winter movements from lek to winter habitat is 2 miles (USFS 2003b). Given that no leks have been confirmed within 2 miles of the Study Area, nesting and wintering grouse may be limited in the area. Therefore, the following impacts are expected to be limited to foraging and transient grouse.

Noise and activity from the Proposed Action would likely cause Columbian sharp-tailed grouse to temporarily avoid some areas of the Proposed Action during active mining. Columbian sharp-tailed grouse would be at risk of collision with moving vehicles along the haul road.

Approximately 145 acres of potentially suitable Columbian sharp-tailed grouse foraging and wintering habitat (grassland, sagebrush, and mountain brush) would be directly removed under the Proposed Action, or 17 percent of the available habitat in the Study Area. The majority (98 percent) of this habitat loss would be short-term because most areas would be reclaimed once mining had ceased. Reclaimed areas would eventually recover to shrubland and again provide potential habitat for Columbian sharp-tailed grouse over the long term. Noxious weeds and invasive plant introductions could indirectly impact Columbian sharp-tailed grouse over the long term through a reduction in habitat quality or changes in trophic structure. The potential for invasive species to spread would be highest in newly disturbed areas. However, impacts from noxious weeds are anticipated to be minimal because of the use of BMPs to control them.

Under the Proposed Action, the existing power lines may already provide hunting perches for raptors and ravens, which may indirectly result in predation on Columbian sharp-tailed grouse in the Study Area. The re-located power lines would be constructed in compliance with BLM standards (**Section 2.5.6**) to minimize raptor perching and thereby reduce predation on Columbian sharp-tailed grouse.

Because Columbian sharp-tailed grouse use the Study Area sporadically, primarily during the non-breeding season, the Proposed Action is unlikely to have population-level effects on this species. Overall, the Proposed Action may result in negligible to minor impacts on individuals or habitat over the long term.

Flammulated Owl

If flammulated owls are nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. However, flammulated owls are relatively tolerant of noise and human presence near their nest sites and are unlikely to abandon nests as a result of these factors (Hayward 1994). Activities could also result in the direct removal of flammulated owl nests. Even so, ground-disturbing activities would be planned outside of the avian nesting season (~March 1 to August 31) to the extent possible. If ground-disturbing activities must extend into the nesting season, a nest clearance survey using agency-approved methods would be conducted within a 0.5-mile buffer of disturbance areas and any active nests discovered would be allowed to fledge out before being disturbed.

Noise and activity from the Proposed Action may influence flammulated owls to temporarily avoid areas near the Proposed Action during active mining. Flammulated owls could also be directly impacted as a result of mortality through mechanisms, such as collisions with aboveground structures (such as the overhead power lines) and moving vehicles, particularly at night. Simplot would minimize collision risk on the relocated power lines by using BLM's power line guidelines (**Section 2.5.6**).

Approximately 583 acres of potentially suitable flammulated owl habitat (forests) would be removed under the Proposed Action, or 38 percent of the forest habitat in the Study Area. In addition to direct habitat loss, habitat removal could indirectly impact flammulated owls by altering prey base and potentially increasing abundance of predators that are more tolerant of human activity, such as great horned owls. Most of the disturbed area would be reclaimed as soon as the area was no longer needed; however, reclaimed areas would not function as suitable habitat for flammulated owls and would likely support a different prey community (favoring rodent species that are habitat generalists or grassland/shrubland species as opposed to mature forest species).

As a result of the relatively small area of mature forest that would be impacted and lack of indication from baseline studies that flammulated owls are present in the Study Area, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on raptors, may result in negligible to minor impacts on individuals or habitat over the long term.

Great Gray Owl

For great gray owls nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. Ground-disturbing activities could also result in the direct removal of great gray owl nests. As discussed in **Section 3.8.3.3**, great gray owl individuals and two nesting territories were detected in the Study Area during baseline surveys. Therefore, ground-disturbing activities would be planned outside of the avian nesting season (~March 1 to August 31) to avoid possible impacts to nesting owls. If ground-disturbing activities must extend into the nesting season, a nest clearance survey using agency-approved methods would be conducted within a 0.5-mile buffer of disturbance areas and any active nests discovered would be allowed to fledge out before being disturbed.

Noise and activity from the Proposed Action may influence great gray owls to temporarily avoid some areas of the Proposed Action during active mining. Great gray owls could also be directly impacted as a result of mortality through mechanisms, such as collisions with aboveground structures (such as the overhead power lines) and moving vehicles, particularly at night. Simplot would minimize collision risk on the relocated power lines by using BLM's power line guidelines (**Section 2.5.6**).

Approximately 583 acres of potentially suitable great gray owl habitat (forested areas) would be removed under the Proposed Action, or 38 percent of the forest habitat in the Study Area. In addition to direct habitat loss, habitat removal could indirectly impact great gray owls by altering prey base and potentially increasing abundance of predators that are more tolerant of human activity, such as great horned owls. Most of the disturbed area would be reclaimed as soon as the area was no longer needed; however, reclaimed areas would not function as suitable habitat for great gray owls and would likely support a different prey community (favoring rodent species that are habitat generalists or grassland/shrubland species as opposed to mature forest species).

As a result of the relatively small area of mature forest that would be impacted and implementing avoidance plans for any active nests (**Section 2.5**), direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on raptors, would result in minor impacts on individuals or habitat over the long term.

Greater Sage-grouse

Under the Proposed Action, there would be 55 acres of direct removal of big sagebrush habitat. As described in **Section 3.8.3.3**, no greater sage grouse have been identified in the Study Area but have been observed nearby. No greater sage-grouse habitat management areas (Priority Habitat Management Areas [PHMAs], Important Habitat Management Areas [IHMAs], and General Habitat Management Areas [GHMAs]) occur in the Study Area or vicinity (**Figure 3.8-3**; BLM and USFS 2015). As noted in **Section 3.8.3.3**, no indication of breeding or nesting activity has been confirmed in the Study Area, and although a group of greater sage-grouse were observed within 10 miles (two miles northeast), no lekking was confirmed. For these reasons, the Study Area is not expected to be used by nesting or brood-rearing grouse but rather by individual or small, transient groups of foraging grouse (which coincides with baseline survey observations). This is further supported by the ROD for the ARMPA (BLM and USFS 2015), which indicates that 90 percent of greater sage-grouse nesting occurs within 6.2 miles of active leks in Idaho; no active leks are known to occur within 6.2 miles of the Study Area. Therefore, the impacts discussed below are specific to individuals or small groups of transient, foraging grouse. Additionally, the Idaho Land Board (IDL) has developed the Idaho State Board of Land Commissioners Greater Sage-Grouse Conservation Plan to develop conservation measures for state endowment trust land and IDL regulatory programs as part of Idaho's commitment to conserving greater sage-grouse. As part of this plan, IDL is to encourage mining operators located within Core or Important habitat zones to adopt mining BMPs specific to greater sage-grouse conservation. After consultation with the IDL, it was determined that the Project does not fall within either of these zones.

The Proposed Action may impact greater sage-grouse through short-term displacement of individuals, long-term habitat loss and alteration, direct mortality from vehicle collisions, avoidance responses to the relocated power lines, and increased predation. Mining activities could potentially cause individual greater sage-grouse to temporarily or permanently avoid marginally suitable habitat in the vicinity of these activities. As a result, displaced greater sage-grouse may relocate to unaffected but already occupied habitats where population and competition would increase. Consequences of such displacement and competition could result in lower survival and potentially lower reproductive success of individual greater sage-grouse (NTT 2011).

Habitat modifications associated with development of the Proposed Action may fragment marginally suitable sagebrush habitat and could directly and indirectly impact individual sage-grouse. Over the long term, the areas reclaimed would be expected to recover to a plant community similar to that present in the on-site baseline high-elevation rangeland habitat, which includes a big sagebrush component. Noxious weeds and invasive plant introductions could indirectly impact greater sage-grouse over the long term through a reduction in habitat quality or changes in trophic structure. The potential for invasive species to spread would be highest in newly disturbed areas. However, impacts from noxious weeds are anticipated to be minimal because of the use of BMPs to control them.

Individual greater sage-grouse could collide with moving vehicles along the proposed haul road, although under the Proposed Action, vehicles would travel the gravel haul road at low speeds, which would limit the potential for collisions.

The relocated and existing power lines could continue to have direct and indirect effects on individual greater sage-grouse using the Study Area, but as noted previously, the area is outside of mapped habitat management areas. Several studies suggest that greater sage-grouse and related species instinctively avoid areas where power lines or other vertical structures are visible to avoid predation (Schroeder 2010). One study found that greater sage-grouse tend to avoid habitat located within 600 meters (1,968 feet) of power lines (Gillan et al. 2013; Braun 1998). By avoiding use of the habitat, the birds lose the benefits of that habitat. Thus, the effective habitat loss and fragmentation created by power lines may extend to an area much larger than the actual power line corridor. These impacts are expected to be minor, as the power line would not fragment any PHMA, IHMA, GHMA, or other important habitats for greater sage-grouse.

Powerlines also provide hunting perches for raptors and ravens, which may result in increased predation on greater sage-grouse in the Study Area (Schroeder 2010; NGSGCT 2010), although this impact may be reduced as greater sage-grouse may avoid areas around the power lines. The relocated power lines would be constructed in compliance with BLM guidelines to minimize raptor perching and thereby reduce predation on greater sage-grouse.

Overall, field observations indicate that sagebrush habitat is marginal and there are no greater sage-grouse habitat management areas (PHMAs, IHMAs, or GHMAs). For these reasons, greater sage-grouse use of the Study Area is expected to be limited to small foraging or migrating groups. Therefore, potential direct and indirect impacts from the Proposed Action on these foraging grouse are not expected to affect greater sage-grouse at the population level. As such, a determination was made that the Proposed Action may have long-term but negligible to minor impacts on individuals or habitat.

Harlequin Duck

As there is no suitable habitat, and this species is not expected to occur in the Study Area, the Proposed Action would have no impact on harlequin ducks.

Northern Goshawk

If northern goshawks are nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. No northern goshawk nests have been confirmed within the Study Area; however, pairs could establish nesting territories in the forests in the Study Area in the future based upon observations and callbacks from the baseline survey results. Nesting northern goshawks can be sensitive to disturbance at a nest site from nest construction through 20 days post-hatch (Squires and Kennedy 2006). Any activity near active nest sites may cause goshawks to abandon the nest. Simplot would plan ground-disturbing activities outside of the goshawk nesting season (April 1 to August 15). However, if ground-disturbing activities must occur during the nesting season, a nest clearance survey using agency-approved methods would be conducted within 0.5 mile of disturbance areas and any active nests discovered would be allowed to fledge out before being disturbed. Noise and activity from the Proposed Action may influence northern goshawks to temporarily avoid areas near the Proposed Action during active mining. Northern goshawks could also be directly impacted as a result of mortality from collision with aboveground structures (such as the overhead power lines) and moving vehicles. Simplot would minimize collision risk on the relocated power lines by using BLM guidelines for power lines.

Approximately 583 acres of potentially suitable northern goshawk habitat (forests) would be removed under the Proposed Action, or 38 percent of the forested habitat in the Study Area. In addition to direct habitat loss, habitat removal could indirectly impact northern goshawks by altering prey base and potentially increasing abundance of predators that are more tolerant of human activity, such as great horned owls. An increase of predators may reduce nesting success for goshawks remaining in the vicinity. Most of the disturbed area would be reclaimed as soon as the area was no longer needed; however, reclaimed areas would not function as suitable nesting habitat for northern goshawks and would likely support a different prey community (favoring rodent species that are habitat generalists or grassland/shrubland species as opposed to mature forest species).

Because of the relatively small area of mature forest that would be impacted, and lack of evidence from baseline studies that there are any active or historical northern goshawk territories within the Study Area, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on raptors, may result in minor impacts on individuals or habitat over the long term.

Olive Sided Flycatcher

Primary impacts to the olive-sided flycatcher under the Proposed Action may include direct removal of active nests and nesting habitat, plus indirect effects from disruption of nesting activity from noise and human activity.

If mine construction were to occur during the nesting season, active olive-sided flycatcher nests could be inadvertently destroyed (and eggs, chicks, and brooding adults could be killed) by construction equipment. To comply with the MBTA, Simplot would minimize the potential for direct mortality of migratory birds by clearing vegetation from potential nesting habitat outside of the nesting season. If olive-sided flycatchers are nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. As discussed in **Section 4.8.2.1**, noise can negatively impact small birds by interfering with acoustic communication and eliciting an avoidance response.

Thirty-eight acres of potentially suitable olive-sided flycatcher habitat (Subalpine coniferous forests and mixed forests) would be removed under the Proposed Action, or 15 percent of the habitat in the Study Area. Most of the disturbed area would be reclaimed as soon as the area was no longer needed; however, reclaimed areas would not function as suitable habitat for olive-sided flycatchers.

Under the Proposed Action, the existing power lines may continue to provide a hunting perch for predators such as raptors and ravens. The relocated power lines would be constructed in compliance with BLM guidelines to minimize raptor perching and thereby reduce predation on olive-sided flycatchers and other migratory birds.

Because of the relatively small area of forested habitat that would be impacted and the uncertainty of their presence in the Study Area, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects olive-sided flycatchers. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on migratory birds, may result in long-term but negligible to minor impacts on individuals or habitat.

Peregrine Falcon

The Proposed Action is not expected to impact nesting peregrine falcons because of a lack of known nests or suitable nesting habitat in the Study Area. Therefore, the impacts described below would most likely affect small numbers of individual peregrine falcons that forage in the area or move through the Study Area during the non-breeding season.

Noise and activity from the Proposed Action may influence peregrine falcons to temporarily avoid areas near the Proposed Action during active mining. Peregrine falcons could be directly impacted as a result of mortality from collision with aboveground structures (such as the existing and relocated overhead power lines) and moving vehicles. Simplot would minimize collision risk on the relocated power lines by using BLM guidelines.

Approximately 701 acres of potentially suitable peregrine falcon foraging habitat (forest, mountain brush, shrubland, grass/forb areas) would be removed under the Proposed Action.

Because the Study Area lacks nesting habitat for peregrine falcons, and peregrine falcons may only use the Study Area sporadically, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on raptors, may result in negligible impacts on individuals or habitat over the long term.

Prairie Falcon

The Proposed Action is not expected to impact nesting prairie falcons because of a lack of known nests or suitable nesting habitat in the Study Area. Therefore, the impacts described below would most likely affect small numbers of individual prairie falcons that forage in the area or move through the Study Area during the non-breeding season.

Noise and activity from the Proposed Action may influence prairie falcons to temporarily avoid some areas of the Proposed Action during active mining. Prairie falcons could be directly impacted as a result of mortality from collision with aboveground structures (such as the existing and relocated overhead power lines) and moving vehicles. Simplot would minimize collision risk on the relocated power lines by using BLM guidelines, as given in **Section 2.5.6**.

Approximately 118 acres of potentially suitable prairie falcon foraging habitat (high-elevation mountain brush and sagebrush) would be removed under the Proposed Action, or 27 percent of the available habitat in the Study Area. The majority (99 percent) of this habitat loss would be short-term because most areas would be reclaimed once mining had ceased. Reclaimed areas would again provide potential foraging habitat for prairie falcons, initially supporting a grassland community, which would recover to shrubland over the long term.

Because the Study Area lacks nesting habitat for prairie falcons, which may only use the Study Area sporadically, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on raptors, may result in negligible impacts on individuals or habitat over the long term.

Sagebrush sparrow

Primary impacts to sagebrush sparrows under the Proposed Action may include direct removal of active nests and nesting habitat, plus indirect effects from disruption of nesting activity from noise and human activity.

If mine construction were to occur during the nesting season, active sagebrush sparrow nests could be inadvertently destroyed (and eggs, chicks, and brooding adults could be killed) by construction equipment. To comply with the MBTA, Simplot would minimize the potential for direct mortality of migratory birds by clearing vegetation from potential nesting habitat outside of the nesting season. If sagebrush sparrows are nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. As discussed in **Section 4.8.2.1**, noise can negatively impact small birds by interfering with acoustic communication and eliciting an avoidance response.

Approximately 55 acres of potentially suitable sagebrush sparrow habitat (big sagebrush shrubland) would be removed under the Proposed Action, or 13 percent of the habitat in the Study

Area. The majority (98 percent) of this habitat loss would be temporary because most areas would be reclaimed once mining had ceased. Areas reclaimed would eventually recover to big sagebrush shrubland through natural succession and again provide potential habitat for sagebrush sparrows over the long-term.

Under the Proposed Action, the existing power lines would continue to provide a hunting perch for predators such as raptors and ravens. The relocated power lines would be constructed in compliance with BLM guidelines to minimize raptor perching and thereby reduce predation on sagebrush sparrows and other migratory birds.

Because of the relatively small area of big sagebrush habitat that would be impacted, as well as reclamation practices that would return much of the site to big sagebrush habitat after cessation of mining, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on sagebrush sparrows. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on migratory birds, may result in long-term but negligible to minor impacts on individuals or habitat.

American three-toed woodpecker

Primary impacts to the American three-toed woodpecker under the Proposed Action may include direct removal of active nests and nesting habitat, plus indirect effects from disruption of nesting activity from noise and human activity.

If mine construction were to occur during the nesting season, American three-toed woodpecker nests could be inadvertently destroyed (and eggs, chicks, and brooding adults could be killed) by construction equipment. To comply with the MBTA, Simplot would minimize the potential for direct mortality of American three-toed woodpecker and other migratory birds by clearing vegetation from potential nesting habitat outside of the breeding season. If American three-toed woodpeckers are nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. As discussed in **Section 4.8.2.1**, noise can negatively impact small birds by interfering with acoustic communication and eliciting an avoidance response. These impacts would be short-term, as they would occur primarily during construction and active mining.

Approximately 38 acres of potentially usable American three-toed woodpecker habitat (spruce-fir forests) would be removed under the Proposed Action, or 15 percent of the suitable habitat in the Study Area. This loss of habitat would be permanent because reclaimed areas would be seeded with upland vegetation rather than being restored to their baseline forested habitat type.

Because of the relatively small area of suitable habitat that would be impacted, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on migratory birds, may result in minor impacts on individuals or habitat over the long term.

Trumpeter swan

As described in **Section 3.8.3.3**, no suitable habitat for trumpeter swans exist within the Study Area so impacts would be limited to transient individuals.

Trumpeter swans could be directly impacted as a result of mortality from collision with aboveground structures (such as the existing overhead power lines) and moving vehicles. Simplot would minimize collision risk on the relocated power lines by using BLM guidelines.

Because of the lack of suitable habitat that would be impacted and lack of evidence from baseline studies that the Study Area supports nesting trumpeter swans, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on migratory birds, may result in long-term but negligible to minor impacts on individuals or habitat.

Willow flycatcher

Primary impacts to the willow flycatcher under the Proposed Action may include direct removal of active nests and nesting habitat, plus indirect effects from disruption of nesting activity from noise and human activity.

If mine construction were to occur during the nesting season, active willow flycatcher nests could be inadvertently destroyed (and eggs, chicks, and brooding adults could be killed) by construction equipment. To comply with the MBTA, Simplot would minimize the potential for direct mortality of willow flycatchers and other migratory birds by clearing vegetation from potential nesting habitat outside of the breeding season. If willow flycatchers are nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. As discussed in **Section 4.8.2.1**, noise can negatively impact small birds by interfering with acoustic communication and eliciting an avoidance response.

No potentially usable willow flycatcher habitat (shrub/scrub wetland) would be removed or impacted under the Proposed Action, thus direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species. Overall, the Proposed Action, with the implementation of design features and measures to minimize impacts on migratory birds, may result in negligible to minor impacts on individuals or habitat over the long term.

Mammals

Direct impacts on mammals would be similar to those described for terrestrial wildlife in general. Small mammals may be crushed or trampled by mine equipment or vehicles. Large- and intermediate-sized mammals may be killed by moving vehicles along haul roads. Mortalities are expected to occur on a short-term, individual, and localized scale; therefore, population- or community-level impacts on wildlife from mortalities would likely be negligible.

In terms of indirect impacts, habitat alteration, disturbance, and displacement from mine activities would affect mammals. Habitat structure and composition determine the current diversity of species in the analysis area. The landscape alteration would cause some large mammals to displace to surrounding habitats, potentially increasing competition for resources with other wildlife already occupying those habitats. However, some species (such as coyote) may acclimate to human presence and disturbances and may continue using resources in the Project Area.

Over the long term, reclaimed areas are anticipated to recover to big sagebrush and high-elevation rangeland habitat types. Aspen forest habitats are unlikely to re-establish in reclaimed areas because of different soil characteristics and drier conditions, as well as removal of aspen root systems from the soil. As such, reclamation would result in a shift in some areas from forest to perennial grasses and shrubs. This shift in the plant community could change the species composition of the mammalian community as forest-dependent species locally decline in abundance while grassland, shrub, and generalist species locally increase in the Study Area.

Because of the localized scale of landscape alteration, overall indirect impacts on mammals are expected to be long-term and negligible to minor.

Noxious weeds and invasive plant introductions could indirectly impact mammals (including special status mammals as described below) over the long term through a reduction in habitat quality or changes in trophic structure. The potential for invasive species to spread would be highest in newly disturbed areas. However, impacts from noxious weeds are anticipated to be minimal because of the use of BMPs to control them.

Direct and indirect impacts on individual groups of mammals are analyzed below. Note that the impacts generally described for mammals apply to all groups discussed in the following paragraphs. Therefore, only those impacts unique to each individual mammal group are discussed.

Big Game

Elk summer habitat exists throughout the Study Area and elk winter range exists on the far western side of the Study Area. Based on where winter range is expected to occur in comparison to the facilities layout for the Proposed Action, approximately 130 acres of IDFG-mapped elk winter range would be directly impacted. This represents 17 percent of the Study Area. Additional winter habitat is available immediately east of the Study Area. This area would be stripped of vegetation and would therefore be unusable as winter range by big game during active mining. Winter range is especially important for big game, as it provides valuable food and thermal cover that allows these species to conserve energy during severe weather conditions (USFS 2003b). Therefore, the temporary loss of winter range would have a long-term and moderate effect on big game survivorship, at least until it was reclaimed and again supported vegetation of sufficient density and cover to provide food and shelter.

Although winter range habitat impacted by the Proposed Action would be reclaimed, the successional stages of grassland habitat to shrubland would take a number of years. Until it had fully recovered, the habitat would not provide the same structure and complexity as it did before disturbance. Increased human presence associated with the mine and reduction in cover may also intensify the potential for wildlife-human interactions.

Mule deer summer range overlaps the entire Study Area and broadly surrounds it. Mule deer are dependent on shrublands for browse and cover (Cox et al. 2009), so the initial loss of shrubs from the impacted areas is likely to adversely affect mule deer in the Study Area over the short term. Over the long term, as reclaimed areas return to shrubland through succession, these areas would once again become suitable mule deer foraging habitat. The Idaho Mule Deer Initiative assigns a high value to fawning habitat and forage production associated with aspen forests (aspen forests are also important to elk annual recruitment). Given that there would be some permanent loss of aspen forest (as a result of changes to soil characteristics and removal of root systems), there would also be some permanent loss of deer fawning habitat and annual elk recruitment production.

Noise and human presence associated with the mine would interrupt big game movement corridors and displace some big game into adjacent undisturbed habitat. Mule deer have been found to avoid heavily disturbed areas at mines during migration (Merrill et al. 1994 and Blum et al. 2015, both as cited in BLM and USFS 2016). In addition to affecting movement corridors, there would likely be at least some displacement of big game from parturition and winter ranges over the short term. Noise and disturbance during the calving/fawning season may cause pregnant elk and mule deer and those with young calves/fawns to vacate the area, which could negatively impact calf and fawn survivorship. Human-related disturbances on winter ranges can cause big game to burn necessary fat reserves that help them survive the winter. Any extra activity or unnecessary movements, such as running from the sound of a vehicle, could affect survivorship, as could the need to travel farther to alternate areas of crucial range (Canfield et al. 1999; Lutz et al. 2011).

A study of elk calf response to human activity and simulated mine noises in southeastern Idaho found that calves exposed to disturbance moved farther, used larger areas, and used less favorable habitat than calves not exposed to disturbance (Kuck et al. 1985 as cited in BLM 2011). However, if a resource in the disturbance area is of high quality, or there is no suitable alternative habitat, then big game may not flee (Frid and Dill 2002). In addition, there currently is and has been an active mine immediately adjacent to the Project Area and it is likely that some individual big game may have become habituated to noise, disturbance, and human presence associated with mining activities in the area.

As described in **Section 3.5**, baseline surface water quality data indicate that streams and tributaries mainly south of the Study Area exhibit concentration levels, particularly for selenium, that exceed Idaho Cold-Water Aquatic Life Standards CCCs. Therefore, big game could continue to be exposed to levels of COPCs (via drinking contaminated water exposed to COPCs) whether the Proposed Action is built or not. As summarized in **Section 4.5**, the Proposed Action has the potential for a minor (0.001 mg/L) increase in water quality impacts to Hoopes Spring. Therefore, big game that drink water in this area could be at an added risk of COPCs exposure under the Proposed Action. However, this risk is expected to be negligible given the potential increase of 0.001 mg/L, plus big game's wide-ranging nature, and irregular use of the site.

Overall, impacts to big game would be long-term and minor to moderate under the Proposed Action. The effects of noise and disturbance would be short-term but would occur over a relatively wide area, whereas the effects of habitat removal would be localized to the Project Area but would be long-term.

Bats

Mining activities could disturb bat roosts and result in the long-term loss of bat foraging habitat. Undocumented bat roosts and habitat could be directly impacted under the Proposed Action through removal of trees (primarily aspen trees). Bats may also collide with vehicles and mine equipment, particularly when they are most active at night during the summer. Because no mine shafts or caves have been identified within the Study Area, the Proposed Action is most likely to affect small numbers of individual bats that may be roosting in trees or rock crevices and is unlikely to have population-level impacts because of the lack of significant roosts or hibernacula identified in the Study Area. Overall, impacts to bats are expected to be minor, as they would occur on an individual and localized scale.

Special Status Species

<u>Gray wolf</u>

As discussed in **Section 3.8.4.4**, there are no established packs or breeding pairs within the Study Area although sightings and evidence of use occur. Disruption of movement (anything that could influence wolves, if present, to travel around the periphery of the Study Area) could result from habitat removal, noise, human activity, or impacts to distribution of prey (e.g., the potential for prey such as big game to avoid the mine site could influence wolves to hunt outside the mine site). Generally, disruption to wolf movement from these impacts is expected to be negligible given the gray wolf's wide-ranging nature and irregular use of the site. If wolves do pass through the area during construction, mining, or reclamation, they could be at risk of vehicle collisions. Again, because of the irregular use of the site, collision with vehicles is expected to be rare. Further, it is more likely that wolves would travel around the edges of the mine rather than along any existing roads during periods of increased human activity.

As described in **Section 3.5**, baseline surface water quality data indicate that streams and tributaries mainly south of the Study Area exhibit concentration levels, particularly for selenium, that exceed Idaho Cold-Water Aquatic Life Standards CCCs. Therefore, gray wolves could continue to be exposed to levels of COPCs (via drinking contaminated water or eating prey exposed to COPCs) whether the Proposed Action is built or not. As summarized in **Section 4.5**, the Proposed Action has the potential for a minor (0.001 mg/L) increase in water quality impacts to Hoopes Spring. Therefore, wolves could be at an added risk of COPCs exposure under the Proposed Action. However, this risk is expected to be negligible given the potential increase of 0.001 mg/L, plus the gray wolf's wide-ranging nature, and irregular use of the site.

Overall, because of the lack of known packs or otherwise robust wolf population in the Study Area, impacts are expected to be limited to individual or small groups of wolves passing through the area. Because of the infrequent and wide-ranging nature of the gray wolf in the Study Area, disruption to movement associated with previously described impacts and exposure to COPCs are expected to be negligible. As such, a determination was made that the Proposed Action may impact individuals or habitat but is not expected to affect the species at a population level.

Canada lynx

The primary impact of the Proposed Action on Canada lynx would be the disruption of their movement through linkage habitat. This impact may result from noise, human activity, and small-scale habitat removal (as discussed below), but is expected to be negligible, as any lynx occurrence is likely to be limited to transient use of linkage habitat (as explained in **Section 3.8.4.4**). For this reason, the potential for lynx exposure to COPCs is also expected to be negligible.

The year-round noise and human activity associated with the construction and active mining phase of the Proposed Action would likely influence lynx, if present, to travel around the periphery of the Study Area rather than directly through it. Therefore, the potential for direct impacts to lynx from Proposed Action mining activities (e.g., vehicle collision) would be negligible.

The Proposed Action area of disturbance would be 2.8 miles tall (measured north to south). Assuming that the entire Proposed Action footprint is potential linkage habitat (USFS 2007), there could be a 2.8-mile-wide impact of disturbance. However, after active mining, the majority of disturbance would be reclaimed with grasses and shrubs, and human presence in the area would be minimal. Over the long term (110 years), reclaimed areas would be expected to recover to habitat composition similar to baseline conditions. Therefore, there would be little impact on lynx movement through the region over the long term. Wildlife corridors (including for the lynx) are discussed further in the RFP (USFS 2003a) and are incorporated by reference here. Thus, a determination was made that the Proposed Action may affect, but is not likely to adversely affect, the Canada lynx.

Pygmy rabbit

Given the lack of habitat for pygmy rabbits within the Study Area as described in **Section 3.8.4.4,** pygmy rabbits are not anticipated to occur and therefore, there would be no impacts to this species.

Spotted bat

As described in **Table 3.8-1**, no spotted bats were detected during baseline acoustic monitoring. Spotted bats are not anticipated to occur give the overall lack of suitable habitat for this species (i.e. cracks and crevices of rocky outcrops and cliffs). Due to this lack of habitat, there would be no impact to this species.

Townsend's big-eared bat

As described in **Table 3.8-1**, no Townsend's big-eared bats were detected during baseline acoustic monitoring. If present, it is expected that use of the Study Area by Townsend's big-eared bats would be infrequent and transitory (because of the lack of roost sites in the vicinity for this species), and impacts would be expected to occur at the individual versus population level. Potential impacts of the Proposed Action on the Townsend's big-eared bat include the loss of foraging and commuting habitat, loss and degradation of water sources, potential mortality from vehicle collisions, and changes in predator communities.

The Proposed Action would result in the loss or alteration of approximately 701 acres of potential foraging habitat. Habitat impacts would be long-term. The majority (96 percent) of disturbed habitat would be reclaimed and would eventually recover to high-elevation rangeland habitat types. However, losses of aspen and forest habitat would be long-term. Water sources used by the spotted and Townsend's big-eared bat could be dried up or reduced in water quantity, although plenty of existing and adjacent water sources would not be impacted.

Townsend's big-eared bats could collide with moving vehicles along the haul road, when vehicles are traveling the road between dusk and dawn. The bats could also be subject to increased mortality from predators, such as the great horned owl, raccoon, and weasel, which are relatively more tolerant of human disturbance. However, predators tend to prey on bats while asleep or when emerging from their roosts (Gruver and Keinath 2003), and because there no known roosts in the area, any predator impacts are expected to be opportunistic in nature. Mortalities are expected to be rare and limited to individual bats because use of the site is expected to be low and sporadic.

Overall, roosting sites (e.g., caves and underground mines) are not known in the Study Area or vicinity; therefore, impacts to Townsend's big-eared bats, if present, would be limited to individuals foraging in or moving through the area. Impacts on habitat would be long-term until the site is successfully reclaimed. Bats may collide with moving vehicles or infrastructure, especially between dusk and dawn. However, collision impacts, if any, are expected to be rare. Added exposure of bats to COPCs given existing selenium levels in the watershed is anticipated to be negligible due to the infrequent use of the site and the very small potential increase in COPCs in surface waters outside of the Study Area.

Uinta chipmunk

Under the Proposed Action, the primary potential impacts on the Uinta chipmunk include the loss of habitat, loss and degradation of water sources, mortality from vehicle collisions, and changes in predator communities.

Approximately 457 acres of potential Uinta chipmunk habitat (i.e., aspen, aspen/mixed conifer, and mixed conifer forests) would be removed under the Proposed Action. In addition to direct habitat loss, habitat removal could indirectly impact Uinta chipmunks by the potential increase in the abundance of predators that are more tolerant of human activity. Most of the areas disturbed by the Proposed Action would be reclaimed as soon as the areas were no longer utilized for Project activities; however, reclaimed landscapes would not function as suitable habitat for Uinta chipmunk, as the forested habitats impacted by the Proposed Action would be reclaimed to grassland and shrubland communities over the short term and shrubland communities over the long term.

Uinta chipmunks could collide with moving vehicles along the proposed access and haul roads. Under the Proposed Action, the impact of vehicle collisions on the Uinta chipmunk would be short-term, as human presence in the area would be minimal upon the conclusion of Project activities.

Uinta chipmunks could also be subjected to increased mortality from predators that are relatively more tolerant of human disturbance and which may benefit from perching on the existing and relocated overhead power lines. The relocated power lines would be constructed in compliance with BLM guidelines to minimize raptor perching and, thereby, reduce the predation of Uinta chipmunks.

The overall impacts to Uinta chipmunk under the Proposed Action would be long-term and negligible to minor.

<u>*North American wolverine*</u>
As discussed in **Section 3.8.4.4**, wolverine use of the Study Area is likely limited to occasional transitory movements of individual wolverines. Therefore, the primary impact of the Proposed Action on the wolverine would be the disruption of wolverine movement through the general area. Disruption of movement (anything that could influence wolverines, if present, to travel around the periphery of the Study Area) could result from habitat removal, noise, human activity, or impacts to distribution of prey (e.g., the potential for prey such as big game to avoid the mine site could influence wolverines to hunt outside the mine site). Generally, disruption to wolverine movement from these impacts is expected to be negligible given the species' wide-ranging nature and irregular use of the site. If wolverines do pass through the area during construction, mining, or reclamation, they could be at risk of vehicle collision along the haul road. Again, because of irregular use of the site, collision with vehicles is expected to be rare. Further, it is more likely that wolverines would travel around the edges of the mine rather than along the haul roads during periods of increased human activity.

As described in **Section 3.5**, baseline surface water quality data indicate that streams and tributaries mainly south of the Study Area exhibit concentration levels, particularly for selenium, that exceed Idaho Cold-Water Aquatic Life Standards CCCs. Therefore, wolverines could continue to be exposed to levels of COPCs (via drinking contaminated water or eating prey exposed to COPCs) whether the Proposed Action is built or not. As summarized in **Section 4.5**, the Proposed Action has the potential for a minor (0.001 mg/L) increase in water quality impacts to Hoopes Spring. Therefore, wolverines could be at an added risk of COPCs exposure under the Proposed Action. However, this risk is expected to be negligible given the potential increase of 0.001 mg/L, plus the wolverines wide-ranging nature, and irregular use of the site.

Overall, there is no potential for wolverine denning in the Study Area. Impacts are therefore expected to be limited to transient individuals, if present, during construction, mining, and reclamation. Because of the likely infrequent and wide-ranging nature of the wolverine in the Study Area, disruption to movement associated with aforementioned impacts and exposure to COPCs are expected to be negligible. For these reasons, a determination was made that the Proposed Action may impact individuals or habitat but is not expected to jeopardize this species.

Reptiles and Amphibians

The Proposed Action would not result in permanent loss of any wetland and riparian habitat within the Study Area. Direct mortalities to amphibians and reptiles may occur on the haul road as individuals travel between various habitats. The placement of culverts and mine runoff could introduce sediments into habitats used by amphibians and reptiles. Simplot would implement surface water control structures with several types of designs to reduce or eliminate risk of surface water contamination or fill. For this reason, indirect impacts from runoff on sensitive amphibians and reptiles are expected to be negligible. Indirect effects could also adversely affect amphibian populations including localized drying or reduction in the quantity of existing surface water sources as a result of the capture of surface runoff during active mining.

Special Status Species

Columbia Spotted Frog
As the Study Area is outside the known range of the Columbia spotted frog, there would be no impact to this species from the Proposed Action.

Northern Leopard Frog, Common Garter Snake, and Boreal Toad
Impacts to these three species would be similar to those already described for amphibians and reptiles generally. Impacts may be long-term and negligible to minor on individuals or habitat.

The Proposed Action would not result in any loss of breeding habitat for the northern leopard frog and boreal toad as no riparian or wetland areas would be impacted. As stated in **Section 3.8.5**, while the common garter snake may occur in a variety of habitat, in Idaho they are associated with marshes and wet areas. As such, there would be no direct impact to habitat for this species as well.

4.8.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

The types of potential impacts on terrestrial wildlife resulting from Alternative 1 would be essentially identical to those described under the Proposed Action (**Section 4.8.2.1**). However, the total acres of wildlife habitat loss and disturbance from mining activities would be reduced by approximately 78 acres as a result of reconfiguring the pit shell footprint and various habitat types used by specific species would be slightly reduced, primarily to forested habitats (**Section 4.7**).

Under this alternative, no cherty shale would be encountered which would result in less seleniferous material being encountered. This reduction would likely reduce the potential for COPCs to affect wildlife populations.

Overall, impacts to wildlife under Alternative 1 would be reduced compared with the Proposed Action by reducing the footprint of disturbance and the amount of seleniferous material. Depending on the season and species, overall disturbance and displacement impacts would be long-term and would range from negligible to minor.

4.8.2.3 No Action Alternative

Under the No Action Alternative, the phosphate leases would not be developed. The No Action Alternative would result in no new impacts to wildlife in the Study Area. The No Action Alternative would maintain the current status of terrestrial wildlife and terrestrial wildlife populations in and around the Study Area. However, this does not preclude future development of the federal phosphate leases under a different mine plan.

4.8.3 Mitigation Measures

EPMs described in **Section 2.5** would be implemented to avoid and/or minimize potential impacts to wildlife. No mitigation measures for wildlife, above and beyond what Simplot has proposed in the M&RP and described in **Section 2.5**, have been recommended.

4.8.4 Unavoidable (Residual) Adverse Impacts

Based on the HEA, reclamation would offset 52 percent of the wildlife habitat services lost under the Proposed Action, with a net debit of 33,551 residual DSAYs of lost wildlife habitat services (Stantec 2017h). This loss of wildlife habitat services would be an unavoidable residual adverse effect of the Proposed Action. The net residual DSAY debit under Alternative 1 would be 5,488 DSAYs less than that of the Proposed Action, at 28,063 DSAYs remaining, with reclamation offsetting 48 percent of the wildlife habitat services lost.

The potential destruction of undiscovered active bird nests under the Proposed Action or Alternative 1 would be unavoidable; however, the potential for this unavoidable impact would be greatly reduced by EPMs that include migratory bird nest surveys prior to any ground disturbing activities.

4.8.5 Relationship of Short-term Uses and Long-term Productivity

The Proposed Action and Alternative 1 would implement ground-disturbing activities that would produce short- and long-term effects to wildlife and Special Status Species and the habitat they use in the Project Area. Species that depend on mid- and late-seral forested vegetation that occurs within the Project Area would be displaced and the long-term productivity of this habitat would be impacted.

4.8.6 Irreversible and Irretrievable Commitment of Resources

Under the Proposed Action, the loss of aspen and forested areas is considered an irreversible commitment of resources and would have long-term impacts on wildlife species that use those habitats. This irreversible commitment would be slightly reduced under Alternative 1. Although reclamation would re-establish upland grassland and shrub vegetation in disturbed areas after mining operations end, it is not anticipated that aspens and conifers would re-establish in the foreseeable future, if ever, because the existing rootstock or seed source would be removed. As a result of the loss of habitat, wildlife species that use forested habitats may locally decline in abundance, while other species that use grassland habitats may locally increase following reclamation. This small-scale shift in wildlife community composition in the Project Area would also be considered an irreversible commitment of resources.

It is possible that some wildlife would be adversely impacted by elevated COPC concentrations from the Proposed Action. These potential negligible impacts are assumed to be limited in magnitude and areal extent and therefore, represent a minor irretrievable commitment of resources. This would be reduced under Alternative 1.

4.9 FISHERIES AND AQUATICS

This section describes the impacts to fisheries and aquatic resources, with the exception of amphibians, which are discussed in **Section 4.8**.

4.9.1 Issues and Indicators

The following are the issues and indicators for fisheries and aquatic resources.

Issue: The Project may affect cutthroat trout, other native fish, fisheries resources, or aquatic resources in the Project Area.

Indicators:

- The length of intermittent and perennial stream channels directly affected by the Project, and comparison with the undisturbed lengths of these stream channels in the Project Area.
- Acres of AIZ to be affected and comparison with undisturbed acreage of this habitat in the Project Area.
- Quantities of suspended sediment, selenium, other heavy metals, and other contaminants of concern, with emphasis on compliance with applicable aquatic life water quality standards and toxicity thresholds, and whether the number of sites where thresholds are exceeded changes as a result of the Project.

4.9.2 Direct and Indirect Impacts

4.9.2.1 Proposed Action

Direct and indirect effects to fisheries and aquatic resources would primarily be driven by two mechanisms: (1) streamflow alterations due to watershed disturbance and mine water management; and (2) potential increases in selenium and other COPCs in streamflow from the weathering of waste rock and subsequent transport of these COPCs to surface water via groundwater. Other mechanisms that have the potential for effects, but for which the potential is slight due to engineering controls include: sediment transport to streams from disturbed areas, and accidental releases of contaminants to the aquatic environment. These mechanisms and the direct and indirect effects that could occur from them are described in separate subsections for AIZs, aquatic habitat, macroinvertebrates, and fish populations. Because any effects to fisheries and aquatic resources are largely connected to changes in surface water, this section tiers to **Section 4.5** and is referenced for further details, as applicable.

Aquatic Influence Zones

The Proposed Action would include direct disturbance of approximately 20.9 acres within AIZs. This is approximately 8.7 percent of the AIZ acreage in the Study Area (239 acres). There would be no direct or indirect effects to the remaining 218.1 acres within AIZs. The areas that would be disturbed include:

- Approximately 0.42 acres within the AIZ on upper Smoky Creek where the rerouted power line terminates (see **Figures 3.9-2a** and **2.4.1**). This area of Smoky Creek is within the active mining area of the existing Smoky Canyon Mine and is an engineered stream channel with little in the way of riparian vegetation or stream habitat.

- Approximately 20.5 acres within AIZs associated with several small intermittent drainages between Roberts Creek and Pole Canyon Creek (see **Figure 3.9-2b**). These areas would be disturbed due to construction of the open pit (8.4 acres), haul road (4.3 acres), and associated facilities (7.8 acres). These areas lack defined channels and do not have surface connections to channel systems or permanent bodies of water. They appear to flow only during snowmelt, but may have subsurface connections to springs that flow into Roberts Creek, the Roberts Creek Diversion, or North Sage Valley.

Disturbance within AIZs can result in a variety of effects to aquatic habitats, such as increases in water temperature due to a loss of shading from riparian vegetation, increases in sediment due to the removal of riparian vegetation, changes to stream channel morphology, etc. The changes can then lead to adverse effects on biota such as macroinvertebrates and fish. Under the Proposed Action, the areas to be disturbed are either in previously disturbed areas that lack the structure or function typical of AIZs or are in drainages that lack sufficient perennial flow and/or habitat for aquatic organisms. As a result, disturbance of these AIZs would not result in changes to stream temperature, sediment, channel morphology, etc., and the effects would overall be minor. They would be long-term, as these areas are unlikely to be restored to a similar function during reclamation (i.e., the areas would be reclaimed, but may not support intermittent drainages). However, it should be noted that AIZ disturbance in the Roberts Creek drainage would be part of a larger area of disturbance that would have indirect impacts to aquatic habitat in Roberts Creek (discussed in the aquatic habitat section).

Appendix 4A summarizes compliance with the CNF RFP with regard to AIZs under the Proposed Action.

Aquatic Habitat

There would be no direct or indirect impacts to Spring Creek, Webster Creek, Draney Creek, or South Fork Sage Creek as these streams are located outside the area of disturbance and no changes to surface water quantity or quality are predicted for these streams. Regarding water quality, the groundwater model does not predict migration of COPCs as far south as South Fork Sage Creek (**Figure 4.5-2**). The model does predict some migration of COPCs northward, reaching as far north as Draney Creek (**Figure 4.5-2**). However, COPCs would be transported in the Wells Formation groundwater, which is found at increasingly greater depths north of the Project Area (HGG 2018). The top of the Wells Formation is estimated to be more than 1,000 feet beneath Draney Creek in the location where the plume is shown (HGG 2018), and springs that support Draney Creek issue from formations younger and higher than the Wells Formation. As a result, Wells Formation groundwater conveying COPCs would not be intercepted by Draney Creek.

Potential direct and indirect effects to other streams in the Study Area are described in separate subsections below.

Smoky Creek

There would be no direct disturbance to Smoky Creek under the Proposed Action and direct effects would be limited to the potential for increases in sediment due to runoff from mine disturbance and the USFS road used for mine access, and/or accidental releases of other pollutants such as chemicals or hydrocarbons. Levels of fine sediment in Smoky Creek are high, possibly due in part to proximity to the access road. Sediment runoff would continue to be managed under Simplot's SWPPP and these effects would continue. Because the long-term substrate embeddedness monitoring in Smoky Creek does not show sediment increasing over time (**Table 3.9-3**), it appears that any road related sediment inputs are stable. The Proposed Action would not result in a change to these inputs and the effects would be negligible (i.e., no measurable change relative to current conditions). Effects would be short term, limited to the active mining and post-mining reclamation period. Regarding an accidental release of contaminants, the most likely sources would be mobile equipment and/or vehicles delivering chemicals and other materials to the mine along Smoky Canyon Road that occurs adjacent to Smoky Creek, although there have not been any known accidental releases in the recent past. The magnitude of the effects of an accidental release would vary depending upon the amount released and the proximity to live water, but would generally be short term. Given that the potential for an accidental release is slight due to the BMPs, SPCC, and other precautionary measures in place, the effects are also expected to be negligible.

Indirect effects to aquatic habitat due to changes in water quality are not expected because the Wells Formation groundwater that would be impacted (**Figure 4.5-2**) is estimated to be more than 600 feet beneath Smoky Creek (HGG 2018). The springs that support Smoky Creek issue from formations younger and higher than the Wells Formation groundwater, as described for Draney Creek. Rather, any indirect effects would be due to streamflow reductions as a result of stormwater runoff rerouting and/or being captured in open pits and sedimentation ponds. Currently, runoff has been withheld from approximately 880 acres (approximately 22 percent of the 4,200-acre Smoky Creek drainage). The Proposed Action would reduce Smoky Creek's contributing area by another 125 acres (3 percent). Because the entire perennial base flow in Smoky Creek comes from LSmS (reaches upstream of LSmS have very low flow in late summer and fall and typically go dry), a 3 percent reduction in runoff would not result in a measurable change to overall habitat conditions. So, although any decrease in streamflow can be considered an adverse effect to aquatic habitat, the effect would be negligible on Smoky Creek. Further, the effect would be short term as disturbed and reclaimed areas would function as part of the watershed following mining.

Tygee Creek

There would be no direct disturbance to Tygee Creek, and the potential for direct effects due to sediment and accidental releases of contaminants would negligible as described for Smoky Creek. Likewise, impacts to water quality are not expected because Tygee Creek does not intercept the Wells Formation groundwater that would be impacted. This is due both to the depth of the Wells Formation groundwater and to the West Sage Valley Branch fault shown in **Figure 4.5-2** that intercepts any eastward movement of contaminated groundwater. The Proposed Action could, however, reduce streamflow in Tygee Creek due to potential indirect effects to streamflow in the Roberts Creek drainage (see Roberts Creek section below and **Section 4.5**). The potential reduction in base flow is estimated to be approximately 0.44 cfs, which would reduce baseflow in upper Tygee Creek by approximately 79 percent (0.56 cfs – 0.44 cfs). Downstream near the mouth of Tygee Creek at LT-6, input from tributaries would attenuate the response and the decrease would be approximately three percent of baseflow (13.23 cfs – 0.44 cfs).

Reductions in streamflow reduce the quantity and quality of habitat available for aquatic organisms. Among other factors, the quantity and quality of habitat is reduced due to decreased wetted stream widths, shallower pool depths, less instream cover, and increased temperatures (Harvey et al. 2006). Reduced flow can also lead to increased amounts of fine sediment in the substrate, as there is less flow for downstream transport. This leads to reduced habitat for macroinvertebrates (due to a filling of interstitial spaces in the substrate) and reduced food availability for fish (Harvey et al. 2006). The magnitude of these effects would vary longitudinally in Tygee Creek due to the differences in flow from upstream to downstream. While the overall effect to the stream is likely moderate, it would approach major in the most upstream areas where the watershed area is small and flows are lower and yet be negligible in downstream areas where the watershed area is larger and flows are higher. The effects would contribute to Tygee Creek's inability to meet its beneficial uses of cold water aquatic life and salmonid spawning. The indirect effects would be long term as disturbed and reclaimed areas would begin to function as part of the watershed following reclamation, but flow patterns may take longer to re-establish.

Roberts Creek

Although the open pit and ancillary facilities would be in close proximity to Roberts Creek, there would be no direct disturbance to perennial portions of the stream. Further, the potential for direct effects due to sediment and accidental releases of contaminants would be negligible to minor due to stormwater controls and other BMPs. In addition, water quality impacts are not predicted due to the depth of the Wells Formation groundwater and the West Sage Valley Branch fault, as described for Tygee Creek. The Proposed Action is predicted to have indirect effects to Roberts Creek due to streamflow alterations.

Runoff has already been withheld from approximately 180 acres of the 1,600-acre Robert's Creek drainage (i.e., about 11 percent). The Proposed Action would reduce Robert's Creek's contributing area by another 530 acres (33 percent), including the loss of areas mapped as intermittent tributaries. This may result in similar losses in runoff volume (i.e., 33 percent). Further, as described in **Section 4.5**, the reduction in watershed area and groundwater recharge would dry up the springs that feed Roberts Creek and Roberts Creek itself. Roberts Creek has limited aquatic habitat due to low flow, impoundments, and it being diverted around the tailings pond in a canal. As a result, although the impact would be moderate (i.e., loss of all flow would be an easily measurable change in current conditions), the quality of habitat lost relative to fisheries and aquatic resources would be minor. The effects would be long term as disturbed and reclaimed areas would begin to function as part of the watershed following reclamation, but flow patterns may take longer to re-establish.

North Fork Sage Creek

There would be no direct disturbance to North Fork Sage Creek. Impacts to water quality are not expected due to depth of the Wells Formation groundwater and the West Sage Valley Branch fault, as described previously for Tygee Creek. Although there is the potential for releases of sediment from stormwater ponds, as well as the accidental release of contaminants, given the protections in place and the large low gradient valley between mine disturbance and the North Fork Sage Creek, direct effects from either of these two mechanisms would be negligible. Despite the direct impacts to intermittent drainages that feed into North Fork Sage Creek, indirect effects due to streamflow alterations would be beneficial to North Fork Sage Creek due to an overall increase in drainage area under the Proposed Action (primarily due to run-on ditches diverting water toward North Sage Valley). The magnitude would be negligible due to the small increase (six percent), and short term, as water would not be diverted to the drainage after reclamation.

Pole Canyon Creek

Direct impacts to Pole Canyon Creek would be as described for North Fork Sage Creek (negligible). Indirect effects would also be similar (negligible) as there would be a small overall increase in drainage area due to runoff from about 260 acres being directed into Pole Canyon Creek via a run-on ditch. Water quality impacts are not expected because the contaminated Wells Formation groundwater is approximately 200 feet below the stream.

Hoopes Spring, Sage Creek, and Crow Creek

There would be no direct disturbance to Hoopes Spring, Sage Creek, or Crow Creek. Further, as all components of the Proposed Action are located north of these streams, there is also no potential for other types of effects (i.e., streamflow alterations, sediment related effects, or effects related to the accidental release of contaminants from a spill). Rather, any effects to aquatic habitat in these streams would be limited to increases in selenium and other COPCs as an indirect effect of mining.

As described in **Section 4.5**, groundwater modeling indicates that the Proposed Action would increase selenium, manganese, sulfate, and TDS concentrations at Hoopes Spring. The number chosen for the analysis is the upper limit of the 95 percent confidence interval for the mean concentration predicted by the stochastic modeling approach. The upper confidence level is the value that when calculated for a random data set equals or exceeds the true mean 95 percent of the time and is considered conservative as explained in **Section 4.5**. The predicted upper limit for selenium is 0.001 mg/L beginning about 80 years after mining and continuing until at least 300 years after mining. The predicted upper limit for manganese, sulfate, and TDS increases would be 0.047 mg/L, 3 mg/L, and 13 mg/L, respectively. These concentrations are assumed to represent the concentration in Hoopes Spring's downstream channel with an assumed average flow of 9 cfs, based upon two measurements made at HS-3 during the water resources baseline study (Stantec 2017a).

For sulfate and TDS, predicted increases would be approximately 4-5 percent greater than the current mean concentrations of approximately 60 mg/L and 300 mg/L for sulfate and TDS, respectively). There are no aquatic life criteria for sulfate or TDS in the Idaho Water Quality Standards or in EPA's National Recommended Water Quality Criteria. Because the predicted increases are small relative to current concentrations, the predicted effects to aquatic habitat would be negligible, but long term.

The predicted increases in manganese are greater than the increases for sulfate or TDS, but are also expected to remain below water quality standards. There is no aquatic life criterion in Idaho for manganese, but predicted concentrations would remain below the secondary drinking water standard of 0.05 mg/L as explained in **Section 4.5**. Wyoming does have aquatic life criteria for manganese, including an acute criterion of 3.11 mg/L and a chronic criterion of 1.462 mg/L (WDEQ 2013). The predicted concentrations would remain well below these criteria and effects to aquatic habitat would be negligible, but long term.

Regarding selenium, there are aquatic life criteria, including SSSC for streams in the Study Area as described in **Section 3.9.5.1**. To be able to calculate potential bioaccumulation of selenium in the food chain and assess the impacts on aquatic life in subsequent sections, the following estimations were made to determine the magnitude of selenium increases in streams downstream of Hoopes Spring (**Table 4.9-1**):

- The assumed flow rate (cfs) and predicted selenium concentration increase (0.001 mg/L) were converted to a selenium load (e.g., pounds per day) by multiplication and unit conversions.
- The load was then applied to Sage Creek and Crow Creek with assumed flow rates and a new (diluted) concentration determined. To be consistent with the water resources impact

assessment (**Section 4.5**), the average low-flow season flow rates for Sage Creek and Crow Creek, obtained from the RI/FS (Formation Environmental 2014), were used for the analysis.

It is important to emphasize that these concentrations are not the predicted total selenium concentrations at these sites, as selenium is already elevated at these sites as a result of previous mining activities as described in **Section 4.5**. Rather, these concentrations merely represent the increase that is predicted from the Proposed Action. Also, it should be noted that the groundwater modeling predicts selenium increases at Hoopes Spring only. As described in previous subsections, streams not connected to Hoopes Spring (i.e., streams in the Tygee Creek drainage, North Sage Valley, Pole Canyon Creek, and South Fork Sage Creek) are not predicted to see selenium increases as a result of the Proposed Action due the depth of the Wells Formation groundwater and the West Sage Valley Branch Fault.

Table 4.9-1 Estimated Increases in Selenium Concentrations – Water

STREAM[2]	SITE	SELENIUM CONCENTRATION (mg/L)[1]
Hoopes Spring	HS-3	0.001
Sage Creek	LSV-3	0.0005
	LSV-4	0.0005
Crow Creek	CC-1A	0.0002

[1] Predicted increase due to Proposed Action only – not a predicted total concentration for all sources combined.

[2] Average low-flow season flow rates for Sage Creek and Crow Creek were used for dilution.

As described in **Section 4.5.2.1**, and discussed below for macroinvertebrates and fisheries, these selenium increases are small relative to current and projected future concentrations. As a result, the indirect effects to aquatic habitat from the projected increases would be minor, but long term, as they would persist long after mining has ceased.

Macroinvertebrates

There would be no direct or indirect effects to macroinvertebrates in Spring Creek, Webster Creek, Draney Creek, or South Fork Sage Creek as these streams are located outside the area of disturbance and no changes to surface water quantity or quality are predicted for these streams. Potential direct and indirect effects of the Proposed Action on macroinvertebrates in others stream are described below.

Smoky Creek

Macroinvertebrates can be affected by a variety of factors such as water quality changes, sedimentation, etc. Current data for Smoky Creek indicates that macroinvertebrate communities are affected by low water flow and sedimentation. The Proposed Action would not directly disturb Smoky Creek. Any increases in sediment or other contaminants would negatively affect macroinvertebrates through alteration of substrates and water quality. Because macroinvertebrate taxa vary in their responses to sediment and water quality changes, the most likely effects of any perturbations would be a shift in the composition of local macroinvertebrate communities. Because sediment would be controlled through the SWPPP and is not likely to differ from current conditions (i.e., there would be no change to the SWPPP under the Proposed Action and mine activity adjacent to Smoky Creek would be similar), and because the chance for an accidental release is slight, changes in macroinvertebrate community compositions are unlikely. Thus, direct effects would be negligible. Changes in streamflow can also affect community composition; however, the changes in streamflow are minimal and indirect effects are also expected to be negligible.

Tygee Creek

The potential for direct effects to macroinvertebrate communities in Tygee Creek would be negligible as described for Smoky Creek. However, in Tygee Creek, indirect effects to macroinvertebrate communities are likely due to streamflow reductions. Streamflow reductions can affect macroinvertebrates by reducing the amount of habitat available (i.e., a reduced amount of wetted substrate), as well by reducing the suitability of that habitat (i.e., increased fine sediment in the substrate due to a lack of flow available to transport the sediment, and increased temperatures). Because the impact on instream flow would be more drastic in upper Tygee Creek than in lower Tygee Creek, indirect effects to macroinvertebrates would be most pronounced in upper Tygee Creek, and would likely include decreases in density and changes in community composition towards taxa tolerant of low flow conditions, higher amounts of fine sediment, etc. However, because conditions for macroinvertebrates are already poor at both the upstream and downstream locations, the measurable effect may only be small. A small measurable effect would by definition be a minor effect, even if that minor effect may include the loss of most macroinvertebrates at the most upstream locations. Effects would be short term as described for habitat related effects.

Roberts Creek

The potential for direct effects to macroinvertebrate communities in Roberts Creek would be negligible; however, there is the potential for macroinvertebrate communities in Roberts Creek to be lost if the stream dries up as assumed (see **Section 4.5**). This would be a moderate effect, as the change would be easily measurable, but not greater as the macroinvertebrate communities present are currently limited by the small amount of habitat available. The effect would be long term as macroinvertebrate communities would be slow to reestablish even if stream flow is restored following reclamation.

North Fork Sage Creek and Pole Canyon Creek

Direct and indirect effects to macroinvertebrates in North Fork Sage Creek and Pole Canyon Creek would be negligible due to the negligible potential for direct effects related to sediment and spills, as well as the negligible changes to streamflow and water quality.

Hoopes Spring, Sage Creek, and Crow Creek

The Proposed Action is predicted to increase selenium, manganese, sulfate, and TDS concentrations by a small amount in these streams, as described for aquatic habitat. Macroinvertebrates can be exposed to pollution, including metals pollution, through direct uptake from the water, through ingestion of contaminated food (periphyton, detritus, other invertebrates), or though incidental ingestion of sediment (Merritt and Cummins 1984). In the case of selenium, evidence suggests that the primary pathway is through ingestion of contaminated food (Chapman et al. 2010, Lemly 1985). Although some work has been done to determine selenium toxicity levels for many macroinvertebrate taxa (EPA 2016b), taxa vary widely in their tolerance to pollution. For this reason, the most common effect of pollution, including metals pollution, is a change in the benthic community composition. For example, in systems with metals pollution, community composition changes toward fewer metal intolerant taxa such as EPT taxa. Poor SMI scores (which includes several EPT related metrics) on reaches of Sage Creek downstream of Hoopes Spring (relative to upstream reaches) are likely due in part to selenium impacts, although high levels of fine sediment may be a stronger determining factor in the differences observed (Formation Environmental 2012).

The question for this analysis is whether or not the predicted increases in these contaminants are likely to result in additional changes to community composition. The predicted increases in manganese, sulfate, and TDS concentrations are small, and it is expected that there would be only negligible changes to community composition (i.e., it would be difficult to discern a change in community composition). The predicted increases in selenium concentrations at Hoopes Spring, Sage Creek, and Crow Creek of 0.001 mg/L, 0.0005 mg/L, and 0.0002 mg/L, respectively, are also small relative to the current concentrations described for these sites in **Section 3.5**. However, since selenium bioaccumulates in macroinvertebrate tissue, the potential increases in water concentration were converted to tissue concentrations using the following equation, which was derived from EPA (2016b):

$$C_{tissue} = TTF \times EF \times C_{water}$$

Where:

C_{tissue} = selenium concentration in benthic macroinvertebrate tissue in mg/kg dw

TTF = Trophic Transfer Factor for benthic macroinvertebrate tissue

EF = Enrichment function (liters per gram [L/g])

C_{water} = Concentration of selenium dissolved in water (µg/L)

Values for TTF and EF were taken from the median values derived for benthic macroinvertebrates at HS-3, LSV-2C, LSV-4, CC-1A, and CC-3A as part of the proposed SSSC for Hoopes Spring, Sage Creek, and Crow Creek (Formation Environmental 2017). The predicted increases in macroinvertebrate tissue concentrations are shown in **Table 4.9-2**. Increases in concentrations range from 0.42 – 0.56 mg/kg dw. Increases in this range would be small relative to existing tissue concentrations in these streams (**Table 3.9-18**). The increase is also small relative to the reference concentration for unaffected macroinvertebrate tissue of 3.75 mg/kg dw (**Section 3.9.5.1**). Because the predicted increases in tissue concentrations would be small, effects relative to existing conditions would be negligible. Research indicates that fish are typically more sensitive to selenium than invertebrates (EPA 2016b). As a result, fish, which are discussed in the following section, are a more sensitive resource for determining the effects of the predicted selenium increases.

It should also be noted that existing selenium concentrations in water are projected to decrease prior to the increases discussed here (which wouldn't begin until 80 years after mining; see **Section 4.5**). Assuming macroinvertebrate tissue concentrations decrease in the future as well, the minor increases under the Proposed Action would not be of a magnitude sufficient to increase concentrations beyond their present values. This is discussed further for cumulative effects in **Section 5.5**.

Table 4.9-2 Estimated Increases in Selenium Concentrations – Macroinvertebrate Tissue

STREAM	SITE	C_{TISSUE} (mg/kg dw)[1]	TTF	EF	C_{WATER} (mg/L)[2]
Hoopes Spring	HS-3	0.56	1.10	0.51	0.001
Sage Creek	LSV-2C	0.51	2.41	0.42	0.0005
	LSV-4	0.40	1.27	0.63	0.0005
Crow Creek	CC-1A	0.42	2.38	0.88	0.0002
	CC-3A	0.54	2.85	0.94	0.0002

[1] Predicted increase due to Proposed Action only – not a predicted total concentration for all sources combined.
[2] Calculations were made with water concentrations in µg/L; displayed in mg/L for consistency with other sections.
C_{tissue} = selenium concentration in macroinvertebrate tissue
TTF = Trophic Transfer Factor for benthic macroinvertebrates – Formation Environmental (2017)
EF = Enrichment Factor – Formation Environmental (2017)
C_{water} = selenium concentration in water from model predictions and dilution (**Table 4.9-1**)

Fish

There would be no direct or indirect effects to fish in Spring Creek, Webster Creek, Draney Creek, or South Fork Sage Creek as these streams are located outside the area of disturbance and no changes to surface water quantity or quality are predicted for these streams. Also, no direct or indirect effects are expected to fish in North Fork Sage Creek or Pole Canyon Creek due to the lack of fish in these streams. Potential direct and indirect effects of the Proposed Action on fish in others stream are described below.

Smoky Creek

Fish populations in Smoky Creek are unlikely to be affected by the Proposed Action. There is the potential for sediment, contaminants, and streamflow changes to occur, all of which limit habitat potential for fish. These changes can also affect macroinvertebrate populations, which can lead to a reduced food source for fish. However, as discussed for habitat and macroinvertebrates, all these potential impacts are expected to be negligible. As a result, effects to fish populations are expected to be negligible as well. Further, any negligible effects would be short term, as they would cease following reclamation.

Tygee Creek

The predicted streamflow decreases in Tygee Creek would have adverse indirect effects to fish, particularly in upper portions of Tygee Creek, due to the loss of habitat. The streamflow decreases would also reduce macroinvertebrate density due to loss of habitat and increased sedimentation, as described in that section. This would lead to reduced food available for fish. YCT populations in upper Tygee Creek (i.e., at LT-3 where they have been monitored) may not be self-sustaining due to the poor habitat available; rather, fish may be moving up from lower reaches (**Section 3.9.4.6**). Assuming this is the case, the effects of decreased flow (and associated effects to macroinvertebrates) on YCT would be minor, as these fish would likely just move out of the most affected reaches. For other fish species that are more resident, such as dace, sculpin, redside shiner, Utah chub, and northern leatherside chub, the magnitude of impacts would be greater. For example, northern leatherside chub have been detected in upper reaches of Tygee Creek (upstream from Draney Creek), but not in lower reaches. Decreased flow and its associated effects in the upper reaches would likely reduce populations of northern leatherside chub, as well as other species found primarily in the upper reaches. The predicted flow decreases are unlikely to eliminate these species entirely from upper Tygee Creek, as inflow from Smoky Creek and Draney Creek would be unaffected. Reduced population sizes or a reduced distribution of these populations would be a moderate effect (i.e., easily discernable). Although flows and associated ecological function (e.g., cleaner substrates, macroinvertebrate populations) would return to normal at some point following reclamation, some fish populations may take longer to recover, thus the effects may range from short term to long term. No direct effects are expected due to the negligible effects to habitat.

Roberts Creek

Predicted streamflow alterations in Roberts Creek would adversely affect fish, but the effects would be limited because Roberts Creek appears to only support sparse fish populations. Only one fish has been sampled in Roberts Creek above the impoundment. That was in 2005, and no fish have been collected in subsequent efforts, although redside shiner have been found below the impoundment in the Roberts Creek diversion. Loss of flow would adversely affect any fish present by eliminating habitat. Assuming all flow is lost as discussed in **Section 4.5**, this would remove all habitat and fish in Roberts Creek. Because few fish are present, the effect would be minor. Although flows would return to normal at some point following reclamation, some fish populations may take longer to recover, thus the effects may range from short term to long term. No direct effects are expected due to negligible to minor effects to habitat coupled with the sparse fish populations present.

Hoopes Spring, Sage Creek, and Crow Creek

There is the potential for indirect effects to fish populations in Hoopes Spring, Sage Creek, and Crow Creek from predicted increases in selenium, manganese, sulfate, and TDS concentrations. The predicted increases for manganese, sulfate, and TDS are expected to be small. Manganese concentrations would remain below Wyoming criteria (no manganese criteria in Idaho). High TDS can disrupt an organism’s normal ion exchange process and cause stress or death. However, research on TDS toxicity indicates toxicity is predominantly due to either chloride (which is not predicted to increase) or sulfate, and that fish were found to be tolerant of sulfate (Iowa Department of Natural Resources 2009). Furthermore, sulfate has been demonstrated to ameliorate selenium bioaccumulation and toxicity, similar to hardness for other metals (DeForest et al. 2017). As a result, no or negligible effects to fish are expected in these streams from these three contaminants (i.e., there would be no effect or an effect that is too small to be measured). Predicted increases in selenium would also be small. However, selenium levels are currently elevated in these streams and will continue to be for the long term (see **Section 4.5**). Because of this, and because selenium accumulates in fish tissue, additional analysis is presented in following paragraphs to better determine what effects could occur from the predicted selenium increases.

Organisms in aquatic environments exposed to selenium accumulate it primarily through their diets and not directly through water (Chapman et al. 2010, Lemly 1985). Research also indicates that selenium toxicity occurs primarily through maternal transfer to eggs, where developing fish are affected by the level of selenium bioaccumulated by the maternal parent (EPA 2016b, Formation Environmental 2012). Deformities (which are known to lead to mortality) result in developing fish when the level of selenium transferred via eggs exceeds a certain level (EPA 2016b). As a result, selenium concentrations measured in egg or ovary tissue of exposed adult females have the best correlation to effects (deformity and reduced survival of offspring). The toxicity levels; however, are often not much higher than the levels considered to be biologically essential (i.e., there is a narrow concentration range where selenium goes from essential to toxic; EPA 2016b).

The EPA Aquatic Life Ambient Water Quality Criterion for Selenium is described briefly in **Section 3.9.5.1** as is the approved whole-body fish tissue element of the Idaho selenium aquatic life criterion as approved by EPA (2019), including various SSSCs. While the applicable approved fish tissue concentrations from these SSSCs are used here to determine potential effects, data and methodology from EPA (2016b) and background information from the SSSC development (Formation Environmental 2017) were used in various calculations, as explained below, to determine potential increases to fish tissue concentrations from the predicted selenium increase at Hoopes Spring.

The predicted increases in water concentration were converted to brown trout tissue concentrations using two methods. First, tissue concentrations were calculated using the tissue to water concentration translation equation developed by EPA and the USGS (EPA 2016b). The translation equation quantifies bioaccumulation in fish tissue as the product of the concentration of dissolved selenium in water, an enrichment function representing the proportional bioconcentration of dissolved selenium at the base of the food web (i.e., the uptake of dissolved selenium by plants), and a parameter representing the trophic transfer of selenium through all subsequent dietary pathways (e.g., macroinvertebrates and fish):

$$(C_{egg\text{-}ovary}=TTF_{composite} * EF * C_{water})$$

Where:

$C_{egg\text{-}ovary}$	= selenium concentration in brown trout egg and ovary tissue in mg/kg dw
$TTF_{composite}$	= Trophic Transfer Factor for macroinvertebrates, sculpin, and trout
EF	= Enrichment function (L/g)
C_{water}	= Concentration of selenium dissolved in water (µg/L)

Values for $TTF_{composite}$ and EF were taken from the median values derived at HS-3, LSV-2C, LSV-4, CC-1A, and CC-3A as part of the proposed SSSC (Formation Environmental 2017). The concentration in egg and ovary tissue was then converted to a whole-body concentration ($C_{whole\text{-}body}$) using a conversion factor (CF) of 1.46 (Formation Environmental 2017). The predicted increases in brown trout tissue concentrations are shown in **Table 4.9-3**.

To provide a range of predictions, the estimated increases in tissue concentrations were also calculated using a bioaccumulation factor (BAF) described as part of the proposed SSSC (Formation Environmental 2017). A BAF is the ratio of the concentration of a chemical in the tissue of an aquatic organism to the concentration of the chemical dissolved in ambient water at the sampling site. In this case, the BAF was calculated by dividing the median selenium concentrations in brown trout tissue at HS-3, LSV-2C, LSV-4, CC-1A, and CC-3A by the median water concentrations at the same sites. The BAFs and predicted concentrations using this approach are shown in **Table 4.9-4**.

The predicted increases in whole body selenium concentrations using both the translation equation and BAFs are small, ranging from 0.26 to 1.04 mg/kg dw. Predicted concentrations are similar between the two approaches, with the largest differences at LSV-2C and CC-3A. The greatest increase (1.04 mg/kg dw) is at the lower Crow Creek location (CC-3A) using the BAF.

Table 4.9-3 Estimated Increases in Selenium Concentrations – Brown Trout Tissue – using the EPA Translation Equation

STREAM	SITE	$C_{WHOLE\text{-}BODY}$ (mg/kg dw)[1]	CF	$TTF_{COMPOSITE}$	EF	C_{WATER} (mg/L)[2]
Hoopes Spring	HS-3	0.71	1.46	2.04	0.51	0.001
Sage Creek	LSV-2C	0.26	1.46	1.85	0.42	0.0005
	LSV-4	0.42	1.46	1.95	0.63	0.0005
Crow Creek	CC-1A	0.32	1.46	2.66	0.88	0.0002
	CC-3A	0.71	1.46	5.51	0.94	0.0002

[1] Predicted increase due to Proposed Action only – not a predicted total concentration for all sources combined.

[2] Calculations were made with water concentrations in µg/L; displayed in mg/L for consistency with other sections.

$C_{whole\text{-}body}$ = selenium concentration in whole-body brown trout tissue

$TTF_{composite}$ = Trophic Transfer Factor for macroinvertebrates, sculpin, and trout – Formation Environmental (2017)

EF = Enrichment Factor – Formation Environmental (2017)

CF = Conversion Factor – Formation Environmental (2017)

C_{water} = selenium concentration in water from model predictions and dilution (**Table 4.9-1**)

Table 4.9-4 Estimated Increases in Selenium Concentrations – Brown Trout Tissue – using the BAFs

STREAM	SITE	$C_{WHOLE\text{-}BODY}$ (mg/kg dw)[1]	$BAF_{MEDIAN\ WHOLE\text{-}BODY}$	C_{WATER} (mg/L)[2]
Hoopes Spring	HS-3	0.71	0.71	0.001
Sage Creek	LSV-2C	0.44	0.87	0.0005
	LSV-4	0.43	0.86	0.0005
Crow Creek	CC-1A	0.39	1.96	0.0002
	CC-3A	1.04	5.21	0.0002

[1] Predicted increase due to Proposed Action only – not a predicted total concentration for all sources combined.

[2] Calculations were made with water concentrations in µg/L; displayed in mg/L for consistency with other sections.

$C_{whole\text{-}body}$ = selenium concentration in whole-body brown trout tissue

$BAF_{median\ whole\text{-}body}$ = BAF calculated as median of brown trout tissue concentrations/dissolved selenium concentrations - Formation Environmental (2017)

C_{water} = selenium concentration in water from model predictions and dilution (**Table 4.9-1**)

Determining the significance and potential effects of these predicted increases is complicated by current conditions, uncertainty regarding effects that may be occurring under the current conditions, and uncertainly about future concentrations associated with existing mining activities. An increase of 0.26 to 1.04 mg/kg dw is a fraction of the applicable SSSC concentrations of 13.6 mg/kg dw at Hoopes Spring and Sage Creek and 12.5 mg/kg dw at Crow Creek. Were increases of this magnitude to occur at an uncontaminated location, such as South Fork Tincup Creek (outside the Study Area) where tissue concentrations have ranged from 1.8–9.16 mg/kg dw, the predicted increases would be unlikely to push concentrations above the applicable SSSCs.

However, the increases would not occur in an uncontaminated location. Selenium concentrations in fish tissue from Hoopes Spring, Sage Creek, and Crow Creek are many times higher than the predicted concentration increases (**Table 3.9-15**) and in most cases higher than the applicable SSSCs. Fish populations at these sites have declined in recent years, which may be due in part to selenium contamination, but may also be due to other factors such as drought (fish populations in nearby streams show similar trends), and other habitat changes (habitat alterations at monitoring locations). Further, trout populations in western streams are known to show large fluctuations in population year to year (Platts et al. 1988). Without knowing if impacts are occurring at current selenium levels (that are already higher than thresholds), it's difficult to determine if the small increases under the Proposed Action would have effects. However, because the predicted increases would be such a small fraction of current concentrations (for example, the upper end prediction for Sage Creek of 0.44 mg/kg dw is a 2.5 percent increase relative to mean concentrations on Sage Creek; **Table 3.9-15**) the contribution of the Proposed Action alone would be minor, and the streams' status in regard to applicable SSSCs would not change with or without the Proposed Action. Because any impacts would be added to past and present concentrations, additional discussion is contained in cumulative effects (**Section 5.5**). Any effects would be long term.

Regarding future selenium levels, predictions are that current selenium levels are expected to decrease prior to any increases associated with the Proposed Action (**Section 4.5**). This would likely mean that any increases from the Proposed Action would not increase selenium concentrations beyond current levels. Because this is a reasonably foreseeable action, it is also discussed further in cumulative effects (**Section 5.5**).

This analysis also acknowledges that there is no way to remove all uncertainty associated with modeling water quality changes, and the actual changes to selenium concentrations at Hoopes Spring could be higher or lower than the value analyzed here. It also acknowledges water quality modeling associated with past and present mining in the area has not always accurately predicted impacts. However, the number used for the Proposed Action was determined to be conservative (the upper limit of the 95 percent confidence interval for the mean concentration predicted by the stochastic modeling approach). Therefore, the possibility of any actual changes being higher than predicted is reduced.

4.9.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

Water quality predictions for Alternative 1 would be the same for selenium loading at Hoopes Spring and lower for manganese, sulfate, and TDS. Impacts to surface water resources in regard to watershed disturbances, flow alterations, sediment and TSS loading, and accidental release of pollutants such as hydrocarbons would be similar in magnitude and locations as predicted for the Proposed Action. As a result, direct and indirect effects to fisheries and aquatic resources would be the same under Alternative 1 as described for the Proposed Action.

4.9.2.3 No Action Alternative

Under the No Action Alternative, mining the East Smoky Panel would not be approved. Thus, there would be no impacts to AIZs, changes to the amount of watershed disturbance, streamflow, sediment, or the potential for an accidental release of contaminants to streams as a result of mining activities related to the Project. Predicted increases in selenium, manganese, sulfate, and TDS concentrations from mining the East Smoky Panel would also not occur. Existing conditions already addressed, predicted, or occurring as related to fisheries and aquatic resources due to other already permitted activities at the Smoky Canyon Mine would continue.

4.9.3 Mitigation Measures

No mitigation measures for fisheries and aquatics have been identified. However, all EPMs described in **Section 2.5** would be implemented to avoid and/or minimize potential impacts to fisheries and aquatic resources. In addition, mitigation measures identified for water resources in **Section 4.5.3** would also be implemented that could reduce potential impacts to fisheries and aquatic resources.

4.9.4 Unavoidable (Residual) Adverse Impacts

The direct loss of AIZs and intermittent drainages under the Proposed Action and Alternative 1 would be an unavoidable adverse impact as these drainages would be difficult to restore to achieve the original structure and function, following reclamation.

4.9.5 Relationship of Short-term Uses and Long-term Productivity

The Proposed Action and Alternative 1 would implement ground-disturbing activities that would produce short- and long-term effects to fisheries and aquatic resources. However, short-term uses associated with the Project are not anticipated to produce more than negligible to minor long-term productivity issues related to fisheries and aquatic resources. Portions of AIZs in the Project Area would be impacted by mining components in order to facilitate short-term uses associated with Project-related activities.

4.9.6 Irreversible and Irretrievable Commitment of Resources

Over the long term, impacts under the Proposed Action/Alternative 1 would be irretrievable in that predicted increases in selenium, manganese, sulfate, and TDS concentrations in affected water resources that impact fisheries and aquatic resources may occur for a long period of time.

4.10 LAND USE (GRAZING AND RECREATION) AND TRANSPORTATION

4.10.1 Issues and Indicators

The following issues and indicators were developed related to land use (grazing and recreation) and transportation:

Issue: There are potential adverse impacts to private property owners in the region and the Project may cause changes to the USFS road network in and around the Project Area, from OHV/ATV use and mining activities.

Indicators:

- Changes in access to private property. Increase/decrease in traffic.
- Relative increase in traffic on public roads in the Project Area as a result of proposed mining activities, change in traffic types, and road design features to deal with this.

Issue: The Project may result in impacts to grazing in the Study Area.

Indicators:

- Acres of suitable livestock foraging areas to be disturbed and the length of time livestock would be excluded from the mining areas, and comparison with undisturbed acres of grazing allotments in the Project Area.
- Changes in vegetation or forage value as a result of the reclamation mix.

Issue: Recreational use and public access to the Project Area may be limited or prevented by mining activities.

Indicators:

- Acres of and number of recreational access points temporarily closed and/or blocked to public use.
- Locations of primary access roads blocked or closed by the Project.
- Changes in the quality of recreational use of the area including fishing, hiking, riding, wildlife viewing, and hunting.

4.10.2 Direct and Indirect Impacts of the Proposed Action

4.10.2.1 Land Use and Jurisdiction

The Proposed Action would convert primarily undeveloped forest land to an active mining area, immediately adjacent to the existing Smoky Canyon Mine. There would not be any change in land ownership and jurisdiction. The Proposed Action would result in additional USFS SUAs (**Section 4.10.2.2**) and the need for an RFP amendment (**Section 4.10.2.3**).

The only two private landowners in the Study Area are Simplot and Alan Linford/Crow Creek Ranches. The Linford parcel is a large piece of land (610 acres) that would not be directly impacted by the Proposed Action, but adjoin a small portion of the Project Area that would be developed with a borrow pit, stormwater pond, stormwater features, haul road, and a potential dewatering pipeline (**Figure 2.4-1**). This portion of the Linford parcel does not contain any year-round residences and the Proposed Action would only change the character of the Simplot parcel, immediately adjacent from forest to an industrial use. No change in access to the Alan Linford/Crow Creek Ranches private parcel would occur as a result of the Proposed Action. Public access to the Simplot parcel that surrounds the Alan Linford/Crow Creek Ranches parcel is currently restricted and would continue under current conditions, thus any indirect impacts would be negligible to minor for the Alan Linford/Crow Creek Ranches private land use.

4.10.2.2 USFS Special Use Authorizations

The Proposed Action would result in 30 acres of CTNF land encumbered by SUAs (**Table 2.4-1**) for a variety of mining-related disturbances situated off-lease, adjacent to mining disturbance that would occur on existing leases in the Project Area (**Figure 2.4-4**). These new SUAs would represent a negligible amount of NFS lands available for public use in the general area and the CTNF on a whole.

4.10.2.3 Consistency with Revised Forest Plan

The Proposed Action would require an amendment to the CNF RFP (USFS 2003a) to change the management prescription of NFS land associated with the reroute of the Lower Valley Energy 115 kV transmission line around the south end of the East Smoky Panel pit. The relocation of the Lower Valley Energy 115 kV transmission line into a location with no CNF RFP designated utility corridor would require an RFP amendment to be consistent with the RFP. The RFP amendment would change the land use to a designated utility corridor on 1.8 acres (< 1 percent) of CTNF along the reroute which would be a negligible effect on land use.

The Proposed Action compliance with CNF RFP standards and guidelines and with the BLM ARMP is presented in **Appendix 4A**.

4.10.2.4 Grazing and Range Resources

Mining and infrastructure development under the Proposed Action would remove 594 acres from the Pole Draney Allotment in the short term, which based upon the numerical ratios would be a loss of 23 percent of the allotment acres and AUMs in the Study Area (moderate effect) and a loss of 5 percent of the acres and AUMs in the allotment as a whole (minor effect).

However, as described in **Section 3.10.1.3**, under current usage the permittee spends 13 and 19 days in the area as the sheep make their way between the Pole Canyon Dump south of the Project Area and the ground north of the Smoky Canyon Road and the Project Area. Therefore, over the life span of active mining and reclamation, the permittee would gradually lose up to approximately 19 days per season of grazing time on NFS lands. Due to active mining in the Project Area, the ability to move a band of sheep throughout the allotment while remaining on NFS lands would become extremely difficult if not impossible, especially along the southeastern portion of the allotment. Based upon the impacts from the Proposed Action combined with the effects and days lost from mining previous panels over the years, it is anticipated that the remaining permitted allotment area would not likely be sufficient to sustain the permitted number and duration of the existing permit unless mitigated (see potential mitigation listed below), resulting in direct impacts to the permittee.

Reclamation would occur as described in **Section 2.4.11**. Reclaimed areas containing established native bunch grasses and forbs and meeting rangeland capability criteria (e.g., over 60 percent ground cover, over 200 pounds of forage per acre; Maxim 2004c) would be suitable for grazing. The exact composition of vegetation communities after reclamation would not resemble their original state as they follow a unique succession process. Grasses would be over-represented initially, and as a result, relatively more fodder may be available for livestock grazing after reclamation than before mining. Because of specific reclamation treatments and cover requirements for overburden, elevated selenium levels in forage on reclaimed sites are not anticipated.

Impacts would occur until the disturbed areas have been reclaimed and their rangeland capacity restored (as determined by the CTNF via restoration criteria). Then these areas would again be suitable for livestock grazing. The long-term objective of the reclamation revegetation would be a vegetative community suitable to support the post-mining land uses of grazing and wildlife habitat. Therefore, there would be a negligible impact on long-term forage value under the Proposed Action.

Under the Proposed Action, there would be no effect on grazing access to portions of the Pole Draney Allotment that have historically been accessed through the mine, and are outside of the Project Area. Access to these portions of the Pole Draney Allotment would be coordinated with the Smoky Canyon Mine to avoid conflicts due to mining activities. The permittee would be allowed to cross the mine area to get sheep to the allotment. Animals would not be allowed to rest, water, or graze in the active mine area associated with the Proposed Action.

4.10.2.5 Recreation

Approximately 409 acres of public land managed by the CTNF would be newly disturbed by mining or mining infrastructure and would become unavailable to recreation in the short term until reclamation restored the land to its post-mining condition. In addition, approximately 570 acres of CTNF land between the existing mine and the Project Area would also become essentially unavailable to public recreation due to safety concerns related to crossing active mining operations. This approximately 980 acres would be 37 percent of the available CTNF land in the Study Area that would become unavailable for recreation in the short term and all of the area occurs within the RM ROS class (**Section 3.10.1.4**). However, given that recreation use and opportunities in the Study Area are currently limited and are not as popular as in other parts of the CTNF due to the presence of the mine and lack of access, and the approximately 3,000,000 acres of greater CTNF available for recreation, this effect would be negligible and last until reclamation has been deemed successful and recreation activities are allowed to occur in the area.

The long-term objective of the reclamation revegetation would be a vegetative community suitable to support the post-mining land uses of grazing and wildlife habitat. While the reclaimed Project Area may not be as suitable for some types of recreation due to altered topography, the revegetated areas may be more desirable for various hunting activities due to better forage for game species.

4.10.2.6 Transportation

There would be approximately 4.5 miles of new haul roads constructed in the Study Area over the life of the Project. The public would not be allowed access on these roads and following mining activities, the haul roads would be recontoured and reclaimed. There would not be any changes to public access on CTNF roads. Traffic would not increase on public roads in the Study Area; there would not be any additional employees traveling to the mine and the current number of haul trucks and other vehicles would continue as in the existing operations. No impacts to transportation are anticipated from the Proposed Action.

4.10.3 Alternative 1 Reduced Pit Shell with Soil-only Cover

Alternative 1 would have the same effects as the Proposed Action would in regard to proposed SUAs and the need for an RFP amendment. Similarly, Alternative 1 would also comply with CNF RFP standards and guidelines for grazing management and recreation. It would also have the essentially the same effects to land use (grazing and recreation) and transportation as described for the Proposed Action, although the area of direct disturbance would be less by 78 acres.

4.10.4 No Action Alternative

Under the No Action Alternative, there would not be any change to land use (grazing and recreation) and transportation and the current status would remain in and around the Study Area. There would not be any new SUAs or an RFP amendment would not be necessary for a new utility corridor. However, this does not preclude future development of the federal phosphate leases under a different mine plan.

4.10.5 Mitigation Measures

Simplot has indicated a willingness to provide adjacent, off-NFS land forage to mitigate this lost grazing time on NFS lands. Any reductions in numbers or days of permitted use would be determined through monitoring of forage use and impacts to water sources, if and when they occurred.

Simplot would be required to prevent livestock grazing on active and reclaimed mine disturbances until these areas are accepted for grazing management by the CTNF. This would be done by periodic coordination between Simplot and the permittee to identify exclusion areas and discuss additional measures that may be needed, such as fencing or bilingual signs. Simplot would also collaborate annually with the permittee to share mining progress plans and to discuss and resolve any potential access issues.

4.10.6 Unavoidable (Residual) Adverse Impacts

The 12 acres of unreclaimed highwall under the Proposed Action and a slightly lesser amount under Alternative 1 would present areas that would not be available for grazing and recreation activities. Disturbed areas would be susceptible for colonization by noxious weeds. Noxious weed invasions would adversely impact the quality of reclaimed sites for grazing, although EPMs for noxious weed control would minimize these residual impacts.

4.10.7 Relationship of Short-term Uses and Long-term Productivity

The Project would implement ground-disturbing activities that would reduce short-term uses of grazing resources and recreation activities. After establishment of vegetation communities on the disturbed areas, long-term productivity impacts to grazing resources would be eliminated and potentially enhanced under the Proposed Action and Alternative 1 and recreation activities that currently take place would once again be available.

4.10.8 Irreversible and Irretrievable Commitment of Resources

All areas disturbed under the Project would be reclaimed as described in **Section 2.4.11**. Grazing losses during the period of time that Project disturbances and reclamation prevent grazing in portions of the grazing allotments would be irretrievable. Once reclamation is complete and vegetation communities are reestablished, there would be no irreversible or irretrievable commitment of grazing resources except for the small areas that would be left permanently unreclaimed.

The conversion of NFS lands to uses associated with mining would represent an irretrievable loss of the current limited recreational uses of the disturbed areas.

4.11 VISUAL RESOURCES

4.11.1 Issues and Indicators

Issue: Visual impacts of the Project should be disclosed.

Indicators:

- Estimated compliance with the VQO in the USFS VMS.
- Change in scenery, from baseline to projected, from various public and occupied points within the Study Area.

4.11.2 Direct and Indirect Impacts

The landscape in the Project Area would be permanently altered by disturbance associated with the Project. The Project-related disturbance would cause direct and indirect impacts and changes to the local landscape; however, a large portion of the Project Area is generally not within view of the casual observer (**Figure 3.11-1**). Further, it is important to note that the past mining operations have become part of the overall viewscape and viewer experience since mining began in the 1980s. The visual impacts from the Project would be more substantial if mining had not occurred in the Project Area in the past and there had been no previous alteration of the landforms and vegetative patterns.

4.11.2.1 Proposed Action

Under the Proposed Action, construction of stormwater ponds, borrow pits, and haul roads, and mining operations would require disturbance that removes vegetation cover, exposes soil, and alters landforms, which would affect the form, line, texture, and color elements of the existing visual environment creating a contrast in the visual landscape. Over the life of the mine, there would be permanent facilities (topsoil stockpiles, borrow pits, haul roads, stormwater ponds, and the two power lines that would be relocated), personnel, vehicles and heavy equipment moving around the site that may be visible from outside the Project Area. There would also be mine-related vehicles and equipment moving to and from the mine, which would be visible offsite. The types of observers potentially affected by visual impacts include local residents, commuters, travelers, mine employees, and recreational users.

The existing mine sits high behind a ridge and is shielded from most views unless a viewer is in a specific location such as on the Smoky Canyon Road or is far enough away to see the mine in the distance as it is seen mainly in the background. Under the Proposed Action, the mine would be extended to the east. As mining progresses, it would open views of the mine from the lower elevation areas to the east because vegetation would be removed, and the mine would extend over the eastern side of the ridge above Sage Valley (see **Figure 3.11-1**). This would cause the mine to become more visually dominant from the east side in both the middle ground and background and would have a minor to moderate effect on visual quality depending on the viewpoint. Even though the site would be mined with a deep V-cut pit hiding some of the mining activities from view, the upper elevations of the mine would be visible from the east. Similarly, the expanded mining area would be more visible from the higher elevations to the north and west, but these views would be affected closer in the middle ground view from ½ to 1 mile away.

Views from the foreground (¼ to ½ mile) of the Proposed Action would be highly dependent on where the viewer was in proximately to the mine, the amount of timber remaining, and the angle of view. For example, the phasing would mine the site from north to south. Viewers in the foreground to the southeast would not see the site until the later years of mining (10-12 years), if at all, because of a lower viewing angle and the raised height of the mine. Similarly, as the mine progresses south and is reclaimed, views from the foreground to the northeast would not include the mining activity towards the southern end again due to a lower viewing angle. (If some timber is left to the eastern side of the pit, this would help to screen the mine from the eastern foreground views which would mainly occur from private lands.) Thus, over time the view from the foreground would change and be highly dependent on the location and angle of the viewer.

Overall views of the mine under the Proposed Action would be most pronounced from the higher elevations such as from existing roads and hiking trails outside the Project Area. Viewer sensitivity in these areas for recreational users may be high. However, visual effects are likely to be minor due to fewer people using these roads and trails, the transitory nature of people moving through these areas (there aren't any campgrounds or other similar facilities that would create longer period views of the site), and the locations of these areas which are typically at greater distances from the mine.

During mining, the landscape character would be unavoidably altered by harvesting trees, removing vegetation, and exposing soil. In particular, soil becomes more noticeable when it is newly exposed as the reddish-brown Project soils would contrast sharply with the greens of the aspens, firs, and pines on the ridgelines above the mine and the lighter browns of the mountain brush in Sage Valley. When newly disturbed, there would be moderate effect on visual quality due to the high contrast. As the soil weathers, the color would slowly become more muted and lighter in shade, which wouldn't stand out as much as when newly disturbed. At this point the intensity of the visual effect would be negligible to minor in intensity.

In addition to soil colors, textures change depending on how the soil has been disturbed. For example, in some places the mining would result in high wall slopes with benches that would create straight horizontal lines. These straight lines would contrast with the irregular forms of trees and ridgelines near the site from the foreground and middle ground views. Over time these slopes would erode and weather and the horizontal lines would become less discernable.

Relocation of the existing transmission lines would alter views. The level of visual impact would vary based on the final location of the transmission lines, the topography of the right-of-way, materials used for the structures, and potential viewers and viewer locations. The relocated portion of the northern line would mostly traverse through areas already mined and is less likely to affect views in that area. The exception is the eastern segment of that line that would be located at the edge or slightly over the ridge line. This portion of the line would have a negligible to minor adverse effect on views because it would likely be seen by mine employees and residents in the vicinity of KOP 1 and the Smoky Canyon Road who would be less sensitive to these changes.

The line to the south would create more of a contrast with the landscape because the new transmission line right-of-way would be constructed through a relatively untouched area where mining would not occur until the final phases (10-12 years). The straight line of the transmission right-of-way in this area would contrast sharply with the surrounding vegetation causing a minor to moderate effect on visual quality.

Due to the 24-hour mining schedule, lighting would be used at the site. Lighting would consist of fixed lighting on working portions of the mine face and on heavy equipment and vehicles, as well as haul roads where necessary. Lighting would affect the night sky in the Project vicinity and would be highly noticeable due to the lack of lighting in the general area (existing sources of light outside the mine are from a few residences and the occasional vehicles passing through the area). The mine-related lighting would create an artificial glare in front of celestial objects making them harder to observe. The deep V-cut pit would help to shield some light from the surrounding area, but depending on climate conditions, the lighting could affect the night sky in an area from 5 to 10 miles around the mine site.

Similar to mine construction and operations, reclamation activities would produce visual effects that contrast with surrounding areas. One beneficial impact of the Proposed Action would be backfilling the existing Panel B area with overburden from the Project to bring the topography closer to pre-mining conditions and thus, minimizing the visual contrast of the reclaimed portions to some degree. Impacts caused by reclamation activities would mostly be temporary, but could produce strong contrasting elements in the viewscape. For example, replacing soil cover from the topsoil piles would create a strong reddish-brown color over the reclamation area contrasting with the green of the mixed coniferous/deciduous forest. The color and texture of new vegetation would also contrast with surrounding mature vegetation. These temporary effects could be negligible to minor in intensity depending on the viewer and location.

<u>Visual Quality Objectives Compliance</u>

The CNF RFP identifies VQO for the Project Area: PR and M, which basically allow for human activities to remain subordinate (PR) or dominate the landscape (M), as long as views of the activities generally conform to the characteristics of the landscape and appear more or less as natural occurrences (see **Table 3.11-1**).

Appendix 4A describes the CNF RFP standard for scenic resources.

<u>Key Observation Points</u>

Viewers from KOP 1 would experience a negligible to minor effect on the visual landscape in the far middle to background view depending on the type of viewer and how long views were visible. Foreground views would not change and retain their strong visual elements as described in **Section 3.11**. In the early phases, the mine would expand towards KOP 1 and open up the far middle ground and background views of the mining activity. Removal of vegetation and earth moving would produce views typified by blocky and irregular landforms that rise up above the gently rolling hills in the middle ground indicating where mining was occurring. The side slopes of the new mined area would display horizontal lines where the slope stability benches were cut contrasting with the curvilinear skyline and more rounded mountains in the background. The cleared mine areas would be devoid of vegetation and produce a brown color that stands out above and against the green vegetation of the mixed conifers and deciduous trees in the middle ground view. The mined areas would also produce a rougher texture compared with the softer views of the surrounding vegetation and terrain.

Observers would see the site from KOP 1 while traveling westbound on Smoky Canyon Road and because most would be traveling along the roadway at 30 to 40 miles per hour, the view would pass by quickly and only produce a negligible effect on visual quality. Observers such as mine employees and residents would not likely be highly sensitive to the change in view. Recreational observers may experience a minor effect on visual quality as the expanded area would create a discernable change, particularly if the observer were to stop by the side of the road. This type of viewer may be more sensitive to the changed visual conditions as more of the mine would be visible from this location. However, as mining moves to the south and the area closer to KOP 1 (Phases 1 and 2) are reclaimed, the visual impacts would lessen over time. Visual impacts at KOP 1 would be relatively short-term (less than 10 years).

Views from KOP 2 are in the far background and the mining operations are less discernable than from KOP 1. The brown color of the existing mine stands out against the intervening terrain of gently rolling green hills, which marks the location of the mine in the landscape view. Under the Proposed Action the mined area would expand, further extending the mined area making it slightly more visible. The Proposed Action would not intrude on the pastoral quality of the foreground and middle ground views. Because of the distance from the mine, the change in the extent of the cleared mining area would only have a negligible to minor effect on visual quality depending on the observer. Travelers on U.S. 89 and Highway 238 would have a brief passing view of the mine when traveling southbound and are not likely to register that there were any changed conditions at the mine. Visual impacts on these travelers would be negligible in intensity. There are several residences in this area (near the intersection of U.S. 89 and Highway 238) and these observers may be likely to notice a change in the extent of the mined area. However, they may be less sensitive since the mine has been a visible feature in the landscape for many years. Visual impacts on these observers would be negligible to minor in intensity but would be longer-term (greater than 10 years).

4.11.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

Although there would be somewhat fewer acres disturbed under Alternative 1 than under the Proposed Action, as well as somewhat few acres left unreclaimed, visual impacts would be similar due to the views from varying vantage points.

4.11.2.3 No Action Alternative

Under the No Action Alternative, the expansion of the mine into the East Smoky Panel would not occur and there would be no adverse Project-related impacts to visual resources or views from the Project. However, this does not preclude future development of the federal phosphate leases under a different mine plan. Panel B would not be backfilled with overburden from the East Smoky Panel and not bring the topography in that area closer to pre-mining conditions to lessen any visual impacts. Mining operations in other areas of the existing mine continue.

4.11.3 Mitigation Measures

Simplot's M&RP proposes temporary and permanent mitigation measures that would help to minimize impacts to visual resources. Temporary measures include: hydroseeding the large cut slopes on the haul roads; revegetation on cuts and fills that would remain disturbed for the life of the mine; minimizing un-reclaimed pit disturbance as much as practical; and minimizing dust by watering or using magnesium chloride on haul and access roads. Permanent measures in the M&RP revolve around reclamation and include: demolishing facilities; restoring natural drainage patterns; contouring final grades so the topography more closely matches the surrounding area; replacing the topsoil cover; and revegetating disturbed areas with a permanent mixture of grass and forbs using USFS approved seed mixes. In addition, vegetation would be monitored and amended as necessary to ensure this effort is successful.

4.11.4 Unavoidable (Residual) Adverse Impacts

The scenic landscape would unavoidably be altered by mining and would likely always be noticeable to a certain degree. While reclamation efforts would result in cover replacement and revegetation, there are some aspects of the landscape, notably the landforms and vegetative patterns, that would be changed and never be fully restored.

4.11.5 Relationship of Short-term Uses and Long-term Productivity

The Project Area would be actively mined of its phosphate resource, producing a number of socioeconomic benefits in the short term. As previously mentioned, the disturbed area would never be fully returned to its natural topography and the visual resources of the area would be permanently altered. As vegetation becomes established visual effects would gradually lessen.

4.11.6 Irreversible and Irretrievable Commitment of Resources

The original characteristics of the landscape would be irreversibly affected as mining would alter the existing landform by changing the topography and the subsequent views of the area and they would always be noticeable to a certain degree. Reclamation of the disturbed areas would mimic the natural conditions, but it may take many years to replace the forested habitat and there would be some areas (e.g., the unreclaimed highwalls) where it may be impractical or impossible to replace in-kind the vegetation that was removed. This would cause an irreversible effect on visual quality because it would change the color and texture of that area. If the re-establishment of vegetation is unsuccessful then this would be an irretrievable commitment of scenic resources.

4.12 CULTURAL RESOURCES

4.12.1 Issues and Indicators

Issue: Cultural resources may be impacted by the Project.

Indicator:

- Number of historic properties (cultural sites eligible for the NRHP) impacted by the Proposed Action

The goals of the DFCs for cultural resources in the CNF RFP are general goals for the identification, evaluation, and protection of the resources for educational, scientific, and public benefit. There are no standards or guidelines specific to cultural resources for any of the prescription areas in the Study Area.

4.12.2 Direct and Indirect Impacts

The entire APE has been inventoried for the presence of cultural resources. As discussed in **Section 3.12**, two cultural resources have been identified within the APE. These two sites have been recommended as not eligible for the NRHP. The CTNF and the Idaho SHPO have concurred with these recommendations. Therefore, no historic properties (cultural sites eligible for the NRHP) have been identified in the cultural resources survey area. The general goals of the DFCs for heritage (i.e., cultural) resources in the CNF RFP are that the resources be identified, evaluated, and protected for educational, scientific, and public benefit. There are no standards and guidelines for the management of cultural resources in the CNF RFP specific to the prescription areas in the Study Area. Regulations implementing Section 106 of the NHPA (36 CFR 800) require that impacts to historic properties be considered for federal undertakings.

4.12.2.1 Proposed Action

Under the Proposed Action, no historic properties are within the areas of proposed disturbance. The Proposed Action would have no effect to known historic properties.

4.12.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

As with the Proposed Action, no historic properties are within the areas of proposed Alternative 1 disturbances. Thus, the alternative would have no effect to known historic properties.

4.12.2.3 No Action Alternative

Under the No Action Alternative, the East Smoky Panel would not be developed, and there would be no effect to known historic properties similar to the Proposed Action and Alternative 1. However, this does not preclude future development of the federal phosphate leases under a different mine plan.

4.12.3 Mitigation Measures

No mitigation measures have been identified as there are no historic properties within the APE.

If unanticipated cultural materials or historic sites are encountered during mining, the CTNF Forest Archaeologist would be notified, and operations would be halted in the vicinity of the discovery until evaluated by the Forest Archaeologist or a professionally trained archaeologist in consultation with the CTNF Forest Archaeologist and a mitigation plan developed, if necessary.

4.12.4 Unavoidable (Residual) Adverse Impacts

The Proposed Action and Alternative 1 would not result in unavoidable residual adverse impacts to historic properties.

There would be no unavoidable adverse impacts to NRHP-eligible cultural resources or heritage resources/values.

4.12.5 Relationship of Short-term Uses and Long-term Productivity

As there would be no impacts to NRHP-eligible cultural resources, there would be no short-term uses or long-term productivity.

4.12.6 Irreversible and Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of NRHP-eligible cultural resource sites.

4.13 NATIVE AMERICAN CONCERNS AND TREATY RIGHTS RESOURCES

4.13.1 Issues and Indicators

Issue: *The analysis should consider whether or not the Project would affect tribal natural and/or cultural resources and address any concerns of the Tribes in accordance with federal tribal trust responsibilities.*

Indicators:

- Change in land status and Treaty Rights access;
- Acres of access and recreation areas that would be unavailable for the duration of mining activities to exercise Treaty Rights;
- Known prehistoric cultural resource and traditional use sites impacted by the Project and visibility of disturbances to these areas;
- Changes in water quality and quantity of both surface water and groundwater;
- Acres of wetlands disturbed;
- Acres and types of vegetation disturbed, including DSAYs, versus acres and types of vegetation replanted;
- Increased COPC uptake by wildlife and vegetation in mining-disturbed areas and reclaimed areas;
- Changes in types of aquatic resources and comparison with undisturbed habitats in the Project Area; and
- Changes in air quality.

A goal of the DFCs for tribal coordination in the CNF RFP is that "Culturally significant items and sites are identified, protected and treated within the context of the culture that identifies and values them." Awareness of the context of tribal culture that may identify and value important items, sites, and resources entails sustained communication and coordination with the Tribes.

4.13.2 Direct and Indirect Impacts

The trust responsibility of the federal government includes an obligation to protect and preserve Treaty Rights resources. The BLM and the CTNF have a responsibility and obligation to consider and consult on potential effects to natural resources related to the Tribes' rights, uses, and interests under the federal laws, EOs, and the 1868 Fort Bridger Treaty between the U.S. and the Shoshone and Bannock Tribes (U.S. Congress 1868). In addition, the NHPA and its implementing regulations (36 CFR 800), AIRFA, EO 13175: Consultation and Coordination with Indian Tribal Governments, and EO No. 13007: Indian Sacred Sites contain requirements for consulting with Tribes on the potential effects of federal actions on Tribal interests. The Native American Graves Protection and Repatriation Act (NAGPRA) requires that concerned tribes be consulted if human remains that may be Native American or objects of cultural patrimony are discovered. Consultation with the Tribes has yielded important issues regarding treaty resources that would potentially be affected by the Project. As stated in Article 4 of the Fort Bridger Treaty of 1868, the Shoshone-Bannock Tribes "…shall have the right to hunt on the unoccupied land of the United States…"

Actions that change the land status, restrict, or alter the ability of the Shoshone-Bannock Tribes to exercise their Treaty Rights, or affect the physical integrity of a sacred site, traditional cultural property, and/or location of traditional importance, are considered impacts.

Resources or issues of interest to the Tribes that could involve their traditional use or treaty rights include tribal historic and archaeological sites, sacred sites and TCPs, traditional use sites, fisheries, traditional use plants (including culturally significant plant species) and animal species, vegetation (including noxious and invasive, non-native species), air and water quality, wildlife, access to lands and continued availability of traditional resources, land status, and the visual quality of the environment. As reflected in the indicators listed previously, tribal concerns include potential changes in the quality and quantity of groundwater and surface water, traditionally valued vegetation (culturally significant plants), grazing resources, and wildlife. Changes in quality of these resources may include increased uptake of COPCs by vegetation and wildlife, changes in the natural setting of traditional resources that would diminish their value to traditional practices; diminished value of traditional hunting, fishing, and gathering areas; rendering of culturally important natural resources unfit for harvest or consumption; and impairment of access to resource areas. Many of these resources or issues overlap with other resource concerns discussed in this EIS, but also must be considered in consultation with the Tribes. Tribal consultation to date has not identified culturally unique resources in this Study Area, including any specifically-identified sacred sites.

4.13.2.1 Proposed Action

The Proposed Action would result in adverse impacts to some of the natural resources that the Tribes may desire in the exercise of their Treaty Rights. The following analysis describes Project effects to Native American concerns and Treaty Rights.

Land Status and Access

There would be no change in land ownership status. The federal portion of the affected land would remain under federal ownership with the rights to mine phosphate granted to Simplot. The use of lands for mining operations and associated facilities would be short-term; lands would be reclaimed and structures removed after mining was completed.

Phosphate mining, directed under the Mineral Leasing Act of 1920, would be considered a temporary surface use and occupancy of the federal land under lease. There would be a short-term, temporary loss of access to land for exercising Treaty Rights under the Proposed Action while the lands are occupied for mining. The Project would disturb approximately 530 acres or 0.1 percent of the CTNF, a negligible temporary impact. There are no known resources located exclusively within the Project Area that are not available on the remaining portions of the CTNF.

Treaty Rights Access

Access, or the continued availability of the traditional natural resources, would be affected by the Proposed Action. There would be a temporary loss of approximately 530 acres of federal land to disturbance associated with land occupancy from mining activities under the Proposed Action, which represents less than 0.1 percent of the CTNF. After reclamation, hunting and gathering areas would be restored through revegetation of disturbed areas (except for approximately 12 acres of unreclaimed areas) and wildlife would return. Tribal members would regain access to the federal lands. There are no known types of natural resources available for exercising Treaty Rights in the Project Area that are not available on the surrounding NFS lands. This EIS assigns 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 or otherwise determine the impact of a temporary loss of a right. In consultations with the Shoshone-Bannock Tribes, they noted that any loss of Treaty Rights is significant to them and could potentially affect all tribal members.

The overall impact to Treaty Rights access from the Proposed Action would be local, short-term, and negligible (less than 0.1 percent of the CTNF).

Land Access/Transportation

There would be no effects to existing transportation routes under the Proposed Action (**Section 4.10**). Existing public access roads would remain open under the Proposed Action. Public motorized access to active mine areas, including haul/access roads, would be restricted during the life of the Project. Public non-motorized access (i.e., walking, hiking, horse) would be unrestricted during mining, except to protect personal safety in the specific areas where active mining operations are occurring. The impact to land access for exercising Treaty Rights under the Proposed Action would be local, short-term, and negligible.

Recreation

There would be impacts to solitude, and the temporary loss of dispersed recreation opportunities in the area disturbed by the Project, although as described previously, current recreation opportunities in the Project Area are very limited due to the existing mine and private property that occur within or immediately adjacent to the Project Area. The limited opportunity for recreation uses would be re-established on these areas following reclamation. Recreation impacts to the Tribes would be local, short-term, and negligible.

Cultural Resources and Traditional Use Sites (including Tribal Historical/ Archaeological Sites, Rock Art, and Sacred Sites)

There would be no impacts to tribal historic/archaeological sites as no tribal historical or prehistoric archaeological sites have been identified within the Project Area. See **Sections 3.12** and **4.12** (Cultural Resources). No occurrences of rock art, specifically-identified sacred sites (EO 13007), or TCPs (NHPA) have been identified in the Project Area.

In addition to the permanent alterations of the Project Area, the Proposed Action would cause changes to the local landscape. Although there are now known sites, changes to the landscape would have negligible to minor impacts on nearby ceremonial or traditional use sites that may exist, depending on whether they could be seen from those sites.

Water Resources

Impacts to water resources are discussed in detail in **Section 4.5**. Runoff associated with the Proposed Action would be contained, which would minimize contribution of sediment to local streams. Implementation of the geologic store and release cover system under the Proposed Action would limit the percolation of water into the seleniferous overburden beneath, by increasing runoff and retaining moisture within some of the cover layers thereby reducing the amount of selenium that could be transported by groundwater. Surface water available for tribal use in the area would not be impacted above human drinking water standards by the Proposed Action.

Vegetation

Impacts to vegetation, including DSAYs with a long-term net debit residual of 33,551, are discussed in detail in **Section 4.7**. Vegetation would be cleared from approximately 850 acres under the Proposed Action, 530 acres would occur on NFS lands. Clearing would likely include plants of traditional importance to the Tribes as discussed in **Section 3.7.7**.

Reclamation would include revegetation with short-lived grass species intended to help stabilize the reclaimed surfaces from erosion as well as long-lived native bunch grasses and forbs. The goal of the selected revegetation mix is to establish healthy native bunch grass communities that are structurally diverse and allow succession of native species over time. Other native forbs, shrubs, and trees could be seeded or planted in clusters where they are most likely to establish. Some species (i.e., yarrow and basin wildrye) of traditionally important plants indicated in **Section 3.7.7** would be included, to make up approximately 11 percent of the proposed seed mix. In addition, a number of grasses and other forbs are important for inclusion in the seed mix to provide a stabilizing cover that does not have deep penetrating roots. This would constitute a short-term and minor impact to Tribal access to vegetation in the Project Area.

Wildlife

Big Game

Impacts to big game would involve displacement and alterations of normal movement routes. The implementation of the geologic store and release cover system under the Proposed Action would limit the levels of selenium and other contaminants in forage sources in reclamation vegetation and water sources and would be expected to reduce the possibility of any contaminant effects on big game. HEA DSAY calculations were described and presented in **Section 4.7.2.1**.

Wolves

Wolves may alter their normal movement patterns to avoid the Project Area, but no direct impacts to individuals or populations are expected.

Bald Eagles

There are no known bald eagle nests or winter roost areas within 5 miles of the Project Area. Project-related noise and activities have the potential to displace bald eagles that happen to be flying over or foraging near the Project Area into adjacent suitable habitat. Impacts to bald eagles are expected to be site-specific, short-term, and negligible.

Small Mammals and Birds

Any greater sage-grouse individuals in the Project Area would be displaced, and noise or increased human presence may cause moderate effects to birds in the vicinity for the duration of active mining and reclamation activities. No direct mortality is expected. Some individual small mammals such as rabbits, rockchucks, and squirrels, in the disturbance areas under the Proposed Action would be displaced or killed. Displaced individuals may cause increased competition in adjacent populations that may lead to increased mortality or decreased reproductive rates.

Similar to big game, selenium and other contaminants in water sources and the reclaimed mine site would be controlled by using BMPs, including a store and release cover that would be built using a native soil cover. This would ensure healthy environments for small game under the Proposed Action. Impacts to these wildlife for exercising Treaty Rights in the Project Area under the Proposed Action would be minor in the short- and long-term as disturbance represents less than 0.1 percent of the CTNF.

Fisheries

Impacts to fisheries are discussed in detail in **Section 4.9**. No direct impacts to intermittent or perennial stream channels or potentially suitable habitat for fisheries, amphibians, or aquatic resources would occur, with the exception of potential indirect impacts of either drying up or reducing the quantity of water at specific surface water sources described in **Section 4.5**. No impacts to YCT are expected from the Proposed Action. There would be site-specific, long-term, and negligible to minor impacts to AIZs from the Proposed Action.

Air Quality

The Proposed Action would meet NAAQS and IDEQ air quality standards. There would be no air quality impacts to Treaty Rights.

4.13.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

Alternative 1 would have similar impacts to Treaty Rights as those described for the Proposed Action, although there would be approximately 78 acres less disturbance and impacts to water resources would be less, as described in **Section 4.5**. DSAYs were provided in **Section 4.7.2.2**, showing that there would be long term net debit residual of 28,063.

4.13.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action or Alternative 1 would not be authorized, and there would be no Project-related adverse impact to known Tribal Treaty Rights and interests. However, this does not preclude future development of the federal phosphate leases under a different mine plan.

4.13.3 Mitigation Measures

No detailed mitigation measures for Native American concerns or Treaty Rights resources specific to this Project have been identified. Potential impacts to traditional use or Treaty Rights that have been identified include short-term interruption of access to the lands to exercise Treaty Rights and traditional uses. No specific impacts to traditional resources or uses that are not available in other areas have been identified. If adverse impacts to traditional resources or uses were identified, mitigation measures specific to those resources would be developed through consultation among the Tribes and the Agencies. Resource-specific mitigation measures are addressed in the applicable sections of this EIS. For wildlife habitat, off-site mitigation could reduce or eliminate any residual impacts prior to full reclamation. In general, however, vegetation and wildlife habitat impacts would occur for a period of time, but reclamation would occur after mining is complete. Eventually (over several decades) vegetation transitions to a more natural state. See **Section 4.7** for residual HEA analysis describing the long-term condition, which reduces mitigation needs.

4.13.4 Unavoidable (Residual) Adverse Impacts

The temporary use of unoccupied federal lands for the Project would affect the exercise of Treaty Rights during the life of the Project and subsequent reclamation. The potential for the indirect impact of selenium uptake due to bioaccumulation in plants and animals utilized by the Tribes would be minimized by the Project design and EPMs. The change in topography as a result of mining and reclamation represents an unavoidable adverse impact to lands of cultural importance to the Tribes.

4.13.5 Relationship of Short-term Uses and Long-term Productivity

The general area of southeastern Idaho is of cultural importance to the Tribes. Although no specific areas of traditional cultural significance have been identified within the Project Area, the short-term use of natural resources and the temporary unavailability of unoccupied federal land during the mining activities would adversely impact the long-term productivity of these lands in terms of providing Treaty Resources.

4.13.6 Irreversible and Irretrievable Commitment of Resources

The Project represents an irretrievable commitment of Treaty Rights resources for the duration of mining, mining reclamation, and rehabilitation of the area. The loss of timber would be an irreversible commitment of resources. Conifer forests in particular may not recover to current stature and complexity for at least 200 years (**Section 4.7**). The change in topography because of mining and reclamation represents an irretrievable commitment of lands of cultural importance to the Tribes.

Mining would result in the short-term partial or complete loss of access to traditional resources on the impacted public lands during mining and initial reclamation. Over time, access to unoccupied public lands and resources would be restored. Valued and traditional resources, including vegetative resources and wildlife habitat, would be reclaimed or replaced.

4.14 SOCIAL AND ECONOMIC RESOURCES

4.14.1 Issues and Indicators

The following issues were identified through scoping and indicators were developed to address the issues.

Issue: Potential for closure of the mine and effects on the local economy of affected communities should be evaluated.

Indicators:

- Numbers of employees, contractors, and their dependents that could be affected by potential mine and fertilizer plant closure and loss of personal/public income.
- Estimated economic and social impacts of the Proposed Action, Action Alternatives, and No Action Alternative.

Issue: Efficient recovery of the phosphate resource should be discussed.

Indicator:

- Phosphate resource (tons) that would not be recovered under the No Action Alternative.

4.14.2 Direct and Indirect Impacts

Social and economic impacts were evaluated for the four-county area of Bannock, Caribou, and Power counties, Idaho, and Lincoln County, Wyoming. The great majority of employees at the Smoky Canyon Mine and the Don Plant reside in those four counties. Consequently, the direct, indirect, and induced employment and wages resulting from operation of the Smoky Canyon Mine and the Don Plant are most strongly felt in this area. The four-county area is influenced by both the Smoky Canyon Mine and the Don Plant in Pocatello.

Direct social and economic impacts are those that are caused by the action and occur at the same time and in the local area of the action, including such things as the Smoky Canyon Mine and Don Plant employment, royalties, expenditures, and taxes. Indirect social and economic impacts are those that are caused by the action but may occur later in time or are farther removed from the location of the action including such things as indirect or induced employment and the purchase of goods and services outside the local area.

4.14.2.1 Proposed Action

From a socioeconomic perspective, the primary impact of the Proposed Action would be to extend the Smoky Canyon Mine's operations for an additional approximately three years past what is currently anticipated. In each of the following areas the Proposed Action would have essentially no impact other than to extend current conditions:

- Land ownership would not change, although some new SUAs would be required on NFS lands.
- Population and demographics would not be affected as there would be no increase or decrease of consequence in the workforce at the mine or the Don Plant.
- Housing would not be affected as there would be no change in the workforce at the mine or the Don Plant which might trigger an increase or decrease in the area population. Therefore, the availability and pricing of housing should remain unchanged.
- Local government finances and services would not be affected for the same reason, including county and municipal governments, school districts or special districts. The extent of the fiscal inputs to local governments from the mine and the Don Plant is provided in **Section 3.14.2**.
- Community services, such as schools, fire protection, law enforcement, health care, and utilities should not be affected as there would be no change in population or government funding.
- Employment in the four-county area should not be affected, including direct employment at the mine and the Don Plant, as well as indirect and induced employment that would be generated in the community due to the presence of the mine and the Don Plant and their direct employees.
- Wages and income should remain approximately the same as currently occurring, adjusted for inflation and other economic factors. In addition to wages paid to employees at the Smoky Canyon Mine, the mine made purchases totaling $12,991,222 to Idaho vendors in 2015, and the Don Plant made purchases of $14,657,530 during that same year (Simplot 2016a) (**Section 3.14.6.1**).
- Agricultural fertilizer production and supply would tend to remain at current levels.

The Proposed Action would reduce the available grazing area and AUMs during operations and reclamation, but, given the comparative small area relative to the overall acreage that is available and potential mitigation measures, this impact would be short-term and minor (**Section 4.10**).

Table 4.14-1 shows direct, indirect, and induced employment and earnings (wages) in the four-county Study Area as determined using the RIMS II multipliers provided by the BEA. Direct social and economic impacts are those that are caused by the action and occur at the same time and in the local area of the action (i.e., the Smoky Canyon Mine and Don Plant). Indirect impacts include those that affect regional businesses that provide goods and services directly to the mine, and induced impacts are those created as a result of employee spending in the region for goods and services. Overall, the impacts of the Proposed Action would be beneficial, short-term, and major.

Table 4.14-1 Direct, Indirect and Induced Employment and Earnings, Smoky Canyon Mine and Don Plant, 2015

	DIRECT EMPLOYMENT	EARNINGS FROM DIRECT EMPLOYMENT	INDIRECT EMPLOYMENT	EARNINGS FROM INDIRECT EMPLOYMENT	INDUCED EMPLOYMENT	EARNINGS FROM INDUCED EMPLOYMENT
Smoky Canyon Mine	254	$25,077,772	465	$39,234,174	218	$8,059,996
Don Plant	372	$35,674,038	533	$52,480,077	164	$10,780,694
Total	626	$60,751,810	998	$91,714,252	382	$18,840,690
Grand Totals	2,006 Employed			$171,306,752 Earnings		

Source: Simplot 2016a; BEA 2017

The Proposed Action would allow Simplot to continue to contribute to the Western U.S. integrated phosphate nutrient/fertilizer network.

4.14.2.2 Alternative 1 Reduced Pit Shell with Soil-only Cover

Impacts to socioeconomics would be the same under Alternative 1 as were described for the Proposed Action.

4.14.2.3 No Action Alternative

Under the No Action Alternative, the East Smoky Panel would not be mined and the Smoky Canyon Mine period of operation, relative to the Proposed Action, would be shortened by approximately three years. However, this does not preclude future development of the federal phosphate leases under a different mine plan. Consequently, the socioeconomic benefits of the mine and the Don Plant would end approximately three years earlier than for the Proposed Action, but no sooner than what is currently authorized for the mine and the Don Plant.

Some of the anticipated impacts from this earlier closure would be as follows:

- Employment in the four-county area would decline, including direct employees of the mine and the Don Plant, as well as indirect and induced employment that is currently generated in the community due to the presence of the mine and the Don Plant.

- Population would likely decline as most, if not all, of the current employees would seek employment elsewhere. Although some current employees may find new positions in the four-county area, the majority would likely need to find work elsewhere due to the limited opportunities locally.
- Housing would likely be affected as workers leaving the area sell their houses or cancel their leases. The increased vacancy rate would likely cause housing prices to decline.
- Local government finances and services would be affected by the population decline as well. Tax and other receipts would decline, including those that fund county and municipal governments, school districts or special districts.
- Community services, such as schools, fire protection, law enforcement, health care, and utilities would lose funding, but they would also be serving fewer people.
- Wages and income from direct, indirect, and induced employment would decline, as would ongoing purchases from local vendors.
- Temporary loss of grazing acreage would not occur.

The No Action Alternative could cause the regional price of fertilizer and cost of agricultural production to increase for a period of time if Simplot had to curtail production pending final acquisition of an alternative area to mine.

Consequently, impacts from the No Action Alternative, compared to those of the Proposed Action, would be adverse, short-term, and major.

4.14.3 Mitigation Measures

No mitigation measures for socioeconomic impacts would be required.

4.14.4 Unavoidable (Residual) Adverse Impacts

There would be no residual adverse impacts to social or economic resources as a result of the Proposed Action or Alternative 1.

4.14.5 Relationship of Short-term Uses and Long-term Productivity

The short-term use of mining of the phosphate ore would result in beneficial long-term effects from increased public funds available for social programs and/or infrastructure improvements due to increased federal lease royalties. There would also be an increase in wealth and economic stimuli from the manufacture of goods and services related to mining phosphate ore from the leases. Mining and use of the phosphate resource would make good use of the mineral in the short-term, but would reduce its availability for the future.

4.14.6 Irreversible and Irretrievable Commitment of Resources

There would be no irreversible and irretrievable commitment of socioeconomic resources associated with the Proposed Action or Alternative 1.

CHAPTER 5

CUMULATIVE EFFECTS

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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 Area (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: mining, roads/trails, timber harvesting, wildfires, Tribal Treaty Rights, livestock grazing, and agriculture. Dispersed recreation (including hunting and fishing) and residential development also occur in parts of the CEAs.

Guidance from 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. 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. Maps for the various CEAs are also included.

5.1 GEOLOGY, MINERALS, TOPOGRAPHY, AND PALEONTOLOGY

5.1.1 CEA Boundary

The CEA boundary for geology, minerals, topography, and paleontology (**Figure 5.1-1**) includes the southeastern Idaho phosphate mining district, including KPLAs in Bear Lake and Caribou Counties, Idaho. The boundary was developed with the IDT experts and professional judgement. This is an area 509,540 acres in size within which there are current leases for 38,874 acres or 7.6 percent of the total CEA area. **Figure 5.1-1** shows locations of KPLAs, phosphate mine leases, and past, present, and reasonably foreseeable future phosphate mines in Bear Lake and Caribou Counties, Idaho; and identifies the general location of proposed future phosphate mines.

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

5.1.2 Introduction

Potential effects to the geology, mineral, topographic, and paleontological 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. The East Smoky Panel 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 East Smoky Panel operations. The mine overburden from the East Smoky Panel operations would be disposed of within the 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 overburden would be covered as described in **Section 2.4.3** to minimize the environmental effects of selenium contained within the overburden.

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, topography, and paleontology compared with phosphate mining.

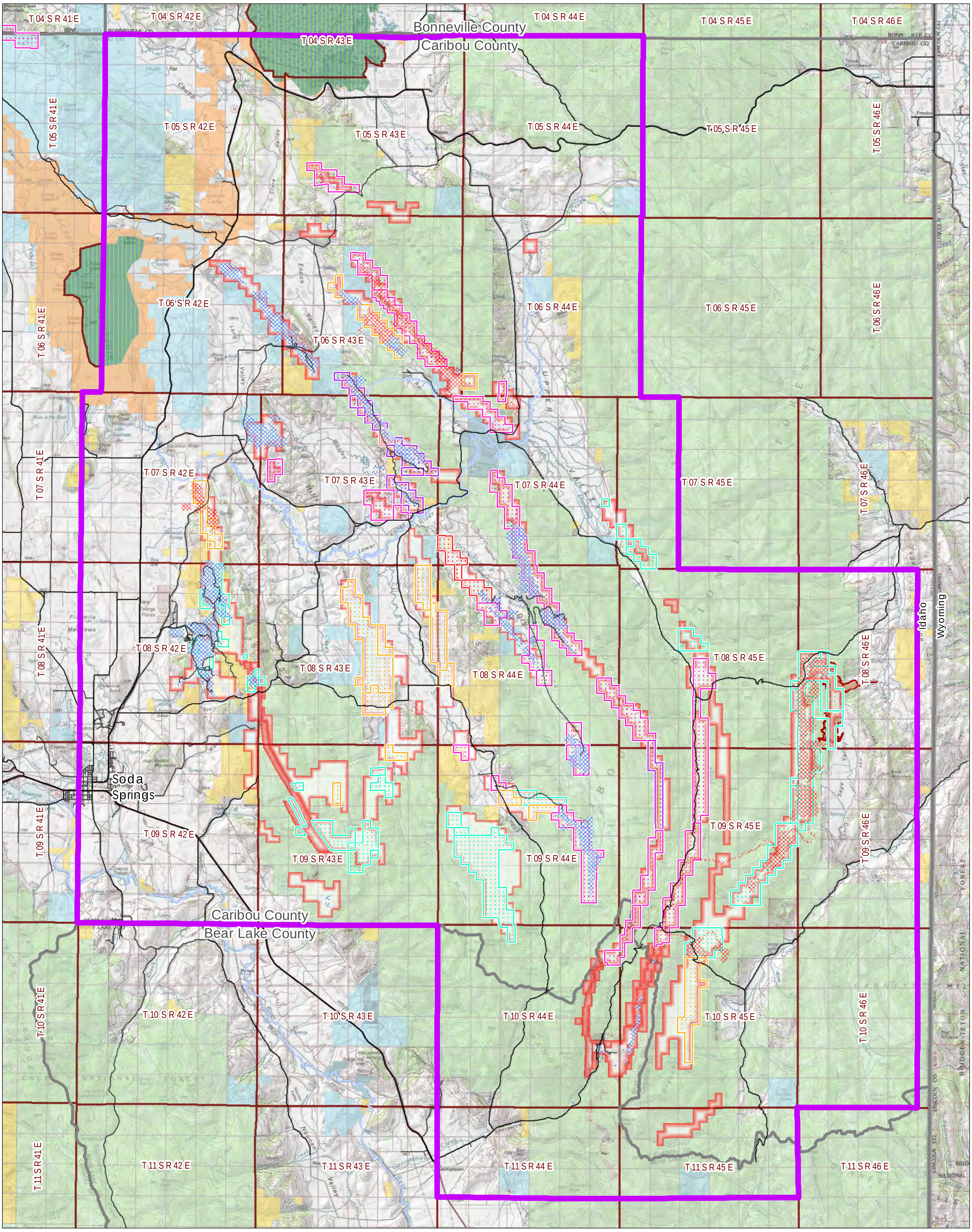
Table 5.1-1 shows land ownership within the CEA for geology, mineral, topographic, and paleontological resources. The largest percentage is land managed by the USFS, approaching 50 percent. Privately owned lands make up almost 40 percent of the CEA area.

Table 5.1-1 Geology Cumulative Effects Area

LAND OWNERSHIP	ACRES	PERCENTAGE OF THE CEA
USFS	247,568	48.6
USFWS (Historic Waterbody)	6,911	1.4
Indian Reservation	9,949	1.9
BLM	15,289	3.0
Private	199,099	39.1
State	28,988	5.7
State (IDFG)	1,736	0.3
TOTAL CEA	509,540	100.0

5.1.3 Past and Present Disturbances

Since phosphate mining began in southeastern Idaho, there have been a total of 31 phosphate mines in the area (USGS 2001). Through consolidations of the original operations, there are 24 mines listed in **Table 5.1-2** that actually occur within the CEA, some of which were small underground mines that have been closed for years. Two former underground mines within the CEA, Conda and Maybe Canyon, were converted to surface mining operations, and the surface mine disturbance for these mines is still noticeable. The open pit phosphate mines in the CEA with significant production include: Conda, Ballard, Maybe Canyon, Georgetown Canyon, Mountain Fuel, Henry, Wooley Valley, Lanes Creek, Champ, Enoch Valley, Smoky Canyon, Blackfoot Bridge, Rasmussen Ridge, South Rasmussen, and Dry Valley.



Legend

Proposed East Smoky Panel Disturbance

Cumulative Effects Area for Geology, Minerals, Topography, & Paleontological Resources

Known Phosphate Lease Areas (KPLAs)

Phosphate Mine Status

- Active
- Inactive
- Non-Phosphate (Inactive)

Phosphate Mine Leases (by Lessee)

- Agrium
- Earth Sciences Inc.
- FMC
- FMC; Rhodia Inc.
- JR Simplot Co.
- Monida Resources Inc.
- Monsanto
- Rhodia Inc.

Land Status

- Indian Reservation
- Bureau of Land Managment
- Idaho Dept. of Fish and Game
- National Wildlife Refuge
- Private
- State
- US Forest Service

Notes

1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E Caribou County, Idaho

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Figure 5.1-1

Cumulative Effects Area for Geology, Minerals, Topography, and Paleontological Resources East Smoky Panel Mine EIS

Table 5.1-2 Past Disturbance: Phosphate Mines of Southeastern Idaho within the CEA

MINE	YEARS OF OPERATION	DISTURBED AREA (ACRES)
Hot Springs	1907 - 1911, 1954 - 1956	<1
Paris Canyon	1917 – 1926	<2 (estimate)
Bear Lake	1920 – 1921	<1
Conda	1920 - 1984	1,988
Consolidated	1920 - 1921, 1930 - 1938	<1 (estimate)
Bennington Canyon	1907 - 1912, 1939 - 1942	2 (estimate)
Wyodak	1942 - 1943	<1 (estimate)
Ballard	1952 - 1969	638
North and South Maybe Canyon	1951 - 1995	1,119
Georgetown Canyon	1958 - 1964	251
Wooley Valley	1955 - 1989	1,052
Diamond Gulch	1960	32
Fall Creek	1955 - 1964	<1 (estimate)
Mountain Fuel	1966 - 1967, 1985 - 1993	717
Henry	1969 - 1989	1,093
Bloomington Canyon	1972 - 1975	<1
Pritchard Creek	1975v1976	2 (estimate)
Lanes Creek*	1978 – 1989, 2015 to present	86
Champ and Champ Extension	1982 - 1985	404
Smoky Canyon*	1982 - present	3,580
Rasmussen Ridge/Enoch Valley Mines*	1991- present	1,400
South Rasmussen	2003 – 2015	275
Dry Valley	1992 – 2014	1,092
Blackfoot Bridge*	2013 - present	466
Total Disturbance	1901-present	14,205

Sources of information: USGS 2001, Open file Report 00-425; various reports citied in BLM and USFS 2007; BLM 2014; BLM 2017

* active mine

Although volumes of mined ore and overburden material may be better indicators of disturbances to geologic and paleontological resources, volumetric data may either be non-existent for older mines or proprietary in the cases of current or recently operating mines. Therefore, acres of known disturbance are presented in **Table 5.1-2**. Based solely upon the information presented previously, past and present disturbances strictly from phosphate mining activities within the CEA total approximately 14,200 acres.

There are currently five active phosphate mines in the Southeast Idaho Phosphate District: Smoky Canyon (Simplot), Rasmussen Ridge Mines (Agrium), Rasmussen Valley (Agrium), Lanes Creek

(Agrium), and Blackfoot Bridge (P4). Each of the currently operating mines simultaneously performs mining and reclamation activities in different parts of the mines. The portion of the mined-out areas at previously approved mines that has been reclaimed is unclear, as reclamation varies from mine to mine, and information for older mines is sparse. Mines in operation before 1970 were often released from lease liabilities without stipulations requiring backfilling, regrading, or reseeding disturbed areas (Causey and Moyle 2001). 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.

U.S. phosphate production fell in 2014 to 25,300 thousand metric tons (down from 31,200 thousand metric tons in 2013) but began rising again in 2015 to 27,600 thousand metric tons (USGS 2016). According to USGS (2016), domestic phosphate rock production capacity remained at 32.7 million tons. Positive effects associated with recovery of this resource include making this commodity available now, economic growth and employment, and increased understanding of the geology of this and similar deposits.

Altogether, the past phosphate mining operations within the CEA have disturbed approximately 14,200 acres of surface or about three percent of the total CEA. The historic mining operations, which account for about two-thirds of the 24 mines, are typically not reclaimed to the same standards as today, thus there is more unreclaimed topographic disturbance associated with the historic mining operations and less with the more recently operated mines. 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.

Past reclamation activities have not always resulted in complete remediation of environmental risk from selenium and other COPCs. CERCLA-related studies and related remediation projects are underway at many of the mine sites in the CEA, due to the potential presence of COPCs in vegetation and water from mining activities. For example, remediation-related work at Dry Valley and Wooley Valley has either just recently began and/or is scheduled to begin in the near future (BLM and USFS 2016).

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, topography, and paleontological resources. These features primarily impact topographic resources, with lesser influences on geologic, mineral, and paleontological resources. The impact of aggregate pits on geologic resources is negligible in comparison to 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 within 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 or gas production in the CEA. Although exploration wells have been drilled in the recent past, no commercial production has been established. Hard-rock mineral and metals mines operate in Idaho, but not within the CEA, although some gold prospecting does occur (Gillerman and Bennett 2007). The inactive Kerr McGee Limestone Mine does occur within the CEA and has resulted in approximately 17 acres of previous disturbance.

Gold and copper mining was historically important on the CTNF 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.

5.1.4 Foreseeable Future Disturbances

Ongoing and future phosphate mining is expected to be the most prominent foreseeable cause of future disturbances within the CEA. In addition to the US phosphate production discussed above, the world phosphate fertilizer demand increased from 41.7 million ton in 2013 to 42.7 million tons in 2014, at a growth rate of 2.4 percent. It is expected to reach 46.6 million tons in 2018 at a growth rate of 2.2 percent per year (FAO 2015). Based on this information, phosphate production from the CEA will likely also be stable or increase slightly.

As reported in the Rasmussen Valley EIS (BLM and USFS 2016), Florida and North Carolina have produced approximately 85 percent of all phosphate rock in the U.S. in recent years, while Idaho and Utah produced the rest. Average annual production in the CEA is expected to be between 5 and 6 million tons per year.

Reasonably foreseeable mining disturbances (including the Proposed Action and Alternative 1) within the CEA include continued mining at the Blackfoot Bridge Mine (approximately 350 acres), development of the Dairy Syncline Mine (approximately 2,900 acres), the recently approved Rasmussen Valley Mine (approximately 520 acres), the proposed Caldwell Canyon Mine (approximately 1,530 acres) and the Husky/North Dry Ridge Mine (approximately 1,050 acres, currently on hold, although the application has not been withdrawn). The continued mining of Blackfoot Bridge and the proposed new mines would result in approximately 6,350 acres of additional disturbance, the majority of which would be reclaimed.

Stonegate Agricom Ltd. (acquired by Itafos in 2017) proposed to develop the Paris Hills phosphate project in Bear Lake County which would be a 2,495-acre underground phosphate rock mine where three previous mines operated intermittently during the 20th century. The proposed Paris Hills mine has total measured and indicated mineral reserves of 16.7 million tons of marketable rock and expected average annual rate of production of about 0.9 million tons (Stonegate Agricom Ltd. 2017). However, this proposal has been curtailed because of financial constraints and the proposed project is situated south of the CEA and thus, not included in the acreage for reasonably foreseeable disturbance.

Additional phosphate exploration drilling within the CEA has also been proposed outside of the new mine areas listed above and includes: Dry Ridge (approximately 69 acres), Trail Creek (approximately 60 acres), and Freeman Ridge/Husky 2 (approximately 168 acres), although only the Trail Creek exploration project is currently active.

The reasonably foreseeable disturbance expected from phosphate mining and potential exploration activities in the CEA is approximately 6,650 acres.

Future oil/gas exploration and possibly production could occur in the CEA, but would have minimal effect on geology and topographic resources. If there were any proposed future oil/gas disturbance it would be analyzed under a separate NEPA analysis process. Mineral resource development of oil/gas would not likely affect phosphate mining and future phosphate mining would have no effect on oil/gas resources in the area.

5.1.5 Cumulative Disturbances

The combined past and present disturbance (approximately 14,200 acres) and reasonably foreseeable future disturbance (6,650 acres) totals about 20,850 acres of mining related disturbance in the CEA. The disturbance of the Proposed Action (approximately 850 acres) would increase this total to about 21,700 acres, still approximately four percent. The cumulative effect of mining disturbance from past, present, and foreseeable future activities (19,320 acres) would be approximately four percent of the CEA. Alternative 1 would disturb approximately 78 fewer acres, also approximately four percent cumulative increase.

As summarized from the Blackfoot Bridge FEIS (BLM 2011), if all KPLAs within the CEA are developed to the extent that 90 percent of each federal phosphate lease is disturbed through excavation, construction, or other ancillary activities, approximately 39,300 acres (7.7 percent of the CEA) would be disturbed at some point. The volumetric equivalent of geological, mineral, topographic, and paleontological resources that would be disturbed is uncertain because each mine would design mine plans according to geologic and market constraints unique to each phosphate lease.

5.1.6 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 approximately 21,700 acres for which there is a residual change in topography following mineral development. This would be approximately four percent of the CEA. A large majority of this disturbance would be fully reclaimed.

Regarding selenium mobilization within the CEA, this is most affected by disturbance of selenium-containing bedrock or soil. Phosphate mining activities impact these resources and can result in release of selenium and trace metals to the environment. Most other ground-disturbing activities within the CEA such as road/highway construction and maintenance, building construction, ditch construction, and agricultural practices typically do not disturb bedrock. The effects of selenium mobilization on water resources are thoroughly discussed in **Section 4.5**.

The Proposed Action includes the construction of a geologic store and release cover over seleniferous overburden associated with the East Smoky Panel and the predicted load loading of selenium and potentially other COPCs to potentially affected springs and creeks in the area is anticipated to be low based upon the modeling results described in **Section 4.5.2**. Alternative 1 includes only a topsoil cover over the East Smoky Panel and the currently approved chert cover over the Panel B pit backfill. However, due to the change in the pit configuration and material handling, there would be less seleniferous overburden. Thus, the area of the Proposed Action or Alternative 1 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.

5.2 AIR AND CLIMATE CHANGE

5.2.1 CEA Boundary

The CEA boundary for Air and Climate Resources 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 the Diamond Creek Watershed (HUC 6) that extends to the confluence with Timber Creek. The boundary was developed with the IDT experts and professional judgement. The CEA encompasses 148,861 acres. This is the same boundary as was used for the Smoky Canyon Mine Panels F & G EIS (BLM and USFS 2007) and identical to the water resources CEA boundary. This area was selected due to geographic and topographic features that surround the Project Area (**Figure 5.2-1**).

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.

5.2.2 Air Resources

5.2.2.1 Introduction

Excellent air quality generally exists on National Forest System Lands (USFS 2003b). Air quality in the CTNF can occasionally be adversely affected by pollutants from sources outside the CTNF 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 CTNF may include power plant, factory, agricultural burning, and auto emissions (USFS 2003b). 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).

5.2.2.2 Past and Present Disturbances

Air quality conditions in the CTNF 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 or Alternative 1. Prescribed fires on the CTNF 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. Particulate emission estimates from 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 CTNF. 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 increase because mining of the East Smoky Panel 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.

5.2.2.3 Foreseeable Future Disturbances

Timber harvesting, agriculture, travel on paved and unpaved roads, grazing, controlled burns, and wildfires are foreseeable future disturbances within the CEA that would continue to generate dust and exhaust emissions, along with continued mining and CERCLA related activities at the Smoky Canyon Mine.

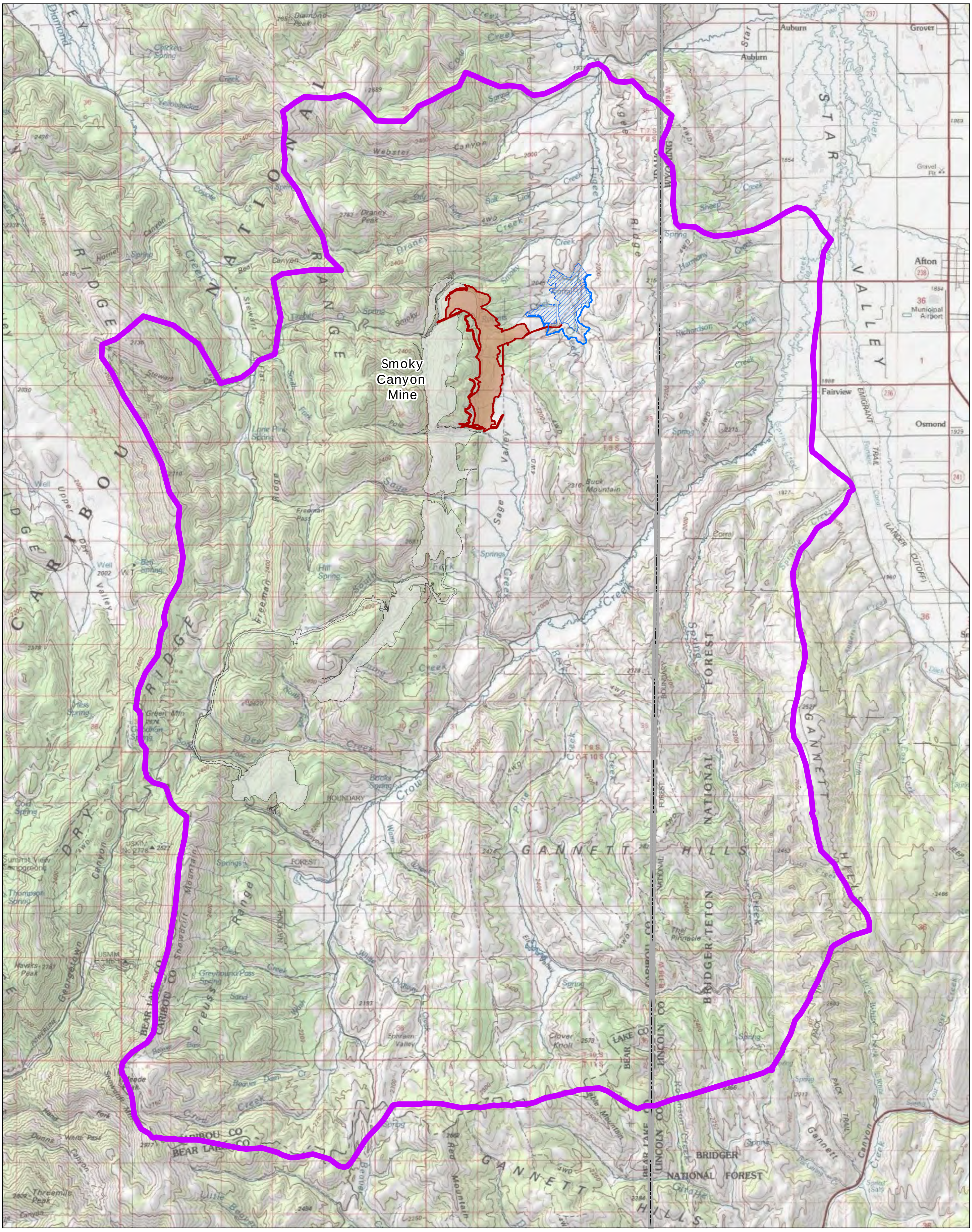
Wildfire and prescribed burns have the greatest potential to affect air quality in the CTNF and surrounding lands (USFS 2003b). Fire produces particulates, carbon monoxide, nitrogen oxides, and volatile organic compounds. Fuel loading in forested and non-forested vegetation in the CTNF has increased, 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 CTNF (see **Section 5.1.4** for details) and could contribute dust and exhaust emissions within the CEA. Also, the Lower Valley Energy Crow Creek Natural Gas Pipeline Project, if approved, would occur within portions of the CEA and during construction would contribute dust and exhaust emissions short term and of negligible amounts.

5.2.2.4 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. All 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. 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). However, depending on the proximity of prescribed fires to the location of the Proposed Action and Alternative 1 and the prevailing wind direction, emissions from the fires could be additive to those from the ongoing mining operations at the Proposed Action or Alternative 1 location. 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 cumulative effects of adding the particulate emissions from the Proposed Action or Alternative 1 to potential smoke emissions from fires cannot be determined.

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 or Alternative 1 and reasonably foreseeable future mining activities. The location of the mining would be moved generally north from current operations, 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 Proposed Action and Alternative 1 would comply with National Ambient Air Quality Standards and applicable State and federal regulations on protection of air quality.



Legend

Cumulative Effects Area for Surface Water, Soils, Vegetation, Wetlands, Fisheries and Aquatics, Visual/Aesthetics, Air, and Noise

Proposed East Smoky Panel Disturbance

Existing Mine Disturbance Boundary

Tailings Pond (TP)

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E Caribou County, Idaho

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Miles
1:125,000 (at original document size of 11x17)
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Figure 5.2-1
Cumulative Effects Area for Surface Water, Soils, Vegetation, Wetlands, Fisheries and Aquatics, Visual/Aesthetics, Air, and Noise
East Smoky Panel Mine EIS

Present mining operations at the Smoky Canyon Mine would result in a cumulative effect from dust emissions due to ongoing 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.

Current, future, or alternative operations at the 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) as most recent air quality monitoring data demonstrates compliance with all applicable NAAQS.

5.2.2.5 Cumulative Effects

Considering past, present, and foreseeable future disturbances to air resources combined with disturbances from the Proposed Action or Alternative 1 to these resources, cumulative effects would be short term and negligible. The Proposed Action or Alternative 1 would be expected to maintain the status of compliance with state and federal standards. Emissions from the Smoky Canyon Mine would continue although move north. Wildfires could add additional pollutants but cannot be predicted.

5.2.3 Climate Change

5.2.3.1 Introduction

As described in **Section 4.3.2** of this EIS, the combustion of diesel and gasoline contribute CO_2, GHGs, to the atmosphere. GHGs would be generated by the Proposed Action or Alternative 1.

5.2.3.2 Past and Present Disturbances

In addition to ongoing phosphate mining, contributions to GHG emissions within the CEA include those from local rural and community traffic, traffic through the area to recreational locations, operation of agricultural equipment, residential and small industrial heating sources, and other commercial and industrial activities. Quantitative data on these varied sources is not readily available, but their contribution in the CEA is small compared to phosphate mining activities and they are expected to remain approximately equal to present conditions.

5.2.3.3 Foreseeable Future Disturbances

Foreseeable future contributions to GHG emissions include ongoing and new phosphate mining activities at the Smoky Canyon Mine as previously described. They also include continuation of local rural and community traffic, traffic through the area and to recreational locations in the CEA, operation of agricultural equipment, residential and small industrial heating sources, and other commercial and industrial activities. Quantitative data on these varied sources not directly associated with phosphate mining is not readily available, but their contribution is small compared to phosphate mining and they are expected to remain approximately equal to present conditions.

5.2.3.4 Cumulative Effects

Past, present, and reasonably foreseeable contributions to GHG emissions in the CEA have been and would continue to be predominantly associated with phosphate mining activities. GHG emissions from the mining operations are associated with direct fuel consumption for operating equipment and machinery including haul trucks and other mining equipment, and generation of electricity consumed at the facilities.

GHGs are considered to have caused a warming trend globally and could continue to do so if atmospheric levels are not reduced. The generation of GHGs would still occur under the Proposed Action, Alternative 1, or No Action. Because the scale of the global warming issue is so large and the release of CO_2 from fuel consumption for both the approved and proposed operations is relatively miniscule compared to the U.S. emission rate (U.S. GHG emissions totaled 6,870 million metric tons of carbon dioxide equivalents in 2014 [EPA 2016a]), an assessment of the effects of the Proposed Action or Alternative 1 on global climate change would be unreliable. Impacts from GHGs may be countered locally by CO_2 sequestration in the vegetation of the adjacent CTNF and added to by any future fires in the CTNF; however, the RFP FEIS (USFS 2003b) cautions that estimating these effects may not be reliable.

5.3 NOISE

5.3.1 CEA Boundary

The CEA boundary for noise is the same as air, surface water, and several other resources (**Figure 5.2-1**) and encompasses 148,861 acres. The boundary was developed with the IDT experts and professional judgement. Noise attenuates within the direct effects area, so cumulative effects are not anticipated outside of this CEA. Noise from mining is attenuated by vegetation and topography to levels that are not discernable for long distances to humans. Noise related to access traffic and haul roads is of importance to persons along nearby public roads and in nearby residences.

5.3.2 Introduction

Mines in the southeast Idaho phosphate mining district do not overlap within the CEA and noise impacts from these mines are not known to overlap either due to the distance and topography between the existing mines. Noise impacts from the Proposed Action or Alternative 1 do not impact sensitive receptors in the CEA beyond what is currently occurring. The effects of adding the Project to the past, present, and foreseeable future disturbances to noise resources would not result in adverse cumulative impacts.

5.3.3 Past and Present Disturbances

Within the CEA, mining and mining-related activities are ongoing at Smoky Canyon Mine. The continuation of approved mining at the Smoky Canyon Mine will result in ongoing noise. Other existing operating phosphate mines are located outside the CEA and would not impact the CEA for noise resources. Past and present disturbances contributing to noise include vehicular traffic on Smoky Canyon Road, the haul roads, and Crow Creek Road. Noise from vehicular traffic is short-term and intermittent. Past mine operations would no longer contribute to noise impacts.

5.3.4 Foreseeable Future Disturbances

Foreseeable future noise disturbances within the CEA include ongoing and new phosphate mining activities at the Smoky Canyon Mine as previously described, as well as local rural and community traffic, traffic through the area and to recreational locations in the CEA, operation of agricultural equipment, and other commercial and industrial activities. The Lower Valley Energy Crow Creek

Natural Gas Pipeline Project, if approved, would occur within portions of the CEA and during construction would contribute to noise disturbances.

5.3.5 Cumulative Disturbances

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

Cumulative activities for the Proposed Action or Alternative 1 would remain the same and would not impact differently for noise levels within the CEA.

5.3.6 Cumulative Effects

Mining-related noise within the CEA, if the Proposed Action or Alternative 1 were selected, would basically be equivalent to existing conditions. Noise impacts from mining operations would shift north of current operations at Panels F and G under the Proposed Action or Alternative 1. The noise from these operations would be cumulative as mining would continue in Panels F and G at the same time mining at the East Smoky Panel would occur, basically replacing the mining activities at Panel B. Noise from haul traffic between the mine panels and the mill at Smoky Canyon would be the same as present conditions. The public driving on the Smoky Canyon Road is currently exposed to the mining and haul traffic noise. Potential noise impacts from the Proposed Action or Alternative 1 are not expected to contribute to cumulative impacts to sensitive noise receptors within the CEA because the sensitive noise receptors along Crow Creek Road would be situated a sufficient distance away so that sound would attenuate.

Noise impacts from mining operations at Panels F and G would be ongoing for another 10-15 years and would likely be combined with potential mining related-noise from the Proposed Action or Alternative 1 (both situated approximately seven miles to the north). The public driving on the road to the main Smoky Canyon Mine entrance is currently exposed to the mining and haul traffic noise and residents along Crow Creek are exposed to some noise from mining currently occurring at Panels F and G which would last until 2027.

Noise impacts from the Proposed Action or Alternative 1 when added to the ongoing Smoky Canyon Mine operations would not impact sensitive receptors within the CEA above what is currently occurring.

Considering past, present, and foreseeable future disturbances to noise resources combined with disturbances from the Proposed Action or Alternative 1 to these resources, cumulative effects would be for the life of the mine and negligible.

5.4 WATER RESOURCES

5.4.1 CEA Boundary

The CEA for groundwater resources is a 37,156-acre area bound by natural geologic and hydrogeologic features as defined by current and previous groundwater modeling and conceptual site models (**Figure 5.4-1**). The boundary was developed with the IDT experts and professional judgement. This area incorporates the existing Smoky Canyon Mine and the Project, and the down-gradient underlying aquifers where groundwater quality impacts could potentially occur. The boundary is formed along Draney Creek between where it is crossed by the West Sage Valley

Branch Fault trace and the top of Webster Range, then south along the Webster Range to Wells Canyon, east along Wells Canyon stream to Crow Creek, northeast along Crow Creek to the trace of the West Sage Valley Branch Fault trace, and north along the West Sage Valley Branch Fault trace back to Draney Creek. 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 affect groundwater chemistry (BLM and USFS 2007).

The CEA boundary for surface water resources (**Figure 5.2-1**) 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. The boundary was developed with the IDT experts and professional judgement. The CEA encompasses 148,861 acres. This is the same boundary as was used for the Smoky Canyon Mine Panels F & G EIS (BLM and USFS 2007), also there has been a slight refinement in the acreage determination.

This boundary was selected because it 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.

5.4.2 Introduction

5.4.2.1 Groundwater

Cumulative effects to groundwater in the CEA could 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 active mining operations in the CEA are those at the Smoky Canyon Mine. Under the Proposed Action or Alternative 1, there would be no change in the mine's water supply wells or water consumption, thus, cumulative effects analyzed in this section are limited to those activities that have the potential to affect groundwater quality, not quantity.

Groundwater conditions in the CEA are described in various studies conducted for the Smoky Canyon Mine under CERCLA authorities to investigate the release of hazardous substances under (Formation Environmental 2014 and related reports). More recently, groundwater has been studied and modeled for this East Smoky Panel Mine EIS (HGG 2018). HGG (2018) in part reinterprets groundwater flow directions and recharge areas that were previously assumed in the CERCLA investigations.

5.4.2.2 Surface Water

Table 5.4-1 provides land ownership data within the CEA, showing that USFS lands dominate the area. 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. Tygee Creek is a tributary of Stump Creek, which drains to the Salt River approximately five miles downstream (northeast) of Tygee Creek. The southern part of the mine is located in tributary basins that drain to Sage Creek. Sage Creek joins Crow Creek in the approximate center of the Water Resources CEA (**Figure 5.2-1**). 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.

Table 5.4-1 Land Ownership in the Surface Water CEA

LAND OWNERSHIP	ACRES	PERCENTAGE OF CEA
USFS	106,388	71%
BLM	2,100	1%
Private	39,080	26%
State	1,293	1%
TOTAL CEA	148,861	100%

Forest management activities including timber harvests, livestock grazing, and public recreational uses occur within the CTNF located on the east and west slopes of the Crow Creek watershed upstream (south) of its confluence with Sage Creek. The CTNF 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.

5.4.3 Past and Present Disturbances

5.4.3.1 Groundwater

The Smoky Canyon Mine is the disturbance that has by far had the greatest effect on, and continues to affect, groundwater quality in the CEA. Past mining operations in the Panel A area of the Smoky Canyon Mine have apparently affected groundwater quality in the underlying Wells Formation aquifer (BLM and USFS 2007). As reported in the RI/FS (Formation Environmental 2014), samples collected from GW-IW in 2000 and 2001 had selenium concentrations that ranged from 0.007 to 0.022 mg/L; selenium then slowly increased (with some seasonal spikes) until it reached a high concentration of 0.126 mg/L in June 2011 in one of the aforementioned seasonal spikes. After that sampling event, selenium concentration dropped quickly to about 0.03 mg/L, then remained consistent at that concentration for most of the 2011 and 2012 RI/FS sampling period, with an overall range between 0.02 and 0.04 mg/L. As also reported in the RI/FS, selenium spiked again in late spring 2013 (0.07 mg/L), then dropped again to about the same range as in 2011-2012 (Formation Environmental 2014). East Smoky Panel Mine baseline data (Stantec 2017a) showed that groundwater sampled from GW-IW had selenium concentrations ranging from 0.026 to 0.046 mg/L. Other nearby Wells Formation wells in this part of the Smoky Canyon Mine have not been affected (or, at least not to the same degree) to date.

Panels B and C have had the potential to impact water quality of the Wells Formation aquifer in a local area under and downgradient of approved pit backfills and external overburden fill areas (BLM and USFS 2002). Mitigation measures introduced by Simplot and adopted by the Agencies were designed to reduce the groundwater quality impacts to acceptable levels within a relatively short distance from the margins of the Panels B and C operations area.

Further to the south, the Smoky Canyon Mine's 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 placed 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, and impacts have extended to downgradient alluvial groundwater (BLM and USFS 2007). Some remediation projects have been implemented to address these conditions; in particular, actions taken to reduce groundwater impacts from the Pole Canyon Dump. For example, GW-15 is a well completed in the alluvium at the mouth of Pole Canyon. The RI/FS (Formation Environmental 2014) reported past selenium concentrations ranging from 0.0892 to 5.19 mg/L in samples collected from GW-15 over the period of record. Data collected more recently during the East Smoky Panel Mine baseline study shows GW-15 selenium concentrations ranging from 0.102 to 0.49 mg/L (Stantec 2017a). Groundwater from alluvial wells GW-22 and GW-26 continues to have elevated selenium (Formation Environmental 2014; Stantec 2017a).

Another fraction of contaminated alluvial groundwater in the Pole Canyon area is believed to enter the Wells Formation where it impacts the regional aquifer. Wells Formation groundwater selenium concentrations were elevated in GW-16 and GW-25 samples before and during the RI/FS. GW-25 is primarily influenced by Panel E. Specifically, Formation Environmental (2014) reports selenium concentrations at GW-16 ranging from 0.447 to 1.27 mg/L, and at GW-25, ranging from 0.00028 to 0.594 mg/L. Data from the East Smoky Panel baseline monitoring (Stantec 2017a) showed selenium concentrations ranging from 0.766 to 0.926 mg/L at GW-16.

Hoopes Spring is located along the trace of that fault and is a key discharge point (along with South Fork Sage Creek Springs) for groundwater from the Wells Formation in the vicinity of the Smoky Canyon Mine (Ralston 1979, NewFields 2005, Formation Environmental 2014). The elevated selenium concentrations at Hoopes Spring (see **Section 5.4.3.2** below) were initially thought to be solely due to 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 2005). The Pole Canyon overburden fill hydrogeological setting is a unique feature at the Smoky Canyon Mine. This valley fill likely represents the worst known source of groundwater contamination at Smoky Canyon Mine and is not repeated anywhere else at the mine. A Removal Action (RA) construction was completed at Pole Canyon in 2008 and included a creek-bypass pipeline, upgradient infiltration basin, and run-on control channel (BLM and USFS 2007). An additional removal action, the Pole Canyon ODA cover, was completed at Pole Canyon over the period from 2013 to 2016. However, sources other than Pole Canyon also influence water quality at Hoopes Spring including sources in Panels D and E (Formation Environmental 2014). More recently, a WTPP (described in **Section 4.5.2.3**) has also been constructed as part of the continuing CERCLA effort and is treating contaminated water discharged from Hoopes Spring as part of the treatability study.

In sum, past mining at the Smoky Canyon Mine has affected groundwater quality locally within the CEA, with those impacts continuing into the present, although they are in the process of being addressed through CERCLA actions. The Wells Formation is the primary aquifer affected, although there have also been local alluvial groundwater impacts.

Simplot's CEMPP currently covers water monitoring done under various programs including CERCLA. Per that plan, there is a merging of parameters, scheduling, and sites, which Simplot closely tracks to ensure that all monitoring requirements of all programs are met. CERCLA monitoring sites have more stringent requirements (e.g., monitoring well development, sampling methods, level of quality assurance/quality control) than some programs and care is taken to ensure compliance with all of those requirements. Per **Section 2.5** and AMP Section 4.1 (**Appendix 4B**), Simplot would update their CEMPP to include any Project-specific monitoring as necessary. This would ensure that water monitoring under various programs would continue to be integrated.

5.4.3.2 Surface Water

According to USFS GIS mapping and Idaho and Wyoming Gap Analysis Program (GAP) maps, mining and agriculture reflect two of the dominant land uses/major disturbances within the CEA, but each represent very small percentages (2 and 3 percent, respectively) of the total CEA (**Figure 5.2-1**). According to the same information, sagebrush/shrub and conifer are the dominant vegetative cover types within the Surface Water CEA, making up about 70 percent. Agriculture occurs on the majority of the private lands. For example, 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.

Table 5.4-2 Dominant Land Use and Disturbance Types in the Surface Water CEA

LAND USE OR DISTURBANCE TYPE	AREA (ACRES)	PERCENT OF CEA
Mining, quarries, gravel pits	4,390	3
Timber Harvests	730	negligible
Burned Areas	930	1
Agricultural Areas (private)	3,400	2
Utility and Pipeline Corridors	60	negligible
Roads/Trails	380	negligible

Table 3.5-5 includes numerous stream segments within the CEA that are listed as impaired in the 2014 305(b) Integrated Report (IDEQ 2017a). In addition, several stream segments that are outside of the Water Resources Study Area, but within the Surface Water CEA are listed. Specifically, Manning Creek, North and South Forks of Deer Creek, Deer Creek, Rock Creek, Books Creek, Warm Creek, White Dugway Creek, Sand Wash, Beaver Dam Creek, Little Elk Creek, Spring

Creek, and Diamond Creek, as well as unnamed tributaries, are listed as impaired in certain segments or throughout their length. Impairments are primarily due to *E. coli*, sedimentation/siltation, or combined biota/habitat bioassessments (i.e., habitat alterations), or a combination of those. Several stream segments down gradient of the Smoky Canyon Mine are listed for selenium impairment (**Table 3.5-5**).

The Salt River Subbasin Assessment and TMDL (IDEQ 2017b), which includes most of the Idaho portion of CEA, notes that sediment, bacteria, habitat modifications, and selenium all affect beneficial uses in the subbasin.

For segments impaired due to sediment, IDEQ (2017b) determined that the impairment was primarily due to bank erosion on public and private lands, with some additional component due to natural hydrological and geomorphic processes. There have been occasional discrete events wherein the Smoky Canyon Mine has released sediment (namely Smoky, Pole Canyon and Sage creeks), and IDEQ (2017b; 2017c) has developed a Smoky Creek TSS WLA specifically for Simplot's allowable TSS load. Simplot is also obligated to follow its SWPPP and to use an adaptive management processes to ensure BMP functioning to comply with Idaho's Water Quality Standards.

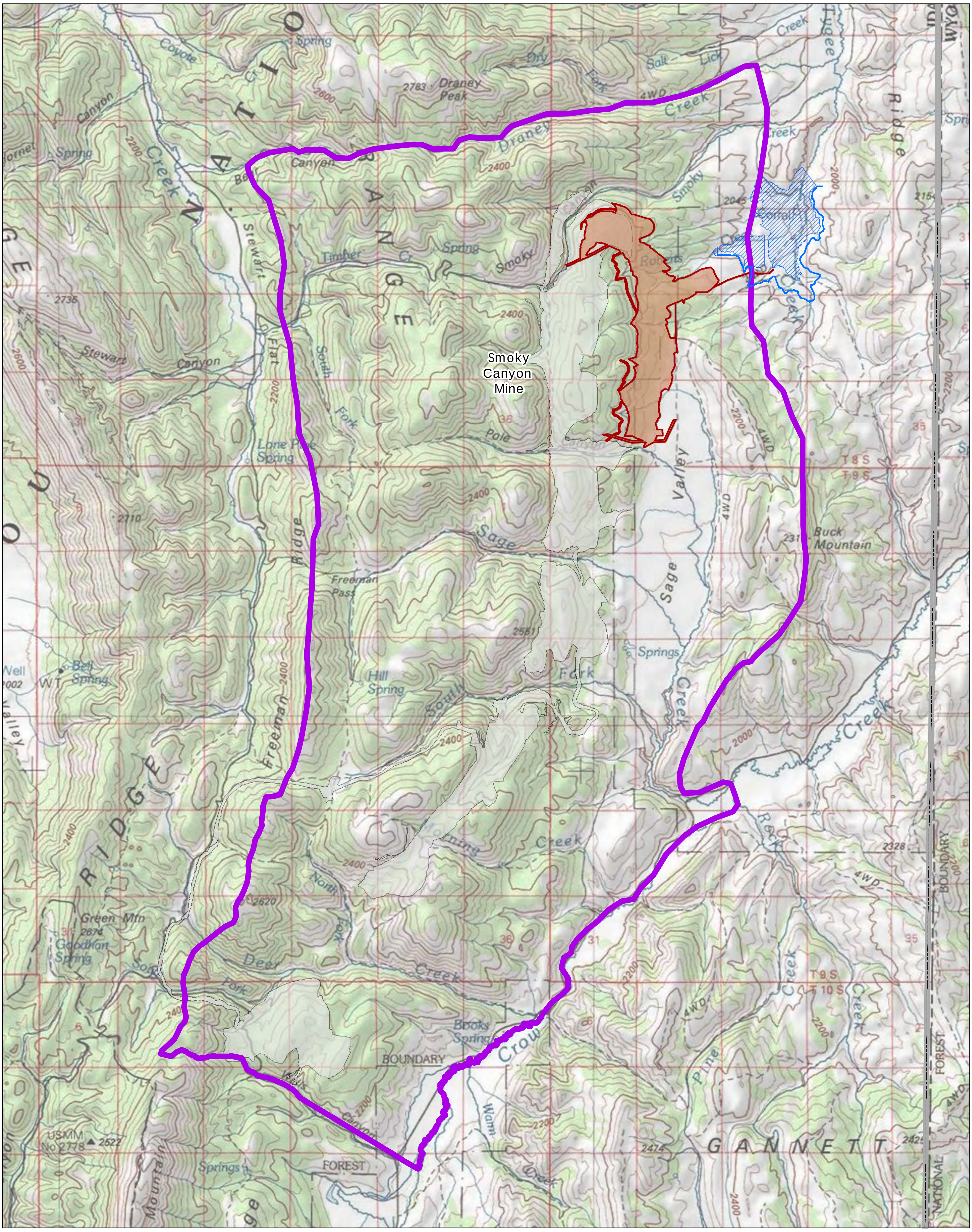
For segments impaired due *E. coli*, impairment was determined as due to nonpoint loading from livestock and wildlife feces, with no components attributed to the Smoky Canyon Mine (IDEQ 2017b). The mine was noted as associated with elevated selenium in the listed stream segments. However, the assessment and TMDL did not address selenium-impaired stream segments because they are currently under CERCLA responsibility (IDEQ 2017b).

As noted above, groundwater quality has locally been impacted at parts of the Smoky Canyon Mine, which in turn has impacted specific surface water, in large part, due to discharge at Hoopes Spring. The selenium concentration at Hoopes Spring began to increase in the fall of 1997. 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 2002a). 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 2005). Hoopes Spring selenium concentrations ranged between about 0.006 and 0.019 mg/L through early 2007 (NewFields 2006 and 2007). Formation Environmental (2014) showed that Hoopes Spring selenium has continued to increase, with essentially all site HS samples collected during the RI/FS (between 2011 and 2013) reflecting concentrations greater than 0.05 mg/L. Further, as reported in **Table 3.5-6**, selenium concentrations ranged from 0.108 mg/L to 0.134 mg/L in the eight samples collected from this site during the baseline study for this EIS.

5.4.4 Foreseeable Future Disturbances

5.4.4.1 Groundwater

Other than the East Smoky Panel Project, and ongoing, already approved mining activities at the Smoky Canyon Mine, there are no reasonably foreseeable phosphate mining operations in the groundwater resources CEA (**Figure 5.4-1**) that are expected to begin operations. Potential exploration activities on existing phosphate leases (Agrium on the west edge of the water resources CEA and Monsanto in the south part of the groundwater CEA) may occur, although in both cases only a very small portion of these lease areas are within the CEA. These leases are shown on the geology CEA map (**Figure 5.1-1**). Exploration would not be likely to impact groundwater quality.



Legend

Cumulative Effects Area for Groundwater Resources

Proposed East Smoky Panel Disturbance

Existing Mine Disturbance Boundary

Tailings Pond (TP)

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

0 1 2
Miles
1:75,000 (at original document size of 11x17)

N

Figure 5.4-1
Cumulative Effects Area for Groundwater Resources
East Smoky Panel Mine EIS

Impacts to groundwater from the existing Smoky Canyon Mine are not expected to continue in perpetuity because of the AOC to investigate and develop alternatives to address contaminant releases from the mine, with its subsequent SIs, RAs, and ongoing CERCLA considerations. These actions are expected to eventually reduce contaminant levels in Hoopes Spring, which are sourced from Pole Canyon, Panel A, Panel D, and Panel E.

There are no other mining or non-mining projects known within the foreseeable future that would be expected to impact groundwater in the CEA.

5.4.4.2 Surface Water

There are no reasonably foreseeable phosphate mining operations in the surface water resources CEA (**Figure 5.2-1**) that are expected to begin operations other than the East Smoky Panel Project and ongoing, already approved mining activities at the Smoky Canyon Mine. Potential exploration activities on existing phosphate leases (Agrium on west edge of the water resources CEA and Monsanto in the south part of the groundwater CEA) may occur. These leases are shown on the geology CEA map (**Figure 5.1-1**). Potential small changes to private agricultural lands are possible as portions of these lands are converted into low-density residential areas. Near-term development of private agricultural lands within the CEA is expected to be limited because Caribou County has identified infilling of existing city limits and impact areas, rather than expansion into rural areas, as a growth goal (Caribou County 2006). Future quantities, extents, and types of grazing activities within the CEA are not expected to vary from current activities.

In the foreseeable future, there would be impacts to surface water as a result of mining at Panels F and G and predicted in the EIS (BLM and USFS 2007). Neither the RI/FS predictions nor the existing conditions account for the predicted future selenium increases in surface waters from the Panels F and G mining. For one, the bounds of the southern groundwater flow sub-region considered in the RI/FS modeling had its northern boundary along a presumed groundwater divide between Smoky Canyon and Pole Canyon and its southern boundary just south of South Fork Sage Creek (Formation Environmental 2014). For another, the predicted Panels F and G impacts to surface water (from the selected Alternative D), combined with existing un-remediated Smoky Canyon Mine impacts, were assessed at South Fork Sage Creek downstream to Crow Creek and Deer Creek downstream to Crow Creek at a timeframe of several hundred years post-mining (BLM and USFS 2007). Thus, the timing of impacts to surface waters from Panels F and G is well beyond the 2050 end-date modeled in the RI/FS. However, the current selenium concentrations in South Fork Sage Creek, Sage Creek, and Crow Creek downstream of Sage Creek are already above the Alternative D predictions in the Panels F and G EIS (BLM and USFS 2007). As discussed in **Section 4.5.2.3**, a reasonably foreseeable action implemented by Simplot at the Smoky Canyon Mine, but not associated with the Proposed Action or Alternative 1, is the continued operation of the WTPP to treat and reduce selenium in spring waters that discharge to the Sage Creek drainage. However, the Feasibility Study process is not complete and the WTPP may or may not be a chosen remedy under CERCLA.

5.4.5 Cumulative Disturbances

5.4.5.1 Groundwater

Existing groundwater pumping at the Smoky Canyon Mine would not change as a result of the Proposed Action or Alternative 1, other than extending the Project life and thus the duration of pumping, so there should be no cumulative effects on groundwater quantity withdrawn that could potentially affect the flow of springs in the CEA. 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 or Alternative 1. The store and release cover would reduce this effect because of the designed reduction in percolation through the cover.

The Panels F and G Project would not be cumulative to the East Smoky Panel Project for groundwater because it is not anticipated to impact Hoopes Spring or groundwater north of South Fork Sage Creek. The groundwater regimes for these two areas are different. Groundwater flow in the Wells Formation in the vicinity of Hoopes Spring is apparently flowing from west to east toward the West Sage Valley Branch Fault then from north to south along the fault zone to the spring (NewFields 2005). In the vicinity of Panel G, groundwater flow in the Wells Formation is to the east, discharging in Lower Deer Creek, Books Spring, and Crow Creek. In the vicinity of Panel F, groundwater flow in the Wells Formation is east to the West Sage Valley Branch Fault and then north to South Fork Sage Creek Spring. 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 (2005) at the Smoky Canyon Mine have indicated that there is a low elevation area in the Wells Formation water table at the mouth of South Fork Sage Creek Canyon. The East Smoky Panel Mine would not impact groundwater any further south than Hoopes Spring, as discussed in **Section 4.5** and as shown in **Figures 4.5-2**, **4.5-3**, **4.5-4**, and **4.5-5**. The geographic area (footprint) of the Wells Formation regional aquifer potentially affected by the East Smoky Panel Project, with regard to water quality, is cumulative to that already, and potentially, impacted by the Smoky Canyon Mine.

Groundwater in the vicinity of the industrial well and the now-abandoned culinary well is influenced by sources in Panel A. The groundwater gradient in the vicinity of the industrial well is heavily influenced by pumping. Leachate from the Pole Canyon ODA 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 East Smoky Panel Project would not impact groundwater quality at the culinary or industrial wells, and would not impact water quality at South Fork Sage Creek Spring. Groundwater beneath and to the south of the East Smoky Panel would be impacted, as described.

5.4.5.2 Surface Water

As described in **Section 3.5.2.1**, the NFS lands portion of the Tygee Creek HUC 6 watershed has approximately 8.6 percent of its area hydrologically disturbed, and the NFS lands portion of the Sage Creek HUC 6 has approximately 19.2 percent. As described in **Section 4.5.2.1**, the Proposed Action would add 3.2 and 1.1 percent, respectively. Cumulatively, the totals for each of these two areas would remain at less than the 30 percent hydrologically disturbed area recommended by the RFP (USFS 2003a). Further, once reclamation has been successfully completed, the amount of hydrologically disturbed mining areas would be greatly reduced over time.

The selenium concentrations in lower Sage Creek are due to contributions of selenium from Hoopes Spring and South Fork Sage Creek Spring, which have been impacted by previously described mine features. The 2007 RA implemented at the Smoky Canyon Mine to reduce the selenium discharges from the Pole Canyon cross valley fill was intended to have reductions in contaminant concentrations in Hoopes Spring and thus in lower Sage Creek (BLM and USFS 2007). Modeled estimates calculated that the RA was expected to result in a 75-percent reduction in load from Pole Canyon as the single source of selenium discharged from Hoopes Spring. The estimated time that it would take to see measurable effects at Hoopes Spring was roughly 10 years (or sooner) from the time the RA was implemented (Appendix 2A in BLM and USFS 2007). A second RA was completed at the Pole Canyon ODA in 2015. It involved construction of the cover and stormwater controls, with minor follow-up construction performed in 2016. Additional sources of selenium at Hoopes Spring include Panels D and E (Formation Environmental 2014).

Figure 5.4-2 shows total selenium concentrations at Hoopes Springs over time, as compiled by Simplot. While most of the time period depicted show selenium concentrations at Hoopes Springs as overall increasing, the more recent data show a leveling off (i.e., plateauing).

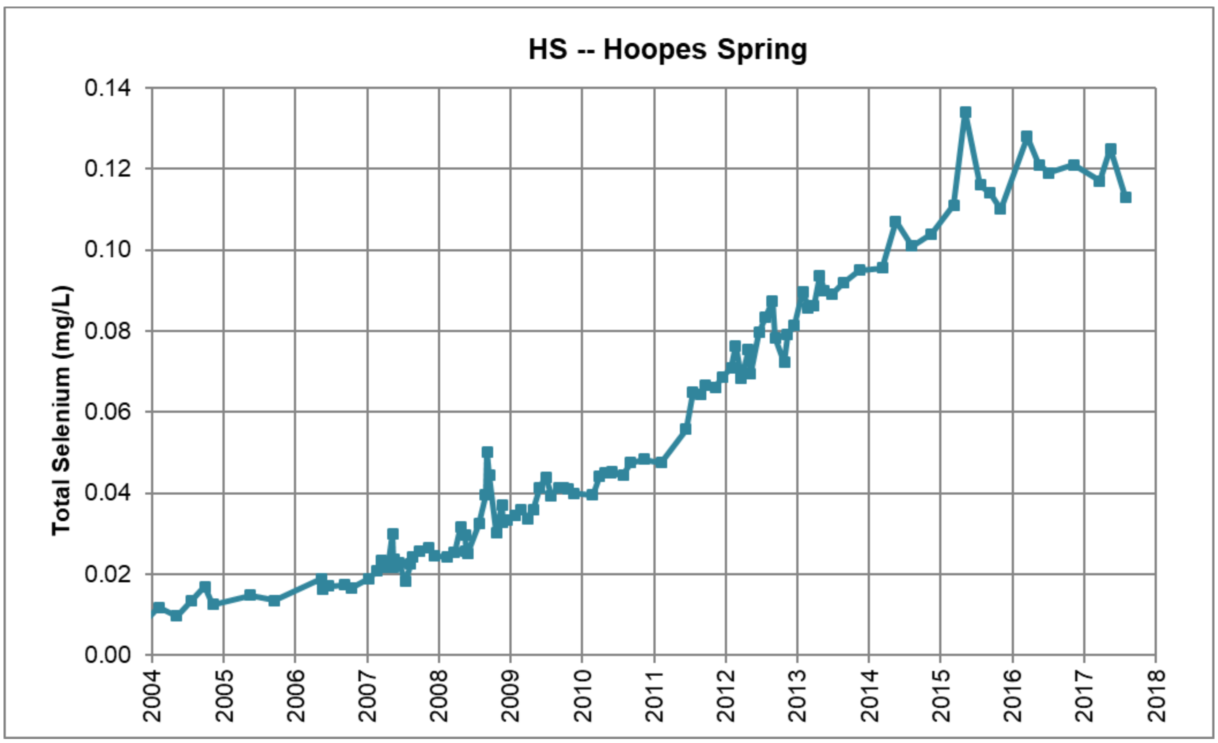


Figure 5.4-2 Selenium Concentrations at Hoopes Spring (HS)

Selenium impacts to surface waters were predicted to occur from Panels F and G development (BLM and USFS 2007), additive to impacts that were already occurring. The selenium concentrations from Panels F and G were expected to peak within a 50 to 100-year timeframe and then steadily decrease. The EIS considered that assumption to be conservative because the regulatory agencies and Simplot would be implementing programs over a much lesser period of time to remediate the current selenium loading to South Fork Sage Creek and lower Sage Creek. However, data collected for the RI/FS and for the East Smoky Panel Mine indicate that these estimated peaks were not realized, at least for streams that are already known to be impacted.

Specifically, the EIS (BLM and USFS 2007) predicted that selenium concentration at the mouth of South Fork Sage Creek would eventually reach a peak of 0.01 mg/L. Baseline data collected between 2014 and 2016 for the East Smoky Panel Mine at LSS in lower South Fork Sage Creek averaged 0.018 mg/L. The 2007 EIS predicted that selenium concentration at the mouth of Sage Creek would peak at 0.009 mg/L; baseline data collected for the East Smoky Panel Mine at that location (LSV-4) averaged 0.041 mg/L. Lastly, the 2007 EIS predicted that selenium concentration at Crow Creek downstream of Sage Creek (CC-1a) would peak at 0.006 to 0.007 mg/L; baseline data collected for the East Smoky Panel Mine in that location averaged 0.0173 mg/L.

The net effect on selenium concentrations in Sage Creek and its tributaries, including Hoopes Spring, would increase slightly due to the Proposed Action or Alternative 1. Within and downstream of Sage Creek within Crow Creek, selenium concentrations may continue to be greater than the applicable aquatic life criterion for selenium in the water column at CC-1A, regardless of the East Smoky Panel activities. The selenium concentration was predicted where Crow Creek reaches the Wyoming border, based upon the draft RI/FS report (Formation Environmental 2014). That report predicts a peak selenium concentration (not including any loading from the East Smoky Panel) during the low flow season at CC-WY-01 of about 0.02 mg/L in about 2015 dropping to about 0.005 mg/L by 2050.

5.4.6 Cumulative Effects

There would be no cumulative impacts to groundwater quantities under the Proposed Action or Alternative 1. However, under the Proposed Action or Alternative 1, there would be cumulative impacts to groundwater quality as the East Smoky Panel Project would result in the addition of various COPC concentrations to the already impacted groundwater resources in the CEA. As described in **Section 4.5**, adding overburden from either the Proposed Action or Alternative 1 to the Panel B backfill would not increase the selenium or cadmium concentration of seepage through the Panel B backfill, so additional groundwater impact analysis of this change to the Panel B backfill is not required. In contrast, manganese concentration predictions for either of the East Smoky Panel action alternatives are greater than the Panels B&C predictions, so there would be a cumulative manganese impact in this immediate area of the CEA.

While the Proposed Action and Alternative 1 modeled groundwater impacts do not show selenium exceeding the regulatory groundwater standard (0.05 mg/L) at any time during the 300-year model simulation time frame, those analyses did not consider the current mining impacted groundwater at the four modeled groundwater points. There is no means to assess current selenium concentrations at the theoretical OBS-1 and OBS-2 locations, but baseline data (Stantec 2017a) at GW-27 (one sample) showed a selenium concentration of 0.0109 mg/L; adding that to the predicted 0.003 mg/L peak impact at 100 years (under the Proposed Action, less under Alternative 1) results in a concentration that is still lower than the standard. At GW-IW, the eight baseline samples showed selenium concentrations ranging from 0.026 to 0.047 mg/L, with a mean of 0.032 mg/L. With no addition predicted from the East Smoky Panel under either alternative, there would be no cumulative impact at this well.

However, for manganese, the Proposed Action predicted groundwater concentrations were greater than the regulatory standard (0. 05 mg/L) at the end of the 300-year simulation at both of the model observation points and at GW-27, with a concentration of 0.101 mg/L at the latter. The current manganese concentration at GW-27 (based on one sample collected during the baseline monitoring program), is 0.004 mg/L. The addition of two orders of magnitude higher concentration would be a major cumulative impact at this well under the Proposed Action. There would be a reduced cumulative manganese impact at GW-27 under Alternative 1: the peak concentration would be at 300 years, at 0.042 mg/L. No manganese increase was predicted at GW-IW under the Proposed Action or Alternative 1, and that site had a mean manganese concentration of 0.002 mg/L during the baseline study.

For sulfate and TDS, the combined concentrations under the Proposed Action (or Alternative 1) and the current baseline conditions would still be well below the 250 mg/L and 500 mg/L groundwater standards, respectively, although existing TDS concentrations are in the 300 mg/L range.

In addition, surface water quality impacts at Hoopes Spring and downstream into Sage Creek and Crow Creek would be negligible from the addition of selenium from the Project. The selenium concentrations would be affected by contributions of selenium from past and existing Smoky Canyon Mine activities that are currently subject to CERCLA remediation, regardless of whether the No Action Alternative is chosen, or whether the Proposed Action or Action Alternative 1 is chosen. The intent of the CERCLA remediation activities is to protect human health and the environment and to comply with applicable or relevant and appropriate requirements (ARARs). The intent of the WTPP described under the No Action Alternative is also to reduce selenium concentrations in these downstream waters. Further, as described in the AMP (**Appendix 4B**), Simplot has committed to operating the WTPP regardless of CERCLA as needed to mitigate water quality impacts at Hoopes Spring. However, a CERCLA remedy, whether through the WTPP or another means, has not yet been selected by EPA.

5.5 SOILS

5.5.1 CEA Boundary

The CEA boundary for soils (**Figure 5.2-1**) is the same as described for surface water resources (**Section 5.4**). The boundary was developed with the IDT experts and professional judgement. The CEA encompasses 148,861 acres and is the same as for surface water due to the indirect effect that soil disturbance has on surface water quality from erosion and sedimentation.

5.5.2 Introduction

The CEA for soil resources includes private lands, state land, BLM land, portions of the CTNF in southeastern Idaho, and portions of the Bridger-Teton National Forest in southwest Wyoming. The USFS administers the largest amount of land within the CEA (71 percent) followed by private land (26 percent), with the state and BLM administering a few percent each of the total area.

Direct impacts to soil resources typically occur as a result of ground-disturbing activity. 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 OHV use can disturb soil resources, but the effects of these activities on soils are insignificant compared to the other four major land uses.

Potential impacts to soil resources include damage or removal of topsoil and subsoil profiles and structure, slope failure, and weathering processes and subsequent erosion. Although disturbed soil will develop new profiles over extended periods of time, cumulative impacts to soils can include the loss of productivity and increased risk due to slope failures.

5.5.3 Past and Present Disturbances

In addition to ongoing mining activities at the Smoky Canyon Mine, other past and present land uses (ground disturbances) in the CEA that affect soils include timber harvests, burned areas, agriculture (including private land development), livestock grazing, utility and pipeline corridors, and roads/trails.

According to CTNF data, approximately 27,000 acres of timber harvest has occurred on the CNF since 1964 (BLM and USFS 2007). Timber harvest activities expose the soil resources to erosional factors, as does equipment used to remove and haul timber, and the associated logging roads. Increased erosion of in-situ soil is a loss of that resource. The USFS conducted a 30-year erosion study on the CTNF by monitoring 25 erosion plots with collection tanks between 1982 and 2012 (USFS 2017b). Land subject to timber sales was monitored at two sites (one in a clear-cut unit and the other in a thinning unit). Average annual erosion rate at both sites was less than 0.2 tons/acre/year (much less than the soils' loss tolerance factor). The 2002-2003 CTNF Monitoring and Evaluation Report (USFS 2003e) analyzed some of that same data and indicated that audits of ten timber sale disturbances in the CTNF showed BMPs appeared to be effective in controlling soil erosion.

Controlled burning and unplanned seasonal wildfires increase the risk of soil erosion by removing the organic surface material from the soil and can permanently alter the physical characteristics of the top layers of the soil. Within the CEA, soil impacts from fire have varied by location, timing of the fire, soil and vegetation type, and post-fire environment (USFS 2003a), but are not expected to comprise more than a negligible percentage of the CEA lands.

Livestock grazing may affect soil by decreasing the vegetation cover, destroying the microbiotic crust, increasing compaction, and thereby increasing the surface erosion of soils. The long-term USFS CTNF erosion plots study (USFS 2017b) included 11 plots in active cattle allotments, 6 plots in active sheep allotments, and 2 plots on historic sheep driveways. When averaged over the two-decades, erosion rates were all below soil loss tolerances for the respective soil types. The 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.

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 at the Smoky Canyon Mine. Past, present, and/or permitted mining activity at the Smoky Canyon Mine has or eventually will disturb approximately 3,580 acres of soil resources in the CEA based upon past and current approvals. Current mining practice requires topsoil salvage and reapplication during reclamation. Reclamation, which stabilizes disturbed soils, is conducted concurrently with ongoing mining activities, such that when mining is completed in one area, reclamation begins while mining proceeds to another area.

<u>Selenium and Other Metals</u>

The concentration of selenium and other metals in surficial growth medium and vegetation at reclaimed mining sites can be influenced by the mining operations and the type of reclamation treatment methods. Previously, reclamation techniques at phosphate mines inadvertently resulted in elevated concentrations of selenium and other COPCs.

The RI/FS (Formation Environmental 2014) reported on soil and overburden sampling at several reclaimed ODAs at the Smoky Canyon Mine, which reflected various types of previous reclamation activities and materials, including ROM (including non-seleniferous chert and seleniferous center waste shale), topsoil, or other geologic materials used as cover growth media. COPCs were detected at concentrations exceeding both the human health and ecological screening-level benchmarks in one or more surface soil samples, to include antimony, arsenic, cadmium, cobalt, manganese, molybdenum, nickel, selenium; and vanadium. Concentrations of aluminum, iron, thallium, and uranium exceeded only human health screening-level benchmarks in one or more surface soil samples. Concentrations of barium, chromium, copper, lead, silver, and zinc exceeded only ecological screening-level benchmarks in one or more surface soil samples. Beryllium and boron were not detected at concentrations that exceeded either the human health or ecological screening-level benchmarks in surface soil samples. Selenium generally had the widest distribution of elevated concentrations, and at times greatly exceeding the screening-level benchmarks. Selenium concentrations at these ODA surfaces in part reflects particular reclamation practices, which have evolved in order to reduce the impact (Formation Environmental 2014). Reclamation cover improvements have focused on thicker covers and/or reduced infiltration of precipitation and have been designed using results from recent and ongoing lysimeter data that suggests covers with no bentonite enhancement or plastic are proving less effective than previously thought. Further, as described in the AMP (**Appendix 4B**), Simplot has committed to construct final reclamation covers in accordance with agency-approved mining and reclamation plans.

5.5.4 Foreseeable Future Disturbances

The reasonably foreseeable developments in the CEA include exploration drilling at Freeman Ridge/Husky 2 (168 acres proposed, although this is currently on hold), plus ongoing livestock grazing and limited recreational use. Additional mining-related disturbances could occur within the CEA depending upon the actual locations of disturbance from proposed mining activities at the future Husky/North Dry Ridge Mine and exploration activities at the Freeman Ridge/Husky 2 and Dry Ridge sites. Also, the Lower Valley Energy Crow Creek Natural Gas Pipeline Project, if approved, would occur within portions of the CEA and during construction would impact soil resources within the trench that would be excavated to bury the pipeline.

5.5.5 Cumulative Disturbances

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

With implementation of the Proposed Action, an additional approximately 12 acres of highwall and stormwater features would not be reclaimed (or 9 acres for Alternative 1). In addition, under the Proposed Action, Panel B would be reclaimed using a store and release cover over all seleniferous overburden; under Alternative 1, the currently approved technique would still apply for the Panel B pit. In accordance with the RFP (USFS 2003a), less than 15 percent of soils in the activity area would be detrimentally disturbed. Compliance with the RFP suggests the effects of the 12 or 9 acres of unreclaimed disturbance would have little effect on soil loss due to erosion.

5.5.6 Cumulative Effects

The most extensive impacts to soils in the CEA would result from mining, agricultural, wildfires, and timber harvesting activities. Because the success of mine reclamation largely depends on reuse of stockpiled or live-handled topsoil, and because all mines are required to implement a SWPPP, impacts to soils beyond initial disturbance and relocation (e.g., soil loss through erosion) are minimized. The success of the agricultural industry is also inherently dependent on maintaining soil quantity and quality, and soil management practices are widely implemented during these activities. Forest management activities on the CTNF include timber sales, livestock grazing, and recreation. Extensive portions of the soil resource CEA are located on lands administered by the CTNF. Activities in these areas are subject to management goals and standards provided in the CNF RFP (USFS 2003b).

BMPs and EPMs would be designed and/or implemented to contain sediment derived from mining disturbance. Because soil loss would be controlled by installation of water retention ponds, runoff control ditches, and implementation of other BMPs and/or EPMs, soil erosion as a result of the Proposed Action or Alternative 1 is expected to be minimal.

Agricultural, recreation, forestry, and land development activities would continue to contribute to soil loss within the CEA. Similarly, increased regulatory control on soil erosion, verified by reclamation monitoring, is expected to minimize impacts to soil productivity and erosion within the CEA. The short- and long-term contributions of the Proposed Action or Alternative 1 to cumulative effects on soil resources are expected to be minor in the CEA.

5.6 VEGETATION

5.6.1 CEA Boundary

The CEA boundary for vegetation (**Figure 5.2-1**) is the same as described for surface water resources (**Section 5.4**) and soils resources (**Section 5.5**). The boundary was developed with the IDT experts and professional judgement. The CEA totals 148,861 acres. The CEA for vegetation was determined to be the same as that for soils because the disturbance of vegetation would result in the disturbance of the soil resources in the same area. Vegetation effects from the Proposed Action and Alternative 1 would not be noticeable beyond this area.

5.6.2 Introduction

Table 5.4-1 provides land ownership breakdown within the CEA. Disturbance of vegetation in the CEA occurs primarily through activities related to mining, agriculture, timber harvests, grazing, wildfires, prescribed burns, and OHV use (BLM and USFS 2007). **Table 5.6-1** indicates the major vegetation types and the amount of acreage each vegetation type encompasses within the CEA according to USFS GIS mapping and both the Idaho and Wyoming GAP maps. The reasonably foreseeable developments in the CEA are the same as those described in **Section 5.4**.

Table 5.6-1 Vegetation Cover Types Within the Vegetation CEA

MAJOR VEGETATION TYPES	AREA (ACRES)	PERCENT OF CEA
Aspen	16,174	11
Aspen Conifer	7,663	5
Conifer	47,126	32
Sagebrush/Shrub	57,763	39
Grassland	13,235	9
Riparian	6,901	4
Total	148,861	100

5.6.3 Past and Present Disturbances

In addition to ongoing mining and exploration activities at the Smoky Canyon Mine and existing roads and trails, 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. Many of the timber harvest treatments in the past have been regeneration prescriptions which result in even-aged younger stands. However, structural diversity at the landscape scale is still outside the desired conditions outlined in the RFP (USFS 2003a), because the area is still dominated by mature and late seral forests.

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 5.9**.

Noxious weeds associated with 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 over a small percentage of the CEA, based upon an analysis for the Panels F and G EIS (BLM and USFS 2007) and assuming small increases in disturbances since then.

5.6.4 Foreseeable Future Disturbances

The reasonably foreseeable developments within the CEA that could affect vegetation include ongoing development of the Smoky Canyon Mine. No foreseeable future timber sales or prescribed burns are proposed or planned within the vegetation CEA in the current CTNF 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.

Ongoing impacts related to vegetation containing selenium at the Smoky Canyon Mine would be expected to continue until remedial action measures are completed. Newer mining and reclamation facilities and operations have incorporated BMPs and cover designs that limit potential for selenium uptake by vegetation, unlike older mine features that were constructed without consideration for the potential of selenium release (IDEQ 2006).

Also, the Lower Valley Energy Crow Creek Natural Gas Pipeline Project, if approved, would occur within portions of the CEA and during construction would impact vegetation resources within the construction corridor. Within the CEA, the pipeline corridor disturbance, as proposed, would largely occur adjacent to existing roads and affect sagebrush vegetation types.

5.6.5 Cumulative Disturbances

The potential new surface disturbance from the Proposed Action (approximately 850 acres) or Alternative 1 (approximately 770 acres), added to past and present known disturbances, likely results in 10 percent or less of the CEA vegetation being disturbed. The majority of disturbances results in the replacement of the natural vegetation condition with mainly grasses and forbs for mining areas, and crops and/or managed pasture for agricultural areas. Roads and trails permanently replace native vegetation with either pavement, gravel, or an exposed earth surface. The rest of the cumulative disturbances are mainly temporary disturbance, except for areas left unreclaimed. An additional amount of unquantified disturbance to vegetation occurs in the CEA as a result of livestock grazing and other 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 approximately 850/770 acres associated with the Project, would affect approximately 4,200 acres of the CEA based upon figures obtained for the Panels F and G EIS (BLM and USFS 2007). Revegetation and reclamation would stabilize this area with vegetation; however, vegetation composition, structure, and community type would likely be different.

There are no predicted impacts to TEPC or sensitive plant species from the Project and none were documented during baseline studies, so there should be no cumulative impacts to those categories of plant species.

Adding the proposed increase in additional new surface disturbance within the CEA from implementing the Project (850/770 acres) would increase the cumulative effect of disturbed acres susceptible to noxious weed invasion. However, improved prevention measures and control/treatment requirements would limit this overall cumulative effect within the CEA.

In terms of potential bioaccumulation of selenium in vegetation growing on future reclaimed areas associated with the Project, as stated in **Section 5.5**, the Proposed Action or Alternative 1 would not incorporate harmful amounts of selenium or trace metals due to the incorporation of BMPs into the M&RP. The RI/FS for the Smoky Canyon Mine (Formation Environmental 2014) assessed COPCs (as reflected by selenium) in numerous vegetation types sampled from various of the ODAs, ODA seep areas, riparian areas, Hoopes Spring vicinity, and the Sage Valley area. Samples were collected in 2004 and 2010. The assessment found that plant uptake of selenium occurs on ODAs where revegetation has been directly into the ODA or where less protective covers were placed, and where overburden seeps saturate nearby soils. Where a more protective cover system was used (e.g., Panel E's Dinwoody cover) selenium concentrations in vegetation are typically lower. 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/Alternative 1 or future mining of phosphate and no cumulative impacts are expected to vegetation in the CEA from this potential impact.

5.6.6 Cumulative Effects

Disturbance from either the Proposed Action or Alternative 1 would include many temporary disturbances and would be short-term and minor. Over the long term, there would be only minor contributions to cumulative effects. Reclamation after mining would replace existing vegetation with grassland and forbs, which would then be subject to the process of succession. Unreclaimed areas (pit walls and stormwater features) and removal of aspen forest (which is not expected to regenerate in reclaimed areas), totaling approximately 520 acres for the Proposed Action and approximately 440 acres for Alternative 1, would be a long-term, negligible cumulative impact affecting approximately 44 percent of the aspen in the CEA for the Proposed Action and 38 percent of the aspen in the CEA for Alternative 1. The overall vegetation cumulative effects with the addition of the Proposed Action or Alternative 1 would be long-term and minor. Disturbed lands would be more susceptible to weed infestations, but control measures would be implemented.

Although there are areas of historical reclamation with elevated selenium and other COPCs in the CEA, it is not expected that either the Proposed Action or the Alternative 1 would add to these areas or any impacts from vegetation with elevated COPCs. The thickness of the reclamation cover over ODAs for the Proposed Action would limit the amount of root mass that could or would be in contact with Meade Peak overburden, thus preventing the accumulation of selenium over the 5 mg/kg action level in vegetation, and low seleniferous materials would be generated under Alternative 1 where only a topsoil cover is proposed. The seed mixes used for reclamation were designed to avoid plants with tap roots that could contact the Meade Peak overburden. Thus, reclamation vegetation is not anticipated to accumulate COPCs; therefore, although there would be additional acreage of disturbed vegetation, it would not exacerbate any current issues with selenium in vegetation in the CEA. Future mines would likely incorporate closure practices and BMPs that would minimize selenium uptake as well. Additionally, as historical mine reclamation is remediated through the CERCLA process, the area of the overall acreage of reclamation vegetation with elevated COPCs may decrease.

There are no predicted wetland impacts from the East Smoky Panel Mine Project, thus there are no potential cumulative wetland impacts.

5.7 WILDLIFE

5.7.1 CEA Boundary

The CEA boundary for wildlife includes species habitat within a 15-mile buffer around the Project Area disturbance boundary (**Figure 5.7-1**). The boundary was developed with the IDT experts and professional judgement. It encompasses 452,993 acres.

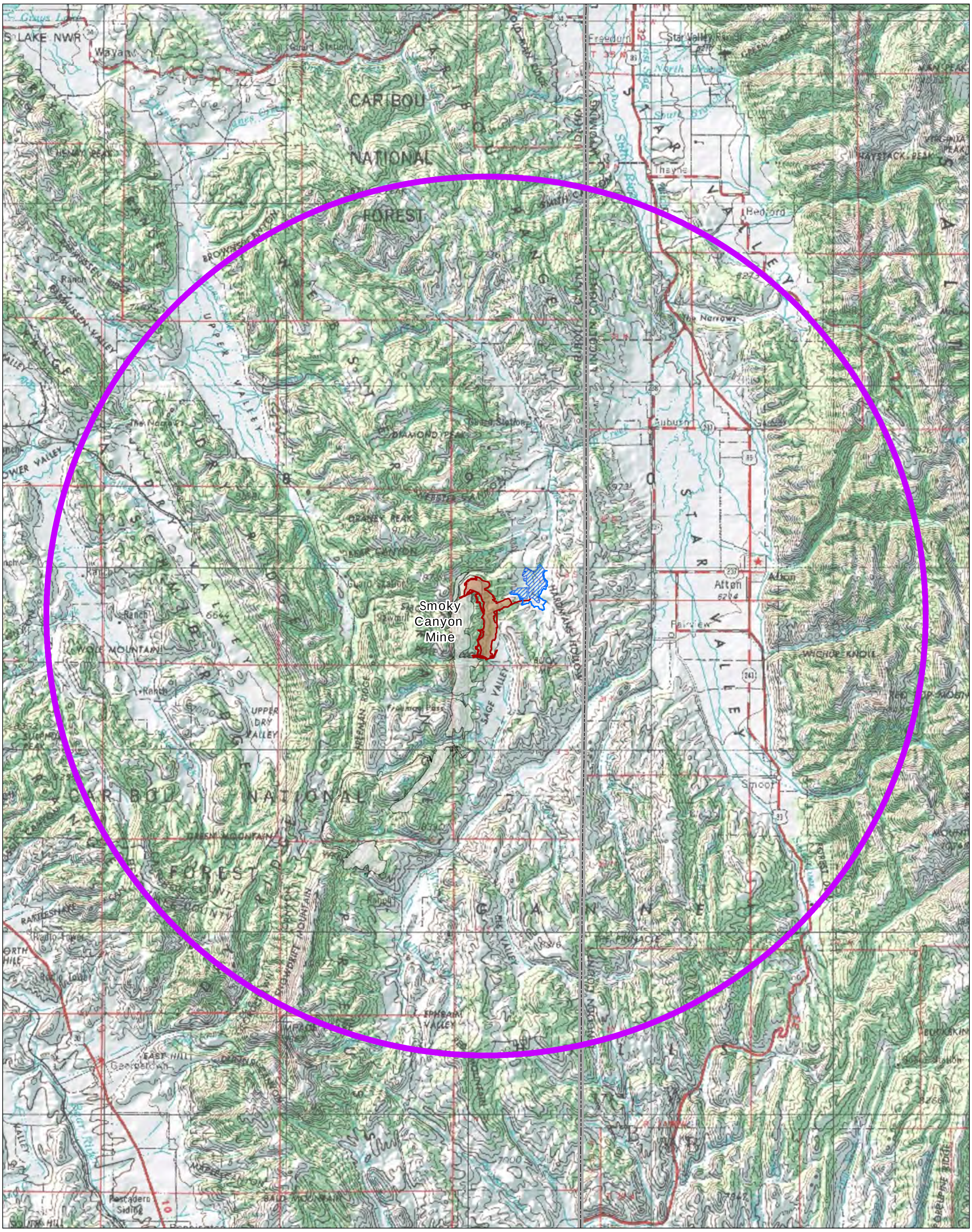
Most impacts to wildlife would occur within or immediately adjacent to the Project Area. Impacts would mostly be limited to temporary (during the life of the Project) displacement. Some individuals may be killed or permanently displaced; however, there should be no significant impacts to wildlife populations on a whole. The Project Area does not provide unique habitats that are not widely available adjacent to the Project Area, thus minimizing potential impacts related to displacement. How far any wildlife individuals would displace, and the impacts of displacement on resident populations is unknown; however, given the scale of the Project and being immediately adjacent to existing mining activities, it is unlikely that any short- or long-term, adverse impacts to wildlife species would occur within or beyond the identified CEA.

5.7.2 Introduction

GAP landcover data were used to quantify habitat types in the CEA, as this data source focuses on habitat identification, it provides habitat categories similar to those delineated in site-specific baseline studies (Stantec 2016e), and covers the entire 15-mile radius CEA. According to GAP and CTNF data, coniferous forest and sagebrush/shrubland are the dominant vegetation types within the CEA (**Table 5.7-1**) and NFS lands make up about 2/3 of the area (**Table 5.7-2**). Riparian areas, aspen forest, grasslands, 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.

Table 5.7-1 Habitat Types in the Wildlife CEA

COVER TYPE	ACRES	PERCENTAGE OF CEA
Sagebrush Shrubland	138,525	30.6
Coniferous Forest	157,491	34.8
Aspen Forest	58,003	12.8
Wetland/Riparian	55,649	12.3
Cropland	1,688	0.4
Grassland	14,988	3.3
Open Water	497	0.1
Other Shrubland	4,294	0.9
Developed	3,452	0.8
Harvested Forest	1,873	0.4
Pasture	14,775	3.3
Quarries, Mines, Gravel Pits	1,540	0.3
Introduced Grassland	11	<0.1
Unclassified	207	<0.1
Total	452,993	100



Legend

- Cumulative Effects Area for Wildlife, including Special Status Species
- Proposed East Smoky Panel Disturbance
- Existing Mine Disturbance Boundary
- Tailings Pond (TP)

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

0 2 4
Miles
1:220,000 (at original document size of 11x17)

N

Figure 5.7-1
Cumulative Effects Area for Wildlife, including Special Status Species
East Smoky Panel Mine EIS

Table 5.7-2 Land Ownership in the Wildlife CEA

LAND OWNERSHIP	ACRES	PERCENTAGE OF CEA
USFS	300,836	66
BLM	10,562	2
Private	134,429	30
State* (includes 1,623 acres of ID Fish & Game)	7,166	2
TOTAL CEA	452,993	100

5.7.3 Past and Present Disturbances

The foremost impact to wildlife within the area has been habitat changes associated with past and present mining activities, grazing, timber harvest, roads/trails, agriculture, and residential development, but these changes occur on a relatively small percentage of the CEA that provides wildlife habitat. Past and present actions in the wildlife CEA have likely resulted in both beneficial and negative impacts, at various levels, on wildlife.

Beneficial impacts related to timber harvesting 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 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 CTNF is conducted in compliance with standards and guidelines contained in the CNF RFP (USFS 2003a). Other impacts that are not quantified have included noise disturbance/displacement from mining, roads, and recreational activities.

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 and wildlife that prefer more open areas to use these areas following the timber harvests.

The general effects of grazing in the CTNF 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.

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 existing roads and mining activities have resulted in fragmentation of certain, less mobile wildlife populations and their habitats. Fragmentation effects within the CEA have not been quantified by the land management agencies.

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 one was observed in 2013 around the Smoky Canyon Mine 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 and the ponds do provide habitat suitable for bald eagles; however, the tailings ponds do not support suitable fish populations or open water habitat during the winter. Further, the tailings ponds are managed by Simplot as to not attract wildlife by reducing shoreline vegetation and habitat (Newfields 2005, revised 2014).

Within the CEA, quantified past and present disturbances based on the information from **Table 5.7-1** have resulted from agriculture (cropland and pasture; approximately 16,500 acres); roads, buildings, and other development (approximately 3,500 acres); timber harvests (approximately 1,900 acres); and quarries, mines, gravel pits, and oil wells (approximately 1,500 acres). According to BLM (2017), mining activity in the CEA indicates that even more acres have been disturbed by mining (primarily from historical phosphate mining activity) but, much of this area has been reclaimed and supports grassland and shrubland wildlife habitat.

Wildfires; grazed range allotments; residential and commercial development; vegetation management activities on private lands; roads; power lines; and recreational uses such as hunting, fishing, OHV and snowmobile use, camping, and picnicking are all past and present activities in the CEA that may affect wildlife and their habitat.

5.7.4 Foreseeable Future Disturbances

As previously described in **Sections 5.1** through **5.6** within the applicable CEAs, the largest disturbance from reasonably foreseeable actions within the CEA would likely result from future mining activities. Thirty-five percent (135,000 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 and within residential areas within the CEA. Impacts on private lands in the CEA are difficult to quantify due to lack of specific data. Although disturbance of wildlife habitat on private land cannot be quantified with existing data, it would be an amount less than the private land ownership area as there are large parcels of private land within the CEA that are left undisturbed and continue to provide suitable wildlife habitat.

BLM phosphate mining regulations at 43 CFR § 3591.1 direct operators to take measures to "avoid, minimize or repair" damage to vegetation, fish, and wildlife habitat. The EPMs described in **Section 2.5** and mine reclamation would reduce or avoid impacts to wildlife and wildlife habitat from mining activities. Implementation of these mitigation measures would also tend to meet established requirements such as those contained in the federal land use plans, the Idaho Surface Mining Act, and contractual provisions in the individual federal phosphate leases.

The residual debits in wildlife habitat services as shown in **Table 5.7-3** would represent a long-term adverse cumulative impact of the Action Alternatives on wildlife, and also on vegetation as measured by plant species metrics.

Table 5.7-3 DSAYs Table

ALTERNATIVE	CURRENT BASELINE	EFFECT OF MINING	EFFECT OF RECLAMATION	RESIDUAL IMPACT
Proposed Action	62,043	-62,043	+28,491	-33,551
Alternative 1	53,527	-53,527	+25,464	-28,068

5.7.5 Cumulative Disturbances

The reasonably foreseeable disturbances due to phosphate mining (approximately 6,350 acres), when added to the past and present disturbances, would increase the disturbance of USFS lands in the CEA to about five percent. When the potential new disturbance of either the Proposed Action/Alternative 1 is added to that total, there would be a negligible increase.

Cumulative impacts to wildlife, over essentially the same CEA, were evaluated in previous NEPA documents for the Smoky Canyon Mine, most recently including the Panels F and G EISs (BLM and USFS 2007; 2014). Those evaluations noted similar types of wildlife impacts as described **Section 4.8**.

The majority of the impacted habitat acreage has been reclaimed and revegetated using conventional practices of the time. Reclamation has stabilized most sites to prevent sediment loading to surface water. Much of the vegetation associated with the mine sites reclaimed prior to the year 2000 have been found to contain elevated levels of selenium that can pose a risk to wildlife in some cases. The majority of those reclaimed sites are under CERCLA investigation that may indicate a need for additional remedial work. The cumulative effects area for wildlife is also being assessed for possible natural resource damages to wildlife and their habitat. There are no formal conclusions regarding damages at this point in the process.

Implementing the Project could result in additional fragmentation to wildlife and habitat beyond that previously described (BLM and USFS 2007; 2014); although because the Project would occur essentially immediately adjacent to active and existing mining operations, the cumulative effects to wildlife from fragmentation impacts should be minimal.

Disturbance associated with activities in the CEA may limit the attractiveness of the CEA to Canada lynx, wolverine, and gray wolves, which generally prefer extensive tracts of undeveloped land. Impacts to mature forest and the disturbances associated with the Proposed Action or Alternative 1 would further decrease potential linkage habitat for Canada lynx, but this would result in a minor cumulative effect when added to the other past, present, and reasonable foreseeable actions in the CEA because the Project would occur immediately adjacent to active and existing mining operations that are already likely displacing lynx from the area. Further, since disturbance associated with the Proposed Action and Alternative 1, 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.

5.7.6 Cumulative Effects

The cumulative activities within the CEA may have a wide array of effects on wildlife. Some types of activities such as timber harvest, vegetation treatments, and fires, may be beneficial for wildlife species that utilize forest openings or early seral stages. The majority of habitat conversion from timber harvest is in the form of forest removal followed by reforestation with a short period of early seral (non-climax grass or shrub) conditions. This habitat conversion would cause forest-dependent wildlife using the affected areas to disperse in search of new areas. In contrast, most wildfires in the CEA have affected the scrub/shrub (largely sagebrush) vegetation type. The flush of new vegetation growth following a fire may provide a beneficial food source for wildlife such as big game. Once active mining had ceased under the Proposed Action or Alternative 1, the newly reclaimed area may likewise benefit some wildlife species through new growth of a variety of native forbs and grasses that could provide forage for a number of species, but at a detriment to other species because of lost forest habitat and further fragmentation.

It is anticipated that the reclamation activities to be performed under the Action Alternatives would not result in uptake of selenium in vegetation that would pose concern to wildlife. This would generally be true at other ongoing and future phosphate mining sites in the CEA. There would be a loss of habitat over the next thirty to fifty years while mining and reclamation at the Smoky Canyon Mine and other phosphate mines is undertaken. Over the long term, reclamation would occur at the mine sites. Wildlife habitat would be converted from areas having great diversity of wildlife habitat, to reclaimed sites with less diversity and productivity that consist primarily of grasses with some forbs. These residual impacts would occur over approximately 850 acres at the Smoky Canyon Mine site and over approximately 5,500 acres within the CEA and would add to the existing approximately 14,000 acres of cumulative impacts.

Negative impacts to wildlife within the CEA include loss of habitat; displacement; and fragmentation as a result of fires, mining, timber harvesting, roads, private land development, agriculture, and recreation. Other impacts that are not quantified include the effects of noise on wildlife, habitat fragmentation, and displacement from mining, roads, and recreational activities. Additionally, small, less mobile wildlife (such as small mammals and reptiles that cannot relocate outside of disturbance areas) are subject to direct mortality and localized population reductions from ground-disturbing activities.

In general, displacement of larger, more mobile wildlife from habitat disturbance decreases survival rates of affected individuals to some degree and increases competition. Mine construction and operation could temporarily cause some wildlife, such as big game, carnivores, and raptors (which generally prefer areas free from anthropogenic noise and activity), to avoid the portion of the CEA close to mining. Implementing the Proposed Action or Alternative 1 would result in the displacement of mobile wildlife from the Study Area and the surrounding habitat into adjacent undisturbed areas, where competition in already-occupied habitats may increase.

Past and present disturbances from roads and mining activities have resulted in fragmentation of certain wildlife populations and their habitats. While larger, more mobile species may be able to traverse or route around mines, small, relatively immobile animals (such as reptiles and small mammals) may be subject to isolation as formerly contiguous habitats are disturbed by features such as roads and mines. Implementing the Proposed Action or Alternative 1 would result in additional fragmentation to wildlife habitat and could isolate populations of small, immobile wildlife.

Wildlife may be subject to direct mortality from a variety of sources, but these effects are not quantifiable. The Proposed Action and Alternative 1 would continue to contribute to cumulative effects of power lines in the CEA because it includes relocation of two existing overhead power lines that would continue to pose a mortality risk to birds and provide a potential perching substrate for avian predators.

Many game species are hunted within the CEA. Human presence in the form of recreation may disturb many species of wildlife. Human disturbance during periods of the year when wildlife are otherwise stressed (such as during the winter) can further stress wildlife and affect their survivorship. Wintering big game may be subject to harassment by recreationists, particularly if available hiding and escape cover is reduced by other activities. The Project would cumulatively contribute to displacement and stress on wintering big game. Under the Proposed Action, there would be 130 acres of winter range impacted.

Wildlife are affected by livestock grazing as a result of competition for forage and alteration of plant communities. As described in the Canada Lynx Conservation Assessment Strategy (Ruediger et al. 2000), both domestic livestock and wildlife ungulate grazing may change the structure or composition of native plant communities. Proper rotation and stocking rates can minimize these effects. Livestock grazing on the CNF is conducted in compliance with standards and guidelines contained in the CNF RFP (USFS 2003b). Neither alternative would change native rangeland plant communities over the long term because more than 95 percent of the disturbance would be reclaimed within native grass, forb, and shrub species. Once reclaimed, each alternative would allow for grazing similar to baseline conditions.

Of the two alternatives, the Proposed Action would have greater overall cumulative effects on wildlife because it would result in a greater residual debit in wildlife habitat services, based on the HEA residual debit of 33,551 DSAYs under the Proposed Action versus 28,063 under Alternative 1).

Elsewhere in the CEA, Simplot has discussed a 440-acre voluntary land-donation to BLM as part of its Dairy Syncline Mine (approximately 2,800 acres in size) application. The parcel is in the Stump Creek area east of Star Valley, Wyoming and adjacent to a BLM Area of Critical Environmental Concern (primarily big game winter habitat and sage grouse habitat). The parcel is in an area where some residential homes may be constructed in the future with an associated impact to wildlife habitat if the land is ultimately developed. A donation of this land to BLM in conjunction with an approval of the Dairy Syncline Mine would reduce cumulative impacts to wildlife habitat an unknown amount in the CEA.

Similar types of residual impacts to wildlife habitat would occur from the 1,530-acre proposed Caldwell Canyon Mine located 13 miles west of the Project. BLM processing of the application is not complete.

5.8 FISHERIES AND AQUATICS

5.8.1 CEA Boundary

The CEA boundary for fisheries and aquatics (**Figure 5.2-1**) is the same as described for surface water and encompasses 148,856 acres. The boundary was developed with the IDT experts and professional judgement. The CEA 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. The CEA encompasses 148,861 acres. This is the same boundary as was used for the Smoky Canyon Mine Panels F & G EIS (BLM and USFS 2007), but with a slight refinement in the acreage determination. This boundary 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.

5.8.2 Introduction

Potential effects to aquatic habitat from mining in the CEA include temporary reductions of runoff contribution to local streams, increased sedimentation from surface disturbing activities, and the introduction of higher levels of selenium into streams by surface and subsurface flow of water. These potential water quantity and quality impacts to the surface waters in the CEA have been previously described in **Section 5.4**.

5.8.3 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, reporting a two-decade erosion plot study as described in **Section 5.5.3**, indicate that erosion rates are below soil loss tolerances for the respective soil types.

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 (BLM and USFS 2007). 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 **5.4.3.2**, approximately 730 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, as reported in **Section 5.5.3**, a 30-year erosion study on the CTNF included land subject to timber sales at two sites. The average annual erosion rate at both sites was less than 0.2 tons/acre/year. While no pre-harvest data was collected at either site, the USFS determined that the 20- and 26-year data collection periods document a return to baseline at both sites. 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.

As noted in **Section 5.4.3.2**, numerous stream segments within the CEA are listed as impaired. Some of those impairments (i.e., sedimentation/siltation, combined biota/habitat bioassessments, selenium) are related to aquatic habitat or could otherwise affect aquatic life. Some of these impairments are caused or exacerbated by water diversions associated with agriculture and mining. Streams that have been impacted by selenium associated with past and current mining in the vicinity of the existing Smoky Canyon Mine include Pole Canyon, Hoopes Spring, South Fork Sage Creek, Sage Creek, and Crow Creek, as described in **Section 3.9.5** and **Section 4.9**. The selenium levels in these streams are described for water in **Section 3.5.2.3** and for periphyton, macroinvertebrate tissue, and fish tissue in **Section 3.9.5**, and the data is not repeated here.

5.8.4 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, private residences, wildfires, and prescribed burns. There are no known timber sales proposed within the fisheries CEA within the reasonable foreseeable future. Agricultural water diversions would continue at existing levels in the foreseeable future.

Selenium contamination from the Smoky Canyon Mine is being addressed through the CERCLA process between Simplot and the USFS, EPA, and IDEQ. Selenium inputs in the foreseeable future are expected to reflect: continued recent improvements due to the Pole Canyon remedial action, dissipating loading from existing mine features, future loads from Panels F & G mining; improvements due to the Hoopes Spring WTPP, and slight increases at Hoopes Spring due to the Proposed Action or Alternative 1. These future activities are discussed in **Sections 4.5.2.1** and **5.4.1.2** (Pole Canyon remedial action, dissipating loading from existing mine features, and Hoopes Spring WTPP), **Section 5.4.1.2** (future loads from Panels F & G mining), and **Section 4.9** (Proposed Action).

5.8.5 Cumulative Disturbances

The past, present, and reasonably foreseeable actions described have the potential for cumulative effects due primarily to the introduction of sediment to aquatic habitat, streamflow alterations, and selenium related water quality changes. The Proposed Action or Alternative 1 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. Other actions in the CEA such as grazing, roads, wildfires, etc. are expected to continue at levels similar to, or slightly below (e.g. grazing and timber harvest) present levels. As a result, sediment levels within the CEA are expected to remain similar to or slightly better than those described in **Section 3.9.2**. Water diversions associated with agriculture would remain the same as past and present levels; however, mining related water diversions would increase due to the Proposed Action, which would decrease streamflow in the Tygee Creek and Roberts Creek drainages. These would be as described for the Proposed Action in **Section 3.9.2**.

The primary effects of the Proposed Action or Alternative 1 on surface water and, subsequently, the fisheries and aquatic resources in the CEA with regard to selenium would be eventual contributions to the surface water system at Hoopes Springs due to the mining and backfilling associated with the Project. The store and release cover used in the Proposed Action would reduce percolation of recharge water through the seleniferous overburden fills but would still introduce COPCs into the Wells Formation aquifer beneath these areas. Under Alternative 1, which includes a smaller pit with improved geochemical characteristics, a more permeable cover would be used. As a result, selenium contributions to Hoopes Spring, Sage Creek, and Crow Creek would be similar between alternatives. Future selenium contributions from the existing Smoky Canyon Mine are unknown but are likely to be lower than present concentrations as loading from existing mining is expected to be near peak and decreasing by 2050 (**Section 4.5.2.1**). In addition, the WTPP at Hoopes Spring is expected to decrease selenium levels by an unknown amount. However, some of these decreases could be offset by increases from Panels F & G mining (**Section 5.4.1.2**).

It should be noted, that due to the dynamics of selenium bioaccumulation, selenium levels in detritus and sediment can remain at high levels after inputs of dissolved selenium have stopped (Lemly 1997). A variety of habitats are present within the CEA, including seepage or floodplain wetlands, and other impoundments or off-channel backwater areas, where selenium can accumulate in the top layer of sediment and detritus through deposition of biologically incorporated selenium and settling of particulate matter (see Appendix 3C of the Panels F & G EIS [BLM and USFS 2007]). This top layer is a temporary repository for selenium until the selenium is cycled back into the biota. 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 and may be a continued source of low levels of selenium.

5.8.6 Cumulative Effects

The cumulative effects from sediment related effects and streamflow alterations would be the same as described for the Proposed Action and Alternative 1. Past and present actions in the CEA are adequately accounted for by the current conditions described in **Section 3.9**, and future levels of other actions are not expected to result in measurable changes to the baseline conditions.

Cumulative effects from all mining related selenium contaminations are difficult to determine for the same reasons as those listed in **Section 4.9.2**; uncertainty regarding effects that may be occurring under the current conditions, and uncertainly about future concentrations associated with existing mining activities. It is also uncertain what fish tissue concentrations will be in the future due to the complexities of bioaccumulation, as explained in **Section 5.8.5**. Acknowledging these uncertainties, a couple cumulative impact scenarios could occur. If selenium levels do not decrease as predicted (i.e., existing inputs from mining do not decrease as predicted or increases from Panels F and G are more than predicted), then the Proposed Action and Alternative 1 would contribute to the existing major impact. If selenium levels do decrease as predicted (due to the reasonably foreseeable actions described above), then the predicted increases from the Proposed Action and Alternative 1 would be added to smaller than existing concentrations, and cumulative effects would not be greater than the effects described in **Section 4.9.2**.

5.9 LAND USE INCLUDING GRAZING, TRANSPORTATION, AND RECREATION

5.9.1 CEA Boundary

The CEA boundary for grazing management and range resources is the Pole Draney Allotment because all Project disturbances would be confined to this 12,071-acre allotment (**Figure 5.9-1**). The boundary was developed with the IDT experts and professional judgement. Although small portions of the Sage Valley and Salt Lick Creek allotments occur within the half- mile-buffer Study Area (**Section 3.10.1.3**), they would not be impacted by the Proposed Action (**Section 4.10.2.5**) and are therefore not included in the CEA.

The CEA boundary for recreation and other non-grazing land uses is shown in **Figure 5.9-2** and includes 135,470 acres.

The CEA boundary for transportation includes existing transportation routes into the Smoky Canyon Mine via Highway 89 and 237 in Wyoming (including Crow Creek Road and Wells Canyon Road) and Highway 30 in Idaho (including Georgetown Canyon Road, Diamond Creek Road, then Smoky Canyon Mine Road). Transportation should not be significantly affected beyond this area; travel and transportation outside of the identified CEA would not likely be impacted by the Proposed Action or Alternatives.

5.9.2 Introduction

5.9.2.1 Grazing

Cumulative effects to grazing in the CEA occur primarily from mining. Recreation can also affect grazing but to a negligible extent compared to mining activities. Restrictions have been placed in the past on grazing permit holders in the CTNF as a result of mining on the affected allotments. In general, grazing is not allowed on active mine areas, livestock trailing is limited, and no watering is allowed in water control ponds or water flowing from mine overburden seeps. Depending on the reclamation methods, renewed grazing may not be allowed on a reclaimed mine site for several years after closure. The grazing permit holder is required to use only certified weed-free hay or straw on USFS lands.

5.9.2.2 Recreation and Other Non-Grazing Land Uses

The CEA for recreation and other non-grazing land use includes approximately 135,470 acres in Idaho and Wyoming. Almost 50 percent of that CEA is lands administered by federal agencies, the vast majority by USFS (**Table 5.9-1**).

Table 5.9-1 Land Ownership in the Land Use and Recreation CEA

OWNERSHIP TYPE	AREA (ACRES)	PERCENT OF CEA
USFS	65,297	48.2
BLM	2,234	1.6
State – Idaho and Wyoming	1,170	0.9
Private	66,769	49.3
Total	135,470	100

Public recreation is generally available on public lands in the CEA, which is mostly public land administered by the CTNF. The recreation opportunity spectrum for the CTNF land in the CEA is shown in **Table 5.9-2**.

Table 5.9-2 CTNF Recreation Opportunity Spectrum for the Recreation Land Use CEA

RECREATION OPPORTUNITY SPECTRUM	AREA (ACRES)	PERCENT OF CEA
Roaded Modified	14,788.9	11
Roaded Natural	0	0
Semi-Primitive Motorized	43,299.3	32
Semi-Primitive Non-Motorized	5,015.5	4
Total CEA with ROS classification	63,103.7	47

Source: Caribou National Forest, email communication from Judy Warrick (6/16/16)

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. There are four developed recreation sites in the CEA (**Table 5.9-3**).

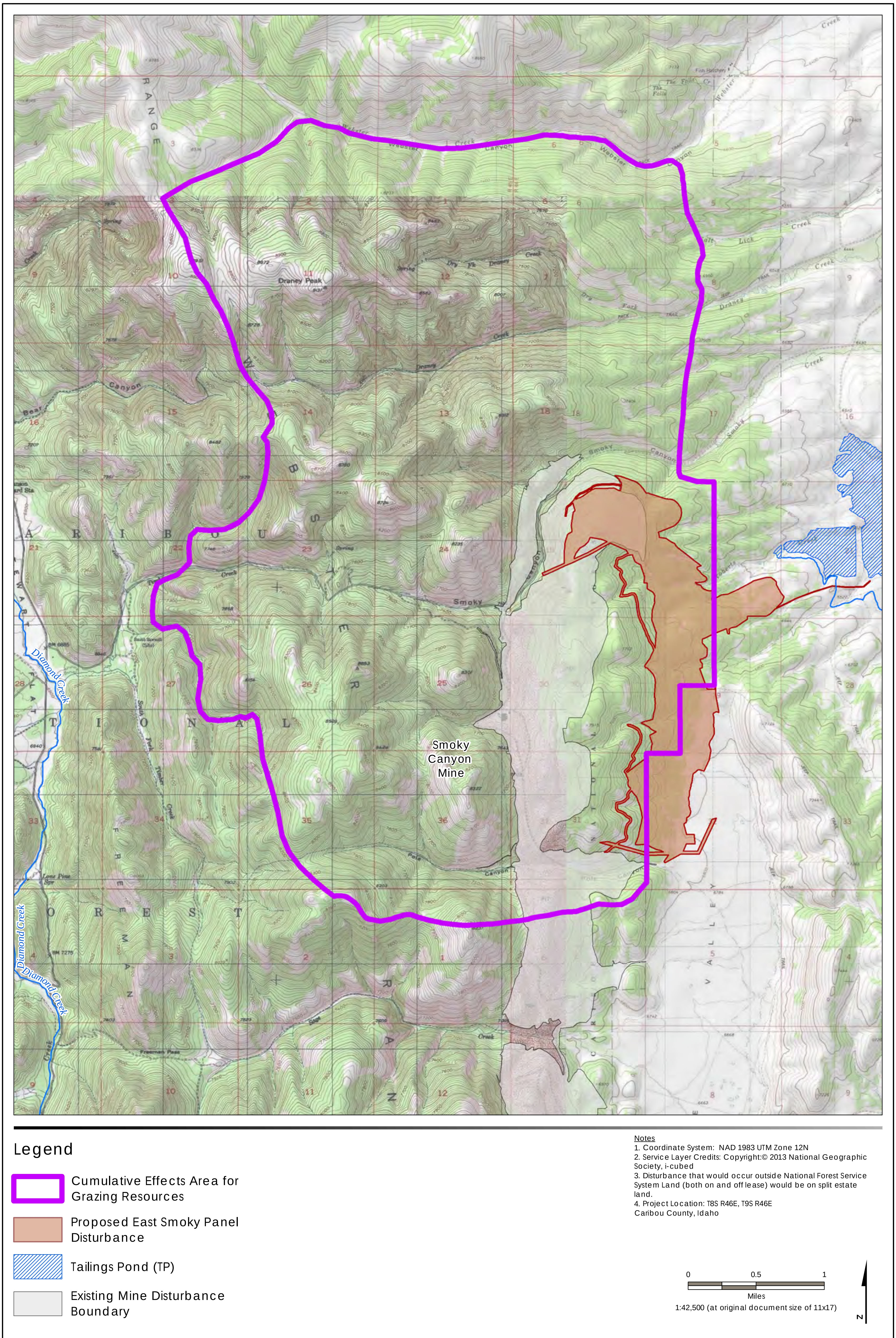
Table 5.9-3 Developed Recreation Sites in the CEA

NAME	TYPE	OPERATOR/OWNER
Diamond Creek	Campground	USFS/USFS
Diamond Creek Cabin	Rental Cabin (summer) & warming shelter (winter)	Private/USFS
Johnson GS	Rental Cabin	USFS/USFS
Stump Creek Guard Station	Rental Cabin	USFS/USFS

A dominant recreational use within the CEA as well as within the CTNF is big game hunting. Within the CEA, cumulative effects to hunting occur from alteration of habitat by mining, reduced access, and reduced available acres.

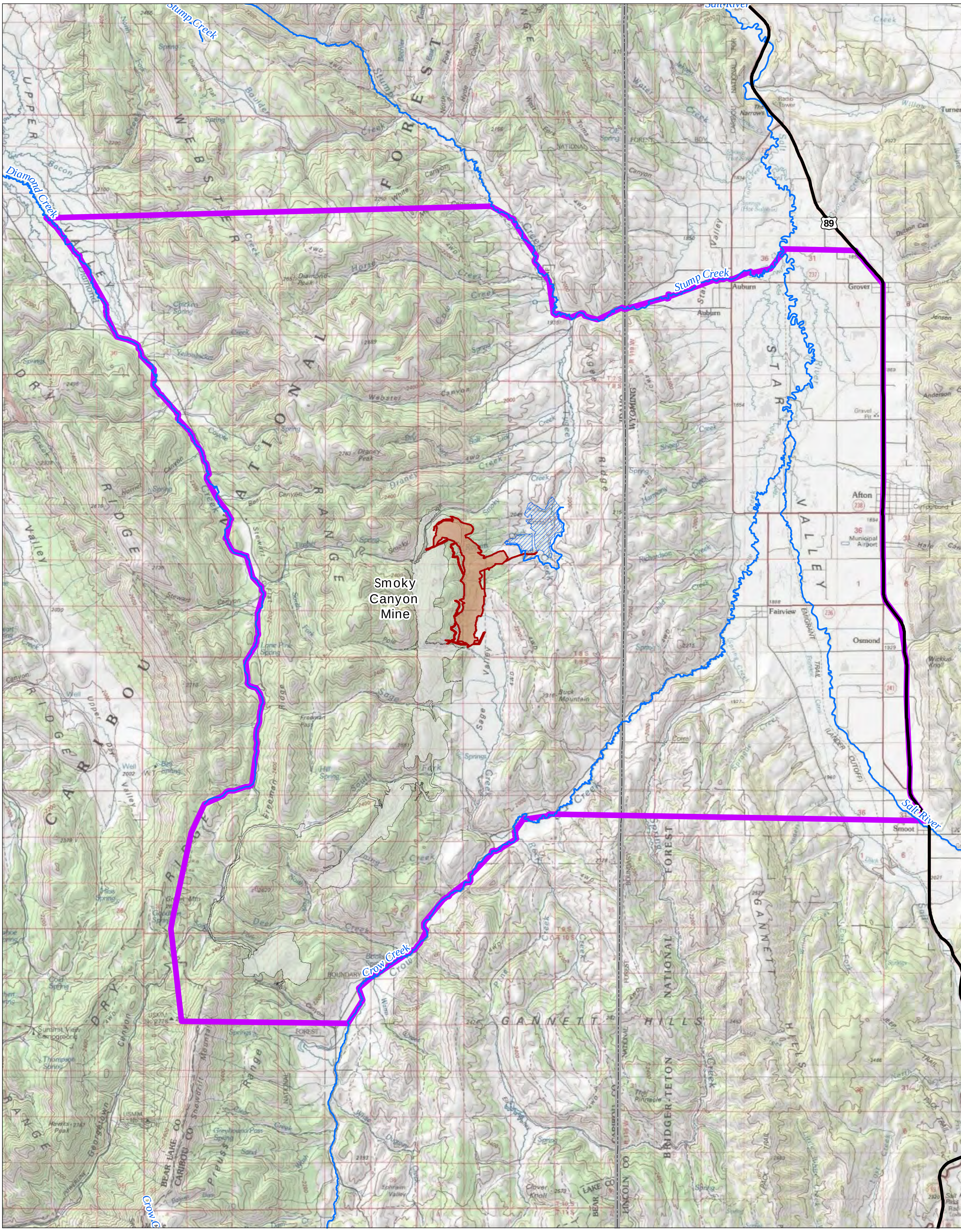
5.9.2.3 Transportation

The transportation CEA contains established transportation routes, including state highways and designated forest roads. Cumulative effects to transportation would be influenced by the roads built and maintained for mining and those that are left in place after closure and reclamation. During mining and reclamation, mining roads would be closed to public access, but some may be opened by surface owners or government agencies over time.



Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E
Caribou County, Idaho

Figure 5.9-1
Cumulative Effects Area for Grazing Resources
East Smoky Panel Mine EIS



Legend

Cumulative Effects Area for Land Use & Recreation Resources

Proposed East Smoky Panel Disturbance

Existing Mine Disturbance Boundary

Tailings Pond (TP)

Notes
1. Coordinate System: NAD 1983 UTM Zone 12N
2. Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed
3. Disturbance that would occur outside National Forest Service System Land (both on and off lease) would be on split estate land.
4. Project Location: T8S R46E, T9S R46E Caribou County, Idaho

0 2 4
Miles
1:140,000 (at original document size of 11x17)

N

Figure 5.9-2
Cumulative Effects Area for Land Use and Recreation Resources
East Smoky Panel Mine EIS

5.9.3 Past and Present Disturbances

5.9.3.1 Grazing

Past and present activities include the approval and management of grazing within the CEA. Grazing permit have 10-year terms. Disturbances in the CEA are dominated by the Smoky Canyon Mine, with some smaller areas of road and forest regeneration disturbances. Grazing is currently not approved by the USFS on the Smoky Canyon Mine, although some grazing of reclaimed areas has been reported and Simplot accommodates short-term trailing across certain mine disturbances. The timber harvest areas within the CEA date as far back to the 1990s. Grazing is allowed in historic timber harvest areas because unless the area is closed in the Term Grazing Permit, the area is open.

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. Since 2003, Simplot has been working with the agencies (i.e., EPA, IDEQ, USFS) to remediate selenium issues (**Section 2.2.3**). The Pole Canyon ODA Removal Action was accomplished in 2008.

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 are 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. There is continued work to understand release mechanisms and to develop best management practices to prevent releases through ongoing studies, sampling, and remedial actions, such as the RI/FS (Formation Environmental 2014).

5.9.3.2 Recreation and Other Non-Grazing Land Use

Past and present disturbance in the CEA is from previous mining and exploration operations, timber harvest, roads, agriculture, and limited development. A land use within the CEA that has effects on recreation activities 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 about 550 acres of private land (tailings pond) and 3,450 acres on CTNF land (totaling 4,000 acres). Visitors to the CTNF 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.

5.9.3.3 Transportation

The transportation 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 CTNF. The routes situated on NFS lands have been assigned designated uses as part of the CNF Travel Plan Revision.

5.9.4 Foreseeable Future Disturbances

5.9.4.1 Grazing

Grazing within the allotments would continue. Natural foreseeable future disturbances affecting grazing resources would include wildfire and noxious weed invasions. Noxious weed abatement efforts by the CTNF would continue as projects on NFS lands require protection measures and/or treatment to minimize the spread and establishment of noxious weeds on disturbed areas.

5.9.4.2 Recreation and Other Non-Grazing Land Use

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 CTNF land by the existing Smoky Canyon Mine, approximately 3 percent of the CEA would be temporarily restricted from recreational use by phosphate mining.

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.

The majority of foreseeable future activities, namely the Proposed Action/Alternative 1, would be continuations of activities that are currently taking place in the CEA, but would be in a new location. It is presumed that usable public and private land in the CEA would continue to be grazed. This also represents a continuation of current activities in the CEA.

5.9.4.3 Transportation

The majority of foreseeable future activities as discussed above would be continuations of activities that are currently taking place in the transportation CEA. Any future roads built in association with other projects on the CTNF would mostly likely be required to be reclaimed; therefore, there would be no net changes to the transportation system within the CEA in the foreseeable future.

5.9.5 Cumulative Disturbances

5.9.5.1 Grazing

Mining disturbance can affect a grazing allotment by directly removing forage within the mining area. Within this footprint area, all forage vegetation is removed until reclamation and successful revegetation 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 long 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 typically change.

The CTNF (USFS 2003a) 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 Proposed Action/Alternative 1 would disturb approximately 850/770 acres, 527 acres of which are in the Grazing CEA, representing approximately four percent of the CEA area. When combined with the past, present and other foreseeable disturbances in the CEA (approximately 1,700 acres), the total disturbance within the CEA would be about 18 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 CTNF decreasing the permitted stocking rates in the affected allotments.

The Proposed Action 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 2.4.11.3**). Alternative 1 would have a topsoil-only cover, but there would be less seleniferous overburden exposed. 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 Project would not add to the current area within the CEA that has elevated selenium.

5.9.5.2 Recreation and Other Non-Grazing Land Use

Cumulative disturbance in the CEA that affects recreation use is mainly the active and unreclaimed disturbance from mining and related roads and structures. The implementation of the Project could temporarily impact recreation and other land use as described above on a maximum of 850 acres of CTNF that are currently used for Roaded Modified and Semi-Primitive Motorized recreation, as well as a small amount of Semi-Primitive Non-motorized recreation.

5.9.5.3 Transportation

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 or volume of traffic. 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.

5.9.6 Cumulative Effects

5.9.6.1 Grazing

The Project would directly impact available forage and movement within the allotment. There are no other past, present, or reasonably foreseeable activities in the CEA that result in restricting livestock grazing, therefore there is no cumulative effect to grazing.

5.9.6.2 Recreation and Other Non-Grazing Land Use

During mining activities, big game would likely move to other areas with less disturbance or activity. 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 Proposed Panels F and G, impacts to trail use would be minimal. Following completion of reclamation activities, all mine areas on CTNF 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 habitat composition and user preference. Upon the successful completion of reclamation and revegetation efforts, 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, minor long-term cumulative effects are anticipated to recreation on the public lands as a result of implementation of the Proposed Action and Alternatives combined with the lingering effects of the rest of the Smoky Canyon Mine.

Cumulative effects on the pattern of land use within the CEA (including grazing, recreation, and means of access) have occurred and would occur from past, present, and reasonably foreseeable future development activities. The cumulative effects would be the result of activities that are currently taking place in the CEA, but would be in new locations. As a result of the sequential nature of phosphate mining in the region, each new mine panel represents a continuation of existing mining activities and a continuation of existing effects.

Similarly, cumulative effects to the amount of land available for recreation could occur within the CEA, as small areas of land affected by the Proposed Action or Alternative 1 may not be reclaimed and made available again for recreation. These effects would be long-term and negligible given the small footprint of the reasonably foreseeable projects located on public land in the CEA and the ongoing reclamation of past projects in the CEA.

In summary, the Proposed Action or Alternative 1, in addition to other existing and reasonably foreseeable projects in the CEA, would contribute to cumulative effects to existing land use and recreation. These effects would be long-term and minor.

5.9.6.3 Transportation

There would be no cumulative effects to transportation in the transportation CEA as there would be no net increase or decrease in transportation corridors or volume of traffic as a result of the Proposed Action or Alternative 1.

5.10 VISUAL AND AESTHETIC RESOURCES

5.10.1 CEA Boundary

The CEA boundary for visual and aesthetic resources is the same as described in Air Resources (**Section 5.2**; **Figure 5.2-1**) and CEA encompasses 148,861 acres. The boundary was developed with the IDT experts and professional judgement. Due to the limited visibility of the Project, visual and aesthetic resources should not be significantly affected beyond this area; viewers outside of the identified CEA would not likely be impacted by the Project.

5.10.2 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 unique landscapes are found in the CEA. The visual quality objectives of all CTNF lands within the CEA are Modification or Partial Retention, with no areas of Retention and only a small area of Preservation. The VQO categories that exist within the CEA are shown in **Table 5.10-1**.

Table 5.10-1 CTNF Visual Quality Objectives in the CEA

VISUAL QUALITY OBJECTIVE	AREA (ACRES)	PERCENT OF CTNF IN THE CEA
Modification	55,205.9	37
Partial Retention	33,815.6	23
Retention	0	0
Preservation	264.2	0.2
Total CEA with VQOs	89,285.7	60

Source of information: USFS email from Judy Warrick 6/16/16

The CEA is largely undeveloped other than for mining activities, associated USFS and private roads, and a few private residences/ranches. Man-made features that have resulted in visual modifications to the landscape include the past and current mining and exploration activities, roads, power lines, pipelines, range improvements, and rural residences.

Cumulative effects to visual resources from other activities in the CEA would result from historical, existing, and future phosphate mining. Often, phosphate mining does not result in major impacts to visual resources because the disturbance areas are not readily visible to the general public. Most of the past, present, and foreseeable future phosphate mining activities in the CEA are located within relatively remote areas, and are not readily visible from sensitive viewing areas, such as roads, recreation sites, or rural residences.

5.10.3 Past and Present Disturbances

The CEA is generally not disturbed visually other than for timber cuts, roads, mining operations, range improvements, power lines, and pipeline corridors. **Table 5.4-2** lists past and present disturbances to areas within the CEA; the largest type of disturbance is phosphate mining related to the existing Simplot Smoky Canyon Mine. Based on those numbers, past and present disturbances have altered approximately seven percent of the area visually. Reclamation of the mine areas would mitigate much of the visual impact. Disturbances due to mining and exploration coincide with disturbances attributed to timber harvest in many cases, since timber sales are often conducted as the initial phase in a mining 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 private land use in the area, and visually is part of the present landscape.

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, F, and G of the Smoky Canyon Mine; Panels A, C, D, and E are mined out and have been fully reclaimed. The total currently approved, permitted mine disturbance for the Smoky Canyon Mine and tailings pond is approximately 4,000 acres (**Section 2.3.2**). 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 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 have views of the mining activity east of the ridge and views to the west where past mining disturbances may be noticeable.

5.10.4 Foreseeable Future Disturbances

The only additional mining activity that has been proposed to date in the CEA is the Proposed Action and Alternative 1. The Proposed Action could potentially add up to approximately 850 acres of disturbance to the CEA, of which all but 12 acres would be reclaimed. The Alternative 1 disturbances would be somewhat less (78 fewer acres total disturbance and 3 fewer acres left unreclaimed). Portions of the East Smoky Panel disturbance would be visible from locations along the Smoky Canyon Road. The general mine area from Smoky Creek on the north to Wells Canyon 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.

5.10.5 Cumulative Disturbances

The total disturbed area for the Proposed Action/Alternative (approximately 850/770 acres) combined with the currently permitted Smoky Canyon Mine disturbance (approximately 4,000 acres) would represent about three percent of the total visual CEA, and the unreclaimed area for the entire mine would represent less than 0.01 percent of the total CEA.

5.10.6 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. 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. As natural succession occurs throughout the reclaimed areas, a setting more similar to the original landscape over time would be restored.

5.11 CULTURAL RESOURCES

5.11.1 CEA Boundary

The CEA boundary for cultural resources encompasses the Project Area and a surrounding one-mile buffer. The boundary was developed with the IDT experts and professional judgement. Cultural resources should not be affected beyond this area; cultural resources outside of the identified CEA would not likely be impacted by the Proposed Action or Alternative 1.

5.11.2 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, grazing activities, and stock pond development (Pagano 2015). These projects were completed between 1978 and 2015. 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 20 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 10 sites have been recorded in studies conducted within one mile of the Project Area (**Section 3.12.2**). Site density in the area is low (Pagano 2014a, 2014b, 2014c, and 2015). 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.

5.11.3 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.).

5.11.4 Foreseeable Future Disturbances

There are no reasonably foreseeable disturbances in the CEA with the potential to impact cultural resources other than the Smoky Canyon Mine disturbances. No USFS timber sales 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 near 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. However, no specific plans are known and these cannot be evaluated for this cumulative effects analysis.

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

5.11.6 Cumulative Effects

Section 106 of the NHPA requires consideration of the effects of federal actions to historic properties. No historic properties would be disturbed by the Proposed Action or Alternative 1. Neither the Proposed Action nor Alternative 1 would have adverse effects to historic properties. Therefore, neither the Proposed Action nor Alternative 1 would contribute to cumulative impacts to historic properties in combination with past, present, and reasonably foreseeable future activities in the CEA.

5.12 NATIVE AMERICAN CONCERNS AND TREATY RIGHTS RESOURCES

5.12.1 CEA Boundary

The CEA for Tribal Treaty Rights resources includes that portion of the Southeast Idaho Phosphate District on public lands in Caribou and Bear Lake Counties (no figure). The boundary was developed with the IDT experts and professional judgement. The CEA encompasses approximately 270,000 acres of public (BLM and USFWS) and CTNF lands. These areas are almost entirely within the upper Blackfoot River and upper Bear River drainage basins. The area extends into a small portion of the Salt River drainage near the Wyoming state line. The Tribes retain and exercise Treaty Rights on unoccupied federal lands.

This CEA does not include all areas of Tribal Treaty Rights resources in southeast Idaho, but only those areas that have been or may be affected by past, present, or reasonably foreseeable future phosphate mining and associated activities. To the extent that data are available on effects to Tribal Treaty Rights resources, the past, present, and reasonably foreseeable future actions would include those identified by the Agencies from the expansion of phosphate mining in the 1970s to currently planned and validated future activities.

5.12.2 Introduction

The ability of Native Americans to practice their traditional culture in the CEA as assured in the Fort Bridger Treaty and related statutes has been reduced through loss of “unoccupied lands” and degradation of the resources over time.

Federal land managers have a responsibility to consider effects on resources essential for the Tribes to exercise their Treaty Rights on public lands and a responsibility to manage and maintain the habitat of traditionally utilized natural resources in a viable and sustainable condition. Over the years, the ability of the Tribes to practice their traditional culture on these lands has been reduced by homesteading, Idaho statehood, and other statutes that allowed federal land to be converted to non-federal ownership. Aside from this, the loss or conversion of vegetation and wildlife habitat from phosphate mining and degradation of the resources valued by the Tribes has tended to reduce land and resource productivity in some cases.

5.12.3 Past and Present Disturbances

Fire suppression, mining, grazing, and timber harvest have altered or restricted access to areas of unoccupied public lands, have changed the vegetation, and in some areas, have affected water quality. In KPLAs in Bear Lake and Caribou Counties, Idaho, past mining alone has disturbed approximately 14,200 acres or approximately five percent of the federal lands within the CEA

(**Table 5.1-2**). A large portion of these lands has been revegetated by reclamation activities. However, much of the vegetation reclaimed prior to 2000 has tested high in selenium, and some water bodies have been affected by contamination. However, upon investigation, the IDEQ concluded that regional human health and population-level ecological risks are unlikely to occur in the area. The assessment noted that ecological subpopulation risks are evident in localized areas, particularly aquatic and riparian environments, impacted by historic mining operations and ongoing releases (IDEQ 2004). Besides the contamination issue, wildlife habitats have been altered or otherwise changed by large scale open pit phosphate mining and reclamation activities, affecting Tribal hunting and gathering activities. The full impact to natural resources utilized by Indian Tribes is not known at this time.

5.12.4 Foreseeable Future Disturbances

Reasonably foreseeable future disturbances in the CEA would result from the Proposed Action or the Alternative 1 and associated activities. Mining plans currently being processed could result in at least 6,350 acres (approximately two percent of the federal lands within the CEA) of additional disturbance in Caribou and Bear Lake counties (**Section 5.1.4**). During mining, many natural resources traditionally utilized and accommodated by the Treaty would be destroyed, and access to others would be impeded for a time by the mine. Mining would continue until the approved ore reserves are depleted, and although reclamation of the mined areas is undertaken concurrently with mining operations, final reclamation of all affected acreage in the CEA would take over 30 years. Unique or non-renewable traditional resources have not been identified in the East Smoky Panel area. Areas proposed to be mined in the future would be reclaimed, and thus there would not be a permanent loss of access to resources and the ability to exercise Treaty Rights, except for relatively small areas to be left unreclaimed or in the cases where land exchanges or sales of public land would occur, such as the proposed Dairy Syncline Project, which is currently undergoing NEPA analysis.

5.12.5 Cumulative Disturbances

As outlined in **Section 3.13**, the federal government has a unique trust relationship with federally recognized American Indian tribes including the Shoshone and Bannock Tribes. The BLM and the CTNF have a responsibility and obligation to consider and consult on potential effects to natural resources related to the Tribes' Treaty Rights, uses, and interests under the federal laws, EOs, and the 1868 Fort Bridger Treaty between the U.S. and the Shoshone and Bannock Tribes (U.S. Congress 1868). In addition, the NHPA and its implementing regulations (36 CFR 800), the American Indian Religious Freedom Act (AIRFA), EO 13175: Consultation and Coordination with Indian Tribal Governments, and EO No. 13007: "Indian Sacred Sites" contain requirements for consulting with tribes on the potential effects of federal actions on tribal interests.

Since the discovery of selenium and other contamination associated with phosphate mining in the late 1990's, new operational and reclamation practices have been developed to reduce contamination potential. Federal and state agencies are enhancing native fish and wildlife habitat, and these collective efforts to improve the condition of natural resources contribute to the protection and restoration of Tribal Treaty Rights. Appropriate mitigation measures and EPMs (such as reclamation, stormwater and sediment control, groundwater and surface water sampling/monitoring), which are protective of natural resources, are required and implemented for ongoing and future mining projects. These would continue.

5.12.6 Cumulative Effects

Consultation is ongoing among the Tribes and federal land managing agencies to address the most effective ways to protect and restore traditional resources and assure the continued exercise of Tribal Treaty Rights. Reclamation practices, BMPs, and EPMs are being implemented for new phosphate mining projects that help to address the cumulative effects to restore vegetation resources and wildlife habitat sooner to allow productive activities under their Treaty rights. Due to the number of undisturbed acres that occur adjacent to the phosphate mines, direct and indirect impacts to wildlife populations are likely fairly minimal as wildlife displace into these adjacent areas (**Section 4.8**). Cumulative effects to vegetation resources occur through short-term vegetation loss and long-term vegetation community changes (**Section 4.7**). Access to these areas also result in short-term impacts as well.

Approximately seven percent of the federal lands within the CEA would be impacted by past, present, and reasonably foreseeable future actions through conversion of wildlife and vegetation habitats for hunting and gathering and could tend to reduce opportunities from current levels, although as successful reclamation and natural succession occurs, the impacts would decrease over time.

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. Consultation that has occurred to date with the Shoshone and Bannock Tribes is described in **Sections 1.7** and **6.2.3**. During past consultations for similar projects in the area, the Shoshone and Bannock Tribes stated that any loss of Tribal Treaty Rights is significant to them and could potentially affect all Tribal members.

5.13 SOCIAL AND ECONOMIC CONDITIONS

5.13.1 CEA Boundary

The CEA boundary for socioeconomics (no figure) includes the six-county area of Bannock, Bear Lake, Bingham, Caribou, and Power counties, Idaho; and Lincoln County, Wyoming. The boundary was developed with the IDT experts and professional judgement. The social and economic structures and relationships in support of mining and other activities are contained within these counties. 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.

5.13.2 Introduction

The types of cumulative effects that could occur to social and economic conditions in the CEA would primarily be from a loss of economic activity under the No Action Alternative. Because the Proposed Action or Alternative 1 constitutes continuation of activities that are currently taking place in the CEA, but would be in a new location, it is not anticipated that there would be any increases in the populations of the CEA counties as a result of the Proposed Action or Alternative 1; therefore, there would be no additive, cumulative effect to housing, community services, and infrastructure from the Proposed Action or Alternative 1.

Local economic activity has increased and diversified in recent years, and such diversification may continue into the future. However, phosphate mining and ore processing will likely continue to anchor the economies in the CEA.

5.13.3 Past and Present Disturbances

The contribution of past and present phosphate mining and related processing plants to local economies within the CEA has been major in terms of employment and revenues earned from tax collections, purchasing, and value-added phosphorus products. The active phosphate mines, as well as previously approved mines, are part of the economic base of the CEA that stimulates the growth of other economic sectors through a multiplier effect as described in **Section 4.14**. Contributions to local economies from increased employment and addition of workforce payroll to local economies have benefitted Bannock, Bingham, Power, and Lincoln counties; however, no phosphate mines are located in these counties. Therefore, revenues earned from tax collections and equipment purchases have occurred primarily in Caribou and Bear Lake counties.

5.13.4 Foreseeable Future Disturbances

No major changes to population, housing, employment, or private and public income would occur as a result of the Proposed Action or Alternative 1. 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 proposed in the CEA or large scale economic issues would be more likely to affect socioeconomics; the Proposed Action or Alternative 1 is a continuation of the current industry.

Several new phosphate mines have been approved or proposed within the CEA (see **Section 5.1.4**). These include Simplot's Dairy Syncline Mine (proposed), Caldwell Canyon (proposed), the Rasmussen Valley Mine (approved), the Husky/North Dry Ridge Mine (proposed), and possibly Stonegate Agricom Ltd.'s Paris Hills phosphate project (acquired by Itafos in 2017). Phosphate exploration drilling has also been proposed outside of those mines including Dry Ridge, Trail Creek, and Freeman Ridge/Husky 2. These proposed exploration projects could lead to future additional mine development.

Minor gold prospecting activities are expected to continue but the development of hard-rock mineral or metals mines in the CEA is unlikely.

The majority of foreseeable future activities as discussed above, such as the Proposed Action or the Alternative 1, would be continuations of activities that are currently taking place in the CEA, but would be in new locations.

5.13.5 Cumulative Disturbances

The additional present and future phosphate mining and exploration projects described in the previous section would add to the continued relative economic stability within the CEA.

5.13.6 Cumulative Effects

Development of the new mines would be expected to at least maintain current economic drivers, should new mines replace completed mining projects. Because the Proposed Action or Alternative 1 would be a continuation of existing mining at the Smoky Canyon Mine, their implementation would not contribute effects on socioeconomics beyond existing levels.

Cumulative effects on the social and economic structure within the CEA have occurred and would occur from past, present, and reasonably foreseeable development activities. These effects have occurred primarily in Caribou County in terms of tax revenues and purchases of equipment and other services; however, all CEA counties have and may continue to benefit from employment. The cumulative effects (both negative and positive) have been substantial and have the potential to continue.

The Proposed Action or Alternative 1, in addition to other existing and reasonably foreseeable phosphate mining projects, would prolong the economic benefits associated with phosphate mining and ore processing as described in **Chapter 4**. BLM estimates that these annual economic benefits when added to all other current eastern Idaho phosphate mining and processing operations would total $130 million in annual salaries, $335 million in total annual purchasing, $6.5 million in property taxes, $11 million in state and federal mineral lease royalties (most of which is returned to the Idaho state governments, primarily for funding schools), around 2,000 direct employees and contract employees (with a total induced employment of around 4,500 in the cumulative effects area).

There is a trend to the development of low-density residential areas, sometimes on privately owned agricultural lands. This has a cumulative effect on the lands outside population centers. However, this land use change is not related to the Proposed Action or Alternative 1. It is not anticipated that there would be any increases in the populations of the CEA counties as a result of the Proposed Action or Alternative 1; therefore, there would be no additive, cumulative effect to housing, community services, and infrastructure from the Proposed Action or Alternative 1. The cumulative effects on social and economic conditions would be positive, short-term and major.

Under the No Action Alternative, the East Smoky Panel would not be approved, and there would be no economic benefit from extending mining operation from the Smoky Canyon Mine. The No Action Alternative could cause the regional price of fertilizer and cost of agricultural production to increase for a period of time if Simplot had to curtail production pending final acquisition of an alternative area to mine. Overall impacts of the No Action Alternative to social and economic conditions would be adverse, short term, and major.

CHAPTER 6

CONSULTATION AND COORDINATION

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CHAPTER 6 CONSULTATION AND COORDINATION

6.1 PUBLIC PARTICIPATION SUMMARY

Initial issues and indicators to be considered in the EIS are identified through public and agency scoping. This process, along with the results of scoping, was documented in a public scoping report (Stantec 2015a).

6.1.1 Public Scoping Period and Meetings

The NOI for the Smoky Canyon Mine East Smoky Panel Project EIS was published in the Federal Register on April 3, 2015. Additionally, a legal notice was published in two local newspapers: the Idaho State Journal in Pocatello, Idaho on April 3, 2015; and the Star Valley Independent in Afton, Wyoming on April 8, 2015. Also, on April 3, 2015, a news release was submitted to approximately 40 different television stations, radio stations, and newspapers. These notices and releases are included in the scoping report (Stantec 2015a).

Three open house-style public meetings were held from 5 – 7 pm as scheduled:

- April 21, 2015 at Afton Civic Center in Afton, Wyoming
- April 22, 2015 at Shoshone Bannock Hotel and Events Center in Fort Hall, Idaho
- April 23, 2015 at BLM Offices in Pocatello, Idaho

The open house meetings provided a Project overview, maps of the Project area, and a forum for exchange of information and ideas or concerns related to the Project. Comment forms were available at the meetings. BLM, Simplot, and Stantec representatives were present. Lists of individuals who signed attendance sheets at the public meetings are included in the scoping report (Stantec 2015a).

Scoping information was also provided on the BLM Land Use Planning and NEPA Register at https://www.blm.gov/epl-frontoffice/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=39795&dctmId=0b0003e88074e314. Information was included on the CTNF Current and Recent Projects website at http://www.fs.fed.us/nepa/nepa_project_exp.php?project=44748 and included in the FS Schedule of Proposed Actions for the CTNF.

Public comments regarding the Project were solicited and are compiled in the scoping report (Stantec 2015a) to help determine the concerns, issues, and any potential alternatives for evaluation in the environmental analysis. Hard copy comments were requested to be received on or before May 4, 2015. By the close of the scoping period on May 4, 2015, nine comment letters had been received. Copies of all written comment letters are included in the scoping report (Stantec 2015a).

6.1.2 EIS Mailing List

The initial public mailing list for scoping was compiled and scoping letters were sent to 96 interested individuals, agencies, and groups. The list included persons and agencies that BLM determined may have interest in the Project from past experience with them. The mailing list for the Project was then revised to add those persons who provided comments in response to scoping, requested to be on the mailing list, signed a scoping meeting list, or responded to the e-mail request for mailing addresses.

6.1.3 Distribution of Draft EIS

A 90-day Draft EIS review period was initiated by publication of the Notice of Availability (NOA) for the Draft EIS in the Federal Register.

The Draft EIS was distributed as follows:

- An NOA was published in the Federal Register specifying dates for the comment period and the date, time, and location of the public comment meetings.
- A news release was provided by the Agencies at the beginning of the 90-day comment period on the Draft EIS. Legal notices and news releases were submitted to the same news organizations as for the initial public scoping announcement.
- The Draft EIS was distributed to interested parties identified in the updated EIS mailing list, as previously described, and made available via the BLM and CTNF websites.

Public meetings were held at the same Afton, Wyoming and Pocatello, Idaho locations as for the initial public scoping meetings to obtain comments on the Draft EIS and to answer questions that the public has regarding the Project or the EIS process. These took place on November 13, 2018 and November 14, 2018, respectively.

Letters and other types of comments received by the Agencies on the Draft EIS were reviewed and evaluated to determine if information provided in the comments required a formal response or contained new data that identified deficiencies in the EIS. Any identified deficiencies were addressed and the Final EIS revised accordingly. There were nine separate, unique commenters on the Draft EIS, including individuals, the proponent, agencies, the Shoshone-Bannock Tribes, and non-governmental organizations (NGOs). In addition, there were 567 essentially identical form letters generated as part of a call to action from one of the NGOs. All of the form letters were reviewed, and any unique comments were identified. All individual comments received were enumerated and tabulated, and responses to each were prepared by the Agencies. These comments and the responses are presented in **Appendix 6A** and supplemental response information is presented in **Appendix 6B**.

6.1.4 Final EIS Distribution

The Final EIS distribution was completed with consideration given to comments received on the Draft EIS. A 60-day Final EIS availability period was initiated by publication of the NOA for the Final EIS in the Federal Register. The Final EIS was released as follows:

- The NOA was published in the Federal Register.
- Copies of the Final EIS were sent to addresses on the updated mailing list and made available via the BLM and CTNF websites.

Legal notices and news releases were issued to the same media sources used for previous Project announcements.

6.1.5 Record of Decision

The USFS released a draft ROD and began an objection period for the SUAs and RFPA decisions concurrent with the 60-day availability period for the Final EIS. The USFS will make recommendations to the BLM for the overall Project during the availability period. The BLM does not issue a draft ROD but will issue a final ROD after considering the Final EIS and any public comments received during the availability period. Both the BLM's ROD and the USFS's Final ROD will be distributed to people and organizations identified in the updated EIS mailing list. BLM will post its ROD on its ePlanning web site. The USFS will post its Final ROD on the CTNF Current and Recent Projects website which publishes the Schedule of Proposed Actions.

6.2 CONSULTATION WITH OTHERS

The BLM Pocatello Field Office and the USFS CTNF Soda Springs District are the primary agencies involved with this EIS. BLM is the lead agency and USFS is the joint lead agency. Their respective roles were described in **Section 1.2**.

6.2.1 Consultation with Idaho Department of Environmental Quality

Based upon their jurisdiction and expertise, primarily with water quality concerns, IDEQ is a cooperating agency for the EIS. They were consulted through the NEPA process in regard to the Project's relationship to EPHA, the Idaho Water Quality Act, the Idaho Ground Water Quality Rule, and the Federal Water Pollution Control Act through the Idaho Water Quality Standards and Wastewater Treatment Requirements.

6.2.2 Consultation with Idaho Department of Lands

IDL is the State of Idaho's agency charged with regulating mine reclamation on all lands in the state, regardless of ownership. They are another cooperating agency for the EIS and were consulted on mine reclamation and other aspects of the Project. They were also consulted on issues related to the Idaho Surface Mining Act; Rules Governing Exploration, Surface Mining, and Closure of Cyanidation Facilities (IDL 2017a); and Title 47 Mines and Mining Chapter 15 Surface Mining (IDL 2017b).

6.2.3 Consultation with Shoshone-Bannock Tribes

Tribal consultation for this Project has been undertaken on a Government to Government basis between the United States and the Shoshone-Bannock Indian Nation. Prior to initiation of formal scoping, as a part of routine contacts, the BLM introduced the proposed project to the Shoshone-Bannock Tribes in a meeting on December 17, 2014. A formal scoping letter was sent certified mail to the Shoshone-Bannock Tribes on March 31, 2015. BLM has met with Tribal technical staff to: brief them on the mining proposal and matters of the EIS; discuss issues to allow BLM a better understanding of Shoshone-Bannock issues and concerns; and to answer questions that Tribal staff may have in order for them to brief the Tribal Council. This process precedes formal consultation with the Fort Hall Council of the Shoshone-Bannock Tribes regarding the Project's effect on land management activities and land allocations that could affect Treaty Rights. This process has been ongoing and will continue throughout the NEPA process. Government-to-Government consultation was held on March 12, 2018 and comments on the Draft EIS were received from the Tribes on December 24, 2018.

6.3 LIST OF PREPARERS AND REVIEWERS

This EIS was prepared jointly by the BLM, Pocatello Field Office and the USFS CTNF. IDEQ, IDL, and OEMR are cooperating agencies.

Table 6.3-1 Agency Interdisciplinary Team Members/Specialists

RESOURCE/TITLE	AGENCY	TEAM MEMBER/SPECIALIST
Project Manager/Lead, Geology	BLM	Kyle Free
Project Lead, Hydrogeology, Geochemistry	USFS	Matthew Wilson
Minerals Branch Chief	BLM	Jeff Cundick
Aquatics, Fisheries	USFS	Lee Mabey
Hydrology	USFS	Brad Higginson
Forestry, Old Growth, Timber	USFS	Wayne Beck
Archaeology	USFS	Ali Abusaidi
Botany	USFS	Rose Lehman
District Ranger, Montpelier	USFS	Dennis Duehren
District Ranger, Soda Springs	USFS	Bryan Fuell
Forest Planning	USFS	Doug Herzog
Range	USFS	Heidi Heyrend
NEPA Coordinator	USFS	Jessica Taylor
Recreation	USFS	Vacant
Inventoried Roadless Areas	USFS	Doug Herzog
Soils	USFS	David Marr
Wildlife	USFS	Devon Green
Groundwater, Surface Water	IDEQ	Brady Johnson
Reclamation/Senior Resource Specialist - Lands	IDL	Gary Billman
Wildlife, Special Status Species, HEA	IDFG	Jim Mende
Administrator	OEMR	John Chatburn
Deputy Administrator	OEMR	Scott Pugrud
Energy Specialist	OEMR	Tyler Mallard

Table 6.3-2 Third Party Contractor – Stantec Consulting Services Inc.

ROLE/RESOURCE	STAFF	EXPERIENCE
Project Manager	Greg Brown	BS Natural Resource Management 25 Years' experience
Assistant Project Manager Water Resources, Geology, Geochemistry	Brian Buck	MS Geological Engineering BS Geology 39 Years' experience

ROLE/RESOURCE	STAFF	EXPERIENCE
Visual Resources, Land Use, Grazing/Recreation, Special Designations	Schelle Davis	BA Environmental Studies 12 Years' experience
Air Resources	Dan Heiser	BS Chemical Engineering MBA Business 33 Years' experience
Air Resources	Eric Clark	MS Civil Engineering BS Environmental Science 12 Years' experience
Air Resources	Dave Strohm	BS Meteorology 13 Years' experience
Cultural Resources, Native American Religious Concerns, Land Use	Jenni Prince-Mahoney	BA Anthropology MC NEPA 22 Years' experience
Land Use, Recreation, Range	Stephanie Lauer	BS Geology MS Forestry/Watershed Management 17 Years' experience
Wildlife, Vegetation	Greg Sharp	BS Fisheries and Wildlife Biology 23 Years' experience
Wildlife, Vegetation	Neil Lynn	BS Wildlife Biology 16 Years' experience
Fisheries, Aquatic Ecology, Vegetation, Wildlife	Dave Kikkert	BS Fisheries and Wildlife MS Ecology 16 Years' experience
Environmental Justice and Socioeconomics	Jon Schulman	BA English MA Journalism MS Environmental Engineering 23 Years' experience
Surface Water Resources, Document Control	Karla Knoop	BS Watershed Science 29 Years' experience
Groundwater Resources	Rebekah Brooks	BS Geology MS Geology 36 Years' experience
Geology	Jamey Sage	BS Geology for Liberal Arts 18 Years' experience
Visual Resources	Gary Maynard	BA Geography 20 Years' experience
GIS	Claudia Gallegos	AS General Studies BS Environmental Studies 16 Years' experience
Administrative Support and Project Record	Sue Terry	AS 30 Years' experience

ROLE/RESOURCE	STAFF	EXPERIENCE
Soils	Robert Long, Long Resources (subcontractor)	Certified Professional Soil Scientist MS Soils and Biometeorology BS Soils and Biometeorology 31 Years' experience
Geochemistry	Scott Effner, Whetstone Associates (subcontractor)	
Hydrogeological Investigation	Jonathan Williams Alpine (subcontractor)	BS Geology 30 Years' experience
Water Resources	Alan Mayo, Mayo and Associates (subcontractor)	BS Geology MS Geology 37 Years' experience
Groundwater Modeling	Michelle Smilowitz, Hydrogeo Group (subcontractor)	

6.4 MAILING LIST

Table 6.4-1 shows the Project mailing list and is divided into federal agencies, state agencies, and others. This list was compiled through agency-maintained lists and the scoping process.

Table 6.4-1 Project Mailing List

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CHAPTER 7

REFERENCES, ACRONYMS, ABBREVIATIONS, GLOSSARY, AND INDEX

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7.2 ACRONYMS AND ABBREVIATIONS

ACRONYM/ABBREVIATION	DEFINITION
$\mu g/m^3$	Micrograms Per Cubic Meter
ABA	Acid-Base Accounting
ABDTPA	Ammonium Bicarbonate-Diethylenetriaminepentaacetic Acid
ACGIH TLV	Association Advancing Occupational and Environmental Health threshold limit value
Agencies	Collectively, Lead and Cooperating Agencies
AGP	Acid Generating Potential
AIRFA	American Indian Religious Freedom Act
AIZ	Aquatic Influence Zone
AMSL	Above Mean Sea Level
ANFO	Ammonium Nitrate/Fuel Oil
ANP	Acid Neutralization Potential
AOC	Administrative Order on Consent
APE	Area of Potential Effect

ACRONYM/ABBREVIATION	DEFINITION
AQRV	Air Quality Related Value
ARARs	Applicable or Relevant and Appropriate Requirements
ARD	Acid Rock Drainage
ARMP	Approved Resource Management Plan
ARMPA	Approved Resource Management Plan Amendment
ARPA	Archaeological Resources Protection Act
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
AWC	Available Water Capacity
BA	Biological Assessment
BAF	Bioaccumulation Factor
$BAF_{median\ whole\text{-}body}$	BAF calculated as median of brown trout tissue concentrations/dissolved selenium concentrations
BCSD	Bannon County Sheriff Department
BCY	Bank Cubic Yards
BCT	Bonneville Cutthroat Trout
BEA	Bureau of Economic Analysis
bgs	Below ground surface
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
BOD	Biological Oxygen Demand
B.P.	Before Present
BT	Brown Trout

ACRONYM/ABBREVIATION	DEFINITION
BURP	Beneficial Use Reconnaissance Program
$C_{egg-ovary}$	selenium concentration in brown trout egg and ovary tissue in mg/kg dw
C_{tissue}	selenium concentration in benthic macroinvertebrate tissue in mg/kg dw
C_{water}	Concentration of selenium dissolved in water (µg/L)
CAA	Clean Air Act
$CaCO^3$	Calcium Carbonate
CCC	Criterion Continuous Concentration
CCS	Center for Climate Strategies
CCSO	Caribou County Sheriff's Office
CEA	Cumulative Effects Area
CEMPP	Comprehensive Environmental Monitoring Program Plan
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CF	Conversion Factor
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
CH_4	Methane
cm	Centimeters
CMC	Criterion Maximum Concentration
CNF	Caribou National Forest
CO	Carbon Monoxide

ACRONYM/ABBREVIATION	DEFINITION
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COD	Chemical Oxygen Demand
COPC	Contaminant of Potential Concern
Corps	United States Army Corps of Engineers
CPD	Chubbuck Police Department
CTNF	Caribou-Targhee National Forest
CY	Cubic Yards
DAP	Diammonium Phosphate
dB	Decibel
dBA	Decibel-A Weighted
dBA Lmax	Maximum dBA Level
dBA Lmin	Minimum dBA Level
DBH	Diameter at Breast Height
DFC	Desired Future Conditions
DNA	deoxyribonucleic acid
DOI	Department of the Interior
DPS	Distinct Population Segment
DSAY	Discounted Service Acre Year
dS/m	deciSiemens Per Meter
dw	dry weight
ECe	Electrical Conductivity
eDNA	Environmental DNA

ACRONYM/ABBREVIATION	DEFINITION
EE/CA	Engineering Evaluations/Cost Analyses
EIS	Environmental Impact Statement
EF	Enrichment Function
EO	Executive Order
EPA	Environmental Protection Agency
EPHA	Environmental Protection and Health Act
EPM	Environmental Protection Measure
EPT	Ephemeroptera, Plecoptera, and Trichoptera
ESA	Endangered Species Act
EWMP	Environmental Waste Management Program
F	Fahrenheit
FEIS	Final Environmental Impact Statement
FHA	Federal Housing Administration
FBR	Fluidized Bed Reactor
FR	Federal Register
FS	Feasibility Study
FSS	Forest Structural Stage
FHWA	Federal Highways Administration
G&G	Garret & Gould
GAP	gap analysis program
GHG	Greenhouse Gas
GHMA	General Habitat Management Area
GLO	General Land Office

ACRONYM/ABBREVIATION	DEFINITION
GIS	Geographic Information System
GMCV	Genus Mean Chronic Value
gpm	Gallons Per Minute
GPS	Global Positioning System
GST	Growth Sample Tree
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HBI	Hilsenhoff's Biotix Index
HDPE	High Density Polyethylene
HEA	Habitat Equivalency Analysis
HGG	HydroGeo Group
HUC	Hydrologic Unit Code
ICFWRU	Idaho Cooperative Fish and Wildlife Research Unit
IDAPA	Idaho Administrative Procedures Act
ICP	Inductively Coupled Plasma
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IDPR	Idaho Department of Parks and Recreation
IDWR	Idaho Department of Water Resources
IFWIS	Idaho Fish and Wildlife Information System
IGS	Idaho Geological Survey
IM	Instruction Memorandum

ACRONYM/ABBREVIATION	DEFINITION
IMA	Idaho Mining Association
IMNH	Idaho Museum of Natural History
IRA	Inventoried Roadless Area
ISDE	Idaho State Department of Education
ISHS	Idaho State Historical Society
ISP	Idaho State Police
ISTC	Idaho State Tax Commission
ISU	Idaho State University
ISCST3	Industrial Source Complex Short Term, Version 3
IWJV	Intermountain West Joint Venture
IWI	Index of Watershed Indicators
km	Kilometer
KOP	Key Observation Point
KPLA	Known Phosphate Lease Area
kV	Kilovolt
L/g	Liters per gram
Ldn	Day-Night Sound Level
Leq	Equivalent Sound Level
LfT[DW]	Downwind Octave-Band Sound Pressure
LCPHD	Lincoln County Public Health Department
LCSO	Lincoln County Sheriff's Office
LCY	Loose Cubic Yard
LP	Lodgepole Pine

ACRONYM/ABBREVIATION	DEFINITION
LWD	Large Woody Debris
M	Modification
M&RP	Mine and Reclamation Plan
MBTA	Migratory Bird Treaty Act
MCA	Mixed Conifer and Aspen
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mg/kg	Milligrams Per Kilogram or parts per million
mg/L	Milligrams Per Liter
mg/m^3	Milligram Per Cubic Meter
MIS	Management Indicator Species
MM	Maximum Modification
mm	milligrams
mmhos/cm	milliMhos Per Centimeter
MOU	Memorandum of Understanding
MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NASIS	National Soil Information System
NASS	National Agricultural Statistics Service
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NFS	National Forest System

ACRONYM/ABBREVIATION	DEFINITION
NGO	Non-governmental Organization
NHPA	National Historic Preservation Act
NNP	Net Neutralization Potential
NOI	Notice of Intent
NO_x	Nitrogen Oxides
NO_2	Nitrogen Dioxide
N_2O	Nitrous Oxide
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NS	Not Sampled
NTT	National Technical Team
ODA	Overburden Disposal Area
OEMR	Office of Energy and Mineral Resources
OHV	Off-Highway Vehicle
ONRR	Office of Natural Resources Revenue
OSHA	Occupational Safety and Health Administration
O_3	Ozone
P	Preservation
Pb	Lead
PCSO	Power County Sheriff's Office
PFYC	Potential Fossil Yield Classification
PHMA	Priority Habitat Management Area

ACRONYM/ABBREVIATION	DEFINITION
PPD	Pocatello Police Department
$PM_{2.5}$	Particulate Matter 2.5 Microns
PM_{10}	Particulate Matter 10 Microns
ppb	Parts Per Billion
ppbv	Parts Per Billion by Volume
ppm	Parts Per Million
PR	Partial Retention
Project	Smoky Canyon Mine, East Smoky Panel
PSD	Prevention of Significant Deterioration
PV	Pore Volume
Q/D	Concentration/Distance
R	Retention
RA	Removal Action
RFP	Revised Forest Plan
RI	Remedial Investigation
RIMS II	Regional Input-Output Modeling System
RM	Roaded Modified
RMEF	Rocky Mountain Elk Foundation
RN	Roaded Natural
RO	Reverse Osmosis
ROD	Record of Decision
ROM	Run-of-Mine
ROS	Recreation Opportunity Spectrum

ACRONYM/ABBREVIATION	DEFINITION
ROW	Right-of-Way
RRA	Runoff Recharge Area
RTP	Revised Travel Plan
SAF	Society of American Foresters
SAR	Sodium Adsorption Ratio
SCORTP	Statewide Comprehensive Outdoor Recreation and Tourism Plan
SEI	Streambank Erosion Inventory
SHI	Stream Habitat Index
SHI2	Stream Habitat Index 2
SHPO	State Historic Preservation Office
SI	Site Investigation
Simplot	J. R. Simplot Company
SIO	Scenic Integrity Objective
SIPHD	Southeast Idaho Public Health Department
SMI	Stream Macroinvertebrate Index
SMI2	Stream Macroinvertebrate Index 2
SNOTEL	National Water and Climate Center's Snow Telemetry
SO_2	Sulfur Dioxide
SPCC	Spill Prevention, Control, and Countermeasures
SPLP	Synthetic Precipitation Leach Procedure
SPNM	Semi-Primitive Non-Motorized
SPM	Semi-Primitive Motorized
SRI/CSE	Stream Reach Index/Channel Stability Evaluation

ACRONYM/ABBREVIATION	DEFINITION
SSPD	Soda Springs Police Department
SSSC	Site-Specific Selenium Criterion
SUA	Special Use Authorization
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
t $CaCO_3$/kt	tonnes Calcium Carbonate Per Kilotonne
TCP	Traditional Cultural Property
TDS	Total Dissolved Solids
TEOM	Tapered Element Oscillating Method
TEPC	Threatened, Endangered, Proposed, and Candidate
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TPA	Trees per Acre
TP2	Tailings Pond 2
TPY	tons per year
TR	Technical Report
TSS	Total Suspended Solids
TTF	Trophic Transfer Factor for benthic macroinvertebrate tissue
$TTF_{composite}$	Trophic Transfer Factor for macroinvertebrates, sculpin, and trout
UCL	Upper Confidence Level
UISS	University of Idaho Seismic Station
U.S.C.	United States Code
USDA	United States Department of Agriculture

ACRONYM/ABBREVIATION	DEFINITION
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
USGS	United States Geological Survey
VES	Visual Encounter Surveys
VFD	Volunteer Fire Department
VMS	Visual Management System
VOC	Volatile Organic Compound
VQO	Visual Quality Objective
VT	Vegetation Type
WCF	Watershed Condition Framework
WDE	Wyoming Department of Education
WDFPES	Wyoming Department of Fire Prevention and Electrical Safety
WGFD	Wyoming Game and Fish Department
WHP	Wyoming Highway Patrol
WLA	Waste Load Allocation
WOUS	Waters of the United States
WPPA	Wet Process Phosphoric Acid
WRCC	Western Regional Climate Center
WTPP	Water Treatment Pilot Plant
XRD	X-ray diffraction
XRF	X-ray fluorescence
YCT	Yellowstone Cutthroat Trout

7.3 GLOSSARY

Acid Rock Drainage (ARD). Water with pH less than 5, elevated TDS, SO4, and trace metal concentrations that result from the oxidation of acid generating sulfide minerals with subsequent dissolution and transport of the oxidation products.

Aliquots. Portions of a sample separated for individual analysis; subsamples.

Allochthon. A geological formation not formed in the region where found and moved to its present location by tectonic forces.

Alluvial. Pertaining to material or processes associated with transportation or deposition of soil and rock by flowing water (e.g., streams and rivers).

Alluvium. Soil and rock deposited by flowing water (e.g., streams and rivers); consists of unconsolidated deposits of sediment, such as silt, sand, and gravel.

Ambient. Surrounding, existing, background conditions.

Animal Unit Month (AUM). A unit used in federal and state livestock grazing permits to mean the amount of forage (i.e., food) required for one animal unit. An animal unit refers to the equivalent of one mature cow.

Anticline. An arch of stratified rock in which the layers bend downward in opposite directions from the crest.

Anthropogenic. Of, relating to, or resulting from the influence of human beings on nature.

Aquatic Influence Zones (AIZs). Defined by the National Forest as the areas between streams or water bodies and the adjacent upland area that have an influence on water quality.

Best Management Practices (BMPs). Methods that have been determined to be the most effective and practical means of preventing or reducing non-point source pollution to help achieve water quality goals. They may also include vegetative and structural methods to control erosion and sedimentation.

Biological Assessment. Information prepared by or under the direction of the federal agency concerning listed species that may be present in the action area and the evaluation of potential effects of the action on such species and habitats. The purpose of the biological assessment is to evaluate the potential effects of the action on listed or proposed species or designated or proposed critical habitat and determine whether any such species and habitats are likely to be adversely affected by the action. Biological Assessments are conducted for major federal construction projects requiring an EIS.

Bird Conservation Plan (BCP). Plans initiated by Partners in Flight to guide conservation and for birds.

Beneficial Use Reconnaissance Program (BURP). A surface water monitoring program to monitor trends in water quality.

Carbon Dioxide Equivalent (CO2e). A quantity that describes the amount of CO2, when measured over a specific time, that would have an impact on global warming potential.

Cubic Feet per Second (cfs). Metric of water flow that describes a cubic foot of water that passing over a given point on a water body (i.e., stream or river).

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). A federal law that requires potentially responsible parties to fund remediation of releases of hazardous substances. Also known as "Superfund."

Chert. A hard, dense microcrystalline or cryptocrystalline sedimentary rock, consisting chiefly of interlocking crystals of quartz; it may contain amorphous silica (opal). It has conchoidal fracture and may be white or variously colored. Chert occurs principally as nodular or concretionary segregations, or nodules in limestone and dolomite, and less commonly as layered deposits, or bedded chert; it may be an organic or inorganic precipitate or a replacement product.

Contaminants of Potential Concern (COPCs). A contaminant which may cause risk or adverse effects to humans or other plants and animals.

Contrast (visual). The effect of a striking difference in form, line, color, or texture of the landscape features within the area being viewed.

Critical (Crucial) Habitat/Range. Habitat that is present in minimum amounts and is a determining factor for population maintenance and growth.

Damage Zone. The volume of deformed wall rocks around a fault surface that results from the initiation, propagation, interaction and build-up of slip along faults.

Decibel-A Weighted (dBA). The sound pressure levels in decibels measured with a frequency weighing network corresponding to the A-scale on a standard sound level meter. The A-scale tends to suppress lower frequencies (e.g., below 1,000 Hz).

Decibel (dB). One-tenth of a Bel is a measure on a logarithmic scale that indicates the ratio between two sound powers. A ratio of 2 in power corresponds to a difference of 3 decibels between two sounds. The decibel is the basic unit of sound measure.

Desired Future Conditions (DFCs). A USFS term that describes what an area of NFS lands should be like after implementation of a particular management direction.

Deterministic model. A numerical model that is based on a single set of model parameters and predicts a single outcome; used for groundwater modeling as well as other subjects.

Discounted Service Acre Year (DSAY). The basic unit of measurement for using the Habitat Equivalency Assessment is typically a discounted-service-acre-year (DSAY). A DSAY used in this EIS represents the value of all of the wildlife habitat services provided by one acre of the habitat in one year. Services for future years are discounted, placing a lower value on benefits that will take longer to accrue. Therefore, additional acres of habitat must be restored when restoration is delayed.

Dissolution. The process of dissolving.

Distinct Population Segment (DPS). The designation of a taxonomic division of a species, as used under the Endangered Species Act.

Environmental DNA (eDNA). Genetic material obtained directly from environmental samples (soil, sediment, water, etc.) without any obvious signs of biological source material, which in the case of determining presence or absence of a fish species. It can improve upon traditional electrofishing, which may have poor capture efficiency for non-game fish species.

Electrical Conductivity (or Specific Conductance). The ability of a water or a soil-water paste to transmit electrical current, used to estimate ion concentration.

Embeddedness. The extent to which rocks (gravel, cobbles, and boulders) are buried by silt, sand, or mud on a stream bottom, used to assess aquatic habitat quality.

Endangered Species. Species in danger of extinction throughout all or a significant portion of its range.

Engineering Evaluations/Cost Analyses (EE/CA). An evaluation of methods and alternatives for restoration or cleanup of the environment.

Environmental Impact Statement (EIS). A document prepared under the National Environmental Policy Act that describes environmental effects of an action that may result in significant impacts.

Environmental Protection Measures (EPMs). Standards used to protect the environment.

Equivalent Sound Level (Leq). A term that describes the noise in the environment, as a value of sound for a specific duration.

Fahrenheit (F). A metric of temperature.

Fate and Transport. Description of the movement of a contaminant through a groundwater system which may include the effects of dilution, dispersion, attenuation and various chemical reactions.

Floodplain. The low and relatively flat areas adjacent to rivers and streams. A 100-year floodplain is that area subject to a 1 percent or greater chance of flooding in any given year.

Forage. Vegetation used for food by wildlife, particularly big game wildlife and domestic livestock.

Forbs. Any herbaceous plant other than a grass.

Game Species. Animals commonly hunted for food or sport.

Geographic Information Systems (GIS). A system that presents spatial geographic data.

Graminoid. Grasses, or more technically graminoids, are monocotyledonous, usually herbaceous plants with narrow leaves growing from the base. They include the "true grasses", of the family Poaceae, as well as the sedges and the rushes.

Greenhouse Gases (GHGs). An atmospheric gas such as water vapor, CO2, methane, and ozone, that absorb and emits radiation.

Grizzly. In mining, a grating placed over the top of a chute or ore pass used to sort various sizes of rock or ore particles. Also, a bear.

Habitat Equivalency Analysis (HEA). A quantitative ecological model used in this EIS to assess and disclose amounts of positive and negative impacts to wildlife habitat including, elimination of habitat by mining, restoration of habitat achieved through reclamation, benefits to habitat from any related mitigation proposed, and the final residual impacts that will occur to overall wildlife habitat after consideration of the positive and negative impacts to the habitat over time.

High Density Polyethylene (HDPE). A product commonly used in the production of plastic bottles, piping, and geomembranes because of its high strength to density ratio.

Hydraulic Conductivity. A coefficient of proportionality describing the rate at which water can move through a permeable medium.

Hydrologic Unit Code (HUC). A number that is used to identify a watershed.

Instruction Memorandum (IM). Supplementary documents used by the BLM to provide specific policy guidance, interpret policies, and provide immediate instruction.

Intermittent Stream. Stream that flows only part of the time or during part of the year; some segments of the stream may flow year-round.

Intermountain West Joint Venture (IWJV). A partnership to conserve bird habitats in the western United States.

Kilometer (km). A unit that measures length equivalent to 0.621 miles.

Known Phosphate Leasing Area. A land area known to contain phosphate minerals subject to competitive leasing for federally owned phosphate under authority and direction of the Mineral Leasing Act.

Land Use Plan. The organized direction or management of the use of lands and their resources to best meet human needs over time, according to the land's capabilities. Under the Federal Land Policy and Management Act (FLPMA) and the Multiple Use Sustained Yield Act of 1960, BLM and USFS prepare land use plans that direct management of local public lands and resources for "multiple use and sustained yield".

Limestone. A sedimentary rock consisting chiefly of the mineral calcite (calcium carbonate), with or without magnesium carbonate. Common impurities include chert and clay. Limestone is the most important and widely distributed of the carbonate rock and is the consolidated equivalent of limy mud, calcareous sand, and/or shell fragments. It yields lime on calcination.

Macroinvertebrate. Organisms without backbones, which are visible to the eye without the aid of a microscope, and in this case are the aquatic larval stages of insects found in stream bed substrate.

Management Prescriptions. Includes desired conditions, standards, and goals that are specific to each forest type, as applied in USFS planning terminology. NFS lands are assigned various prescriptions that have different attributes and that require different management emphasis.

Mesic. Moist habitats associated with springs, seeps, and riparian areas.

Memorandum of Understanding (MOU). A document describing an agreement of interaction between two or more parties.

Milligrams per kilogram (mg/kg). A commonly used measure of concentration; equivalent to parts per million.

Milligrams per liter (mg/L). A unit of mass in volume measurement.

Migratory Bird Treaty Act (MBTA). A law that makes it unlawful to pursue, hunt, take, capture, kill, or sell birds such raptors and songbirds.

Mine and Reclamation Plan (M&RP). A plan that describes the mining and reclamation activities of a mine.

Mitigation. Actions to avoid, minimize, reduce, eliminate, replace, or rectify the impact of a management practice.

Morphology. The study of form or structure. Used in this EIS in regard to stream channel morphology.

Notice of Intent (NOI). A formal announcement from the federal government that an Environmental Impact Statement will be prepared.

Off Highway Vehicle (OHV). Any vehicle that can drive off a paved or gravel road.

Overburden. Sub-economic or waste rock or soil that must be removed in order to recover the ore associated with a mineral deposit.

Overburden Disposal Area (ODA). An area where overburden is placed and stored.

Oxidation. A geochemical process involving chemical and mineralogic changes to rock or soil materials to atmospheric oxygen and water. The process occurs naturally but is accelerated by mining activity.

Peak Flow. The greatest flow attained during melting of winter snowpack or during a large precipitation event.

Percolation Rate. Movement of water through soil or similar material.

Perennial Stream. A stream that flows throughout the year and from source to mouth.

Permeability. The capacity of porous rock, sediment, or soil to transmit a fluid.

pH. The negative log10 of the hydrogen ion activity in solution; measure of acidity or alkalinity of a solution.

Particulate Matter (PM). Small particles or liquid droplets that are in the air. Can also be known as Particle Pollution.

PM2.5. Particulate matter less than 2.5 microns in aerodynamic diameter.

PM10. Particulate matter less than 10 microns in aerodynamic diameter.

Pore Volume (PV). The total volume of very small openings in a bed of adsorbent particles, in this case the volume of void in broken rock or soil that can be occupied by leachate.

Prevention of Significant Deterioration (PSD). A permit program to prevent environmental impacts from large sources of air pollution.

Raptor. A bird of prey (e.g., eagles, hawks, falcons, and owls).

Riparian. Situated on or pertaining to the bank of a river, stream, or other body of water. Riparian is normally used to refer to plants of all types that grow along streams, rivers, or at spring and seep sites.

Record of Decision (ROD). An official record that explains why a federal action was approved, based on alternatives and public comment assessed in a Final Environmental Impact Statement.

Recreation Opportunity Spectrum (ROS). A system for managing opportunities for recreation, often on federal lands.

Revised Forest Plan (RFP). A Plan that has been updated to reflect changes to an existing Forest land use plan. In this EIS it is the federal land use plan governing activities within the Caribou portion of the Caribou-Targhee National Forest.

Resource Management Plan (**RMP)**. Document that establishes direction for the use of resources to best meet the needs of humans over time, according to the resource potential or capability. In this EIS it is the federal land use plan governing activities within the BLM Pocatello Field Office.

Roadless Area. Natural or federal lands that are without roads.

Run-of-Mine (ROM) Overburden. Sub-economic rock mined from the phosphate deposit, which is and placed in surface dumps or as pit backfill.

Salinity. Measure of solute concentration, in grams per kilogram; "saltiness".

Scenic Integrity Objective (SIO). Scenic integrity is how visually intact people perceive the landscape to be**.** A SIO is an objective that defines how visually intact the landscape should be.

Scoping. Procedures by which agencies solicit input from the public, other agencies, and Indian tribes, to determine the extent of analysis necessary for a proposed action, (i.e., the range of actions, alternatives, and impacts to be addressed; identification of significant issues related to a proposed action; and the depth of environmental analysis, data, and task assignments needed).

Sediment Load. The amount of sediment (sand, silt, and fine particles) carried by a stream or river.

Seleniferous. In the context of this EIS, this term describes a material, most generally shale, that contains selenium or other contaminants of potential environmental concern that may pose a risk of release to the environment, primarily to water and reclamation vegetation resources.

Semi-primitive Motorized (SPM). Areas that are managed for a natural-looking environment, but vehicle assess is allowed on low standard roads and trails.

Sensitive (as in Species). Those plant or animal species that are susceptible or vulnerable to activity impacts or habitat alterations.

Shale. A fine-grained detrital sedimentary rock, formed by the compaction of clay, silt, or mud. It has a finely laminated structure, which gives it a fissility along which the rock splits readily, especially on weathered surfaces. Shale is well indurated, but not as hard as argillite or slate. It may be red, brown, black, or gray.

Significant. As used in NEPA, requires consideration of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole, and the affected region, interests, and locality. Intensity refers to the severity of impacts (40 CFR 1508.27).

Sinuosity (of a stream). A stream channel's tendency to move back and forth across its floodplain in an S-shaped pattern, over time.

Site Investigation (SI). An investigation to evaluate and report the nature and extent of contamination and fate and transport of contaminants associated with past mining practices, performed in accordance with requirements in an Administrative Order on Consent.

State Implementation Plan (SIP). A Plan created by a state for compliance with the Clean Air Act at sites that are polluted.

Stochastic Model. A numerical model type whose approach is one where model parameters that are not well defined are varied randomly within a reasonable range based on known conditions, and the results from multiple model runs are analyzed statistically.

Sodium Adsorption Ratio (SAR). Ratio of dissolved sodium to calcium and magnesium in water; provides a prediction of cation exchange reaction potential.

Special Use Authorization (SUA). A permit that authorizes the use of or action on National Forest System lands.

Split Estate. Lands are those where the surface rights are in private or State of Idaho ownership and the mineral resources are owned and managed by the federal government.

Storm Water Pollution Prevention Plan (SWPPP). A plan that is used to reduce pollutants entering waterbodies during storm (i.e., rain) events. Includes sources of pollution and control measures.

Stream Habitat Index (SHI). An aquatic habitat index that includes 10 habitat measures indicative of water quality conditions.

Stream Macroinvertebrate Index (SMI). An aquatic habitat index that includes 9 metric measures indicative of macroinvertebrate habitat.

Student's *t*-Statistic. In statistics, a method of testing hypotheses about the mean of a small sample drawn from a normally distributed population when the population standard deviation is unknown.

Swell. The increase in volume exhibited by certain soils and rocks on absorption of water; an enlarged place in an orebody.

Taxa. Plural of taxon, which is a group of one or more populations of an organism or organisms seen by taxonomists to form a unit.

Threatened Species. Any species of plant or animal which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Thrust Fault. A low-angle reverse fault produced in rocks subjected to thrust.

Total Suspended Particulate/Particles (TSP). Particulates less than 100 microns in diameter (Stokes equivalent diameter).

Total Dissolved Solids (TDS). Total amount of dissolved material, organic or inorganic, contained in a sample of water.

Ultimate Maximum Recovery. A term specified in 43 CFR 3594.1 and defined in 43 CFR 3509.0-5 to mean that all portions of a leased Federal mineral deposit be mined, based on standard industry operating practices.

Upper Confidence Limit (UCL). The value that when calculated for a random data set equals or exceeds the true mean a certain percentage of the time.

Visual Quality Objective (VQO). A desired level of excellence based on physical and sociological characteristics of an area. Refers to degree of acceptable alteration of the characteristic landscape.

Watershed. Drainage basin for which surface water flows to a single point.

Wetlands. Areas inundated by surface water or groundwater with a frequency sufficient to support vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

7.4 INDEX

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APPENDIX 4A

CNF RFP AND BLM ARMP CONSISTENCY

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APPENDIX 4A CNF RFP AND BLM ARMP CONSISTENCY

1. INTRODUCTION

Chapter 4 presents the results of environmental impact analyses for the various resources that may be affected by the Proposed Action or Alternative 1 and described and disclosed direct and indirect changes in the human environment. The significance, intensity, and duration of effects are also disclosed.

This appendix is a continuation of assessing impacts. Specifically, it contains information related to compliance of the Proposed Action and Alternative 1 to the CNF RFP and the BLM ARMP. The relationship of this EIS to federal land management agency plans, including the RFP and ARMP, was described in **Section 1.5.1** of the EIS.

The CNF RFP (USFS 2003a) establishes forest-wide requirements that apply to - and regulate - future management activities. The USFS evaluates all proposed activities against these requirements (i.e., standards and guidelines). According to the RFP:

- *Standards are used to promote the achievement of the desired future condition and objectives and to assure compliance with laws, regulations, Executive Orders or policy direction established by the Forest Service. Standards are binding limitations on management activities that are within the authority of the Forest Service to enforce. A standard can also be expressed as a constraint on management activities or practices.*

- *Guidelines are used in the same way as standards but tend to be operationally flexible to respond to variations, such as changing site conditions or changed management circumstances. Guidelines are a preferred or advisable course of action, and they are expected to be carried out, unless site-specific analysis identifies a better approach.*

Because the Project involves split-estate lands where private land overlies BLM managed federal mineral estate, the Project would need to be in compliance with certain BLM ARMP goals, objectives, and actions for these lands.

The focus in the following tables apply to both the Proposed Action and Alternative 1, unless noted otherwise. In most cases where acres are provided, they apply to the Proposed Action, since Alternative 1 would result in approximately 78 acres less disturbance within essentially the same Project Area.

2. RESOURCES

RFP and ARMP compliance information is presented below in tables organized by resource and/or topic, by order in which resources appeared in **Chapter 4**. The relevant RFP standards and guidelines are presented, along with a discussion of whether or not the Project would be in compliance with the particular standard or guideline. The standards and guidelines for Drastically Disturbed Lands, including prescriptions in Category 8.2 that are specific to phosphate lease areas are also included in the table for the applicable resource. Some resources do not have standards and guidelines that are relevant to the Project; only those that do are included in the following sections. Similarly, tables are presented to address BLM compliance on split-estate lands for various resources.

2.1 Soil Resources

Table 1 summarizes compliance with applicable standards and guidelines from the CNF RFP (USFS 2003a) with regard to soil resources under the Proposed Action and/or Alternative 1. **Table 2** summarizes compliance with applicable standards and guidelines from the BLM ARMP with regard to soil resources.

Table 1 Compliance with Applicable Caribou Forest Plan Standards and Guidelines for Soil Resources

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Soil Standard 2: Suitability for resource management activities shall be disclosed in the site-specific analysis. (RFP 3-6).	**Section 3.6** of the EIS provides detailed description of the various soil types encountered in the project area. More specifically, **Section 3.6.5** of the EIS provides a determination of reclamation suitability.
Soil Guideline 2: Maintain ground cover, microbiotic crusts, and fine organic matter that would protect the soil from erosion in excess of soil loss tolerance limits and provide nutrient cycling. (RFP 3-6).	Soil stockpiles would be protected from erosion by seeding and establishment of short-term vegetation cover. Incorporation of slash and vegetative materials into the growth medium during stripping would increase the organic matter content of the material and elevate the production potential. Reclamation would entail placing a topsoil cover and revegetating disturbed areas. This would return topsoil to a productive resource use, and along with the accompanying grading and reestablishment of drainage patterns would conserve soil by reducing erosion potential.

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Soil Guideline 3: Detrimental soil disturbance such as compaction, erosion, puddling, displacement, and severely burned soils caused by management practices should be limited or mitigated to meet long-term soil productivity goals. (RFP 3-6).	Salvaging topsoil and vegetation growth medium from disturbed areas prior to mining would occur to support long-term reclamation success. Topsoil would be removed and either direct-hauled to re-graded surfaces ready to receive topsoil or placed in topsoil stockpiles for temporary storage. Environmental staff would inspect areas shortly after they are topsoiled to ensure coverage with topsoil thickness of at least 16 inches. Stable reclaimed areas would be promoted through the use of stabilization techniques such as: placement of soil on slopes that are 3h:1v or less; scarifying soil surfaces to reduce runoff; seedbed preparation to enhance the germination rate of seeds; incorporation of fertilizer and other methods to enhance successful growth of vegetation; and/or redirection of run-on/run-off. (M&RP 2015) Low permeability layers of soil or shale in foundations of overburden disposal area slopes would be modified or removed to avoid the perching of water to prevent seeps at the face of these sites. Low permeability horizons in topsoil and subsoil under specific areas of overburden fills would be removed during topsoil stripping.

Table 2 Compliance with Applicable BLM ARMP Goals, Objectives, and Actions for Soil Resources

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Action SW-1.1.1. Appropriate management techniques, guidelines or practices (Appendix A) will be implemented to limit soil loss to an amount, generally 5 tons per acre per year (5 ton/acre/year) (Schertz 2006 as cited in BLM 2012) that will not affect its long-term quality, productivity or hydrological function.	Soil stockpiles would be protected from erosion by seeding and establishment of short-term vegetation cover. Incorporation of slash and vegetative materials into the growth medium during stripping would increase the organic matter content of the material and elevate the production potential. Reclamation would entail placing a topsoil cover and revegetating disturbed areas. This would return topsoil to a productive resource use, and along with the accompanying grading and reestablishment of drainage patterns would conserve soil by reducing erosion potential.
Action SW-1.1.2. Reclamation of disturbed sites will be done as soon as conditions (e.g., soil moisture, weather) will support or promote success.	Under the Project reclamation of disturbed areas that are no longer required for active mining operations would be conducted concurrent with other mining operations.

2.2 Vegetation Resources

Table 3 summarizes compliance with applicable standards and guidelines from the CNF RFP (USFS 2003a) with regard to vegetation resources under the Project.

Table 3 Compliance with Applicable CNF RFP Standards and Guidelines for Vegetation Resources

STANDARD OR GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Vegetation Standard 2: In each 5th code HUC which has the ecological capability to produce forested vegetation, the combination of mature and old age classes (including old growth) shall be at least 20 percent of the forested acres. At least 15 percent of all the forested acres in the HUC are to meet or be actively managed to attain old-growth characteristics (RFP 3-19).	The existing CTNF vegetation GIS coverage in the two relevant HUCs show over 90% (97% and 94%) of the forested vegetation within mature or old age structural classes. All of the forested stands that would be impacted by the Project are in mature/old age classes. However, on-site inventory showed that no acres that currently meet Region Four "Old-growth" definitions would be impacted on USFS lands. Therefore, the Project would not negatively impact the distribution of forest age classesand would be consistent with maintaining at least 20 percent mature/old age classes in the 5th code HUC that encompasses the analysis area. Because of the prevalence of mature/old aspen stands on the landscape, it is likely that at least 15 percent of the aspen forest in the watershed would still remain to be actively managed to attain old-growth characteristics under the Project.
Vegetation Guideline 1: Manage to reduce the decline of aspen and promote aspen regeneration and establishment. Provide protection from grazing where needed and consistent with management objectives.	The Proposed Action would result in the permanent loss of 521.4 acres of aspen forest. This permanent loss is not expected to impact aspen on a forest-wide scale, particularly given that stands in the Study Area are naturally patchy. In addition, Simplot would coordinate with the current permittee as needed to ensure that protection from grazing is provided.
Vegetation Guideline 3: For aspen and conifer types, acres classified as mature and old growth should be in blocks over 200 acres in size unless the natural patch size is smaller (a block can consist of a combination of mature and old-growth forest types). Within these blocks: • Maintain the dead and down woody material guidelines for wildlife. • Silvicultural techniques may be used to maintain or improve old-growth and mature forest characteristics. If a catastrophic event (such as fire) reduces the acres of old-growth and mature forest below 20 percent of the forested acres in a principal watershed, identify replacement forested acres. When necessary, use silvicultural techniques to promote desired characteristics in the replacement acres.	While the aspen forest in the Study Area is naturally patchy, none of the individual aspen stands surpass 200 acres in size (Stantec 2017h). The Proposed Action would result in a permanent loss of 521.4 acres of aspen or mixed aspen forest. This would further reduce the size of mature and old-growth areas (blocks) in the Study Area and thus further reduce mature and old-growth forest availability for wildlife habitat management.

STANDARD OR GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Plant Species Diversity Standard 1: Projects and activities shall be managed to avoid adverse impacts to sensitive plant species that would result in a trend toward federal listing or loss of viability.	There are no identified plant species listed as threatened, endangered, or proposed under the Endangered Species Act (ESA) in Caribou County (**Section 3.7.6**). No CTNF sensitive plant species or CTNF Forest Watch rare plant species have been documented in the baseline studies. The Project is in compliance with this guideline.
Plant Species Diversity Guideline 1: Native plant species from genetically local sources should be used to the extent practical for erosion control, fire rehabilitation, riparian restoration, road rights-of-way seeding, and other revegetation projects.	Native plant species from genetically local sources would be used to the extent practical. The Project would be in compliance with this guideline.
Plant Species Diversity Guideline 2: Where practical, disturbed sites should be allowed to revegetate naturally where the seed source and soil conditions are favorable (e.g., low erosion potential, deeper soils) and noxious weeds are not expected to be a problem.	The existing seed mix used for the Smoky Canyon Mine is approved by the USFS and BLM and would be used for the Project. Natural revegetation would be allowed as applicable and as directed by the USFS on NFS lands. The Project would be in compliance with this guideline.
Plant Species Diversity Guideline 3: Known occurrences or habitat for rare plants on the "Forest Watch" list and rare or unique plant communities on the Forest should be maintained.	No CTNF sensitive plant species or CTNF Forest Watch, rare plant species have been documented in the baseline studies. The Project is in compliance with this guideline.
Plant Species Diversity Guideline 4: Maintain, and where possible, increase unique or difficult-to-replace elements such as areas of high species diversity aspen, riparian areas, tall forbs, rare plant communities, etc.	The Project would be consistent with this guideline, as it would not result in the loss of riparian areas or rare plant communities. Some aspen communities which are high in species diversity would be removed as specified in Vegetation Guideline 3 compliance.
Plant Species Diversity Guideline 5: The Forest Botanist or Ecologist should review seed mixes used for revegetation to insure no adverse impacts to threatened, endangered, sensitive species; other species at risk; and the overall native flora within the analysis area.	The existing seed mix used for the Smoky Canyon Mine is approved by the USFS and BLM and would be used for the Project. Natural revegetation would be allowed as applicable and as directed by the USFS on NFS lands. The Project would be in compliance with this guideline.
Drastically Disturbed Lands Standard 7: Reclamation vegetation shall be monitored for bioaccumulation of hazardous substances prior to release for multiple-use management.	**Section 2.5** and Simplot's existing CEMPP that is reviewed and approved by the USFS identifies the environmental monitoring activities that would be undertaken at the mine to ensure the effectiveness of BMPs and mitigation measures. The Project would be in compliance with this standard.
Drastically Disturbed Lands Standard 10: Within mine areas, native vegetation shall be retained undisturbed when disturbance of the site is not necessary for minerals development or safety.	Existing vegetation would be protected to the extent practicable by limiting surface disturbance to those areas needed for operations. The Project would be in compliance with this standard.

STANDARD OR GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Drastically Disturbed Lands Guideline 2: Selection of plant species for establishment should reflect the surrounding ecosystem and post-remedial land use. Plant materials used should be adapted to the climate of the site. Consideration and preference should be given to promoting natural succession, native plant species, and structural diversity.	Agency-approved seed mixes containing native seeds would be applied. The Project would be in compliance with this guideline.
Drastically Disturbed Lands Guideline 3: Prescribe reclamation plant species known to reduce the risk of bioaccumulation of hazardous substances, if such risk is present.	Under the Project, a seed mix has been developed to encourage uptake of water from the upper soil horizon and avoid the use of selenium accumulator species. These seed mixes do not contain any trees, legumes, or deep-rooted species, which typically accumulate selenium to a greater extent than grasses and shrubs (Mackowiak and Amacher 2003; Mackowiak et al. 2004). The Project would be in compliance with this guideline.
Prescription 8.2.2 Goal 4: Emphasize the use of native plant species in reclamation but allow the use of non-natives when natives will not achieve reclamation goals.	Agency-approved seed mixes containing native seeds would be applied. The Project would be in compliance with this guideline.

Noxious Weeds

Table 4 summarizes applicable CNF RFP Standards and Guidelines for Noxious Weeds. The Project would be in compliance with these goals/objectives/actions, standards, and guidelines by use of a native seed mix that would be applied to complement the existing plant communities and reclaimed areas and by actively controlling identified noxious weeds. Appropriate BMPs, in compliance with the goals/objectives/action, standards, and guidelines listed in **Tables 4**, **5**, and **6** would be implemented to control invasive and noxious species throughout the life of proposed mining activities. Examples of these BMPs include treatment of identified invasive species, using state-certified noxious weed free hay/straw when needed, use of a seed mix that is certified as weed-free, and monitoring for noxious weeds. There is a low occurrence of noxious weeds in the Project Area, and BMPs would be implemented to minimize their potential spread. Therefore, the effects of noxious weeds from the Project would be short-term and minor.

Table 4 Compliance with Applicable CNF RFP Standards and Guidelines for Noxious Weeds

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Noxious Weeds and Invasive Species Standard 1: Only weed-free hay, straw, pellets, and mulch shall be used on the Forest.	Simplot would comply with this guideline by using only certified weed-free mulch, straw bales, etc.
Noxious Weeds and Invasive Species Standard 2: All seed used shall be certified to be free of noxious weed seeds from weeds listed on the current *All States Noxious Weeds List*.	Simplot would comply with this guideline by using only certified weed-free seed.

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Noxious Weeds and Invasive Species Standard 3: Gravel or borrow material sources shall be monitored for noxious weeds and other invasive species. Sources infested with noxious weeds shall be closed until the weeds are successfully controlled.	The Project would comply with this standard.
Noxious Weeds and Invasive Species Standard 4: Noxious weeds shall be aggressively treated throughout the Forest, unless specifically prohibited, following the Caribou Noxious Weed Strategy. Using Integrated Weed Management, methods of control, and access shall be consistent with the goals of each prescription area.	The Project would comply with this standard as Simplot would continue to implement their current noxious weed program that is approved by the USFS.
Noxious Weeds and Invasive Species Guideline 1: Weed treatment projects, especially those using herbicides, should be timed to achieve desired effects on target vegetation, while having minimal effects on non-target vegetation.	The Project would comply with this guideline as Simplot would continue to implement their current noxious weed program that is approved by the USFS.
Noxious Weeds and Invasive Species Guideline 3: Monitor, as needed, disturbed areas, such as landings, skid trails, roads, mines, burned areas, etc., for noxious weeds or invasive species and treat where necessary.	The Project would comply with this guideline as Simplot would continue to implement their current noxious weed program that is approved by the USFS through their CEMPP.
Noxious Weeds and Invasive Species Guideline 4: Evaluate the potential for invasion by noxious weeds into proposed vegetation units and wildland fire use plan areas and modify units or mitigate where necessary.	The Project would comply with this guideline as Simplot would continue to implement their current noxious weed program that is approved by the USFS through their CEMPP.

Table 5 Compliance with Applicable BLM ARMP Goals, Objectives, and Actions for Vegetation Resources

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER PROPOSED ACTION AND/OR ALTERNATIVE 1
Action ME-2.1.4. Applicable Idaho Standards for Rangeland Health (BLM 1997) will be employed to determine the success of reclamation, rehabilitation, or restoration activities following major surface disturbances on public lands.	The Project would be consistent with this action because proposed reclamation activities are designed to comply and the seed mixtures selected for reclamation contain a variety of native grass, forb, and shrub species that could provide forage for livestock and wildlife. Additional native species are predicted to colonize reclaimed areas over time through natural successional processes. Weed control would also be undertaken.
Action ME-2.2.1. Reclamation Plans for mineral development operations will be designed to attain and final reclamation will meet applicable standards (BLM	The Project would be consistent with this action because proposed reclamation activities are designed to comply and the seed mixtures selected for reclamation contain a variety of native grass, forb,

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER PROPOSED ACTION AND/OR ALTERNATIVE 1
1997) consistent with the rehabilitation potential of the disturbed site.	and shrub species that could provide forage for livestock and wildlife. Additional native species are predicted to colonize reclaimed areas over time through natural successional processes. Weed control would also be undertaken.
Action ME-2.2.2. Operational Standard 9: Within development areas, soils and native vegetation will be retained undisturbed when disturbance of the site is not necessary for minerals development or safety.	This standard would be met for the Project as disturbance would be limited to the minimum area necessary, and areas would be reclaimed and revegetated when no longer needed for mining.
Action ME-2.2.2. Operational Guideline 1: Selection of plant species for establishment will reflect the surrounding ecosystem and post-development land use. Plant materials selected for reclamation use will be adapted to the climate of the site. Consideration and preference will be given to promoting natural succession, native plant species, and structural diversity.	This guideline would be met by the Project as areas would be reclaimed with a variety of predominantly native plant species (**Table 2.4-2**) that are adapted to the local climate. The seed mixes include bunchgrasses, forbs, and shrubs for structural diversity. Reclaimed areas would also be subject to natural succession over time.
Action ME-2.3.5. In reclamation activities, plant species known to reduce the risk of bioaccumulation of hazardous substances, such as selenium, will be used if such risk is present.	The Project would be consistent with this Action. Seed mixes were designed to include predominantly shallow-rooted species, and no selenium accumulator species were included in seed mixes. The store and release cover system, which would consist of approximately two feet of chert, overlain by three feet of Dinwoody and/or Salt Lake Formation and, finally, a topsoil layer estimated at a minimum of six to twelve inches used under the Proposed Action is designed to eliminate adverse bioaccumulation of selenium. Under Alternative 1, a topsoil-only cover would be used because the potential for selenium bioaccumulation would not occur.
Action ME-2.3.6. Prior to release of any performance bond or relinquishment of a mineral lease/permit, reclamation vegetation will be monitored for bioaccumulation of hazardous substances for a period of time to be determined appropriate by the Authorized Officer.	The Project would be consistent with this Action. Simplot would conduct monitoring according to its CEMPP.

Table 6 Compliance with Applicable BLM ARMP Goals, Objectives, and Actions for Noxious Weeds and Invasive Species

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER PROPOSED ACTION AND/OR ALTERNATIVE 1
Action VE-2.1.3. When authorizing new permitted/authorized activities, stipulations will be incorporated for the prevention and treatment of invasive species/noxious weeds as applicable. Examples of such stipulations to consider will promote: • The replacement of invasive species/noxious weeds by perennial plant cover which includes purchasing and • planting of desirable seeds or plants. • The use of perennial green fire breaks when emergency stabilization and rehabilitation (ES&R) or restoration efforts are planned/implemented. • Invasive species/noxious weed management being integrated into any new or renewal of permitted/authorized activities resulting in major surface disturbance.	The Project would be consistent with this action because proposed reclamation activities are designed to comply and the seed mixtures selected for reclamation contain a variety of native grass, forb, and shrub species that could provide forage for livestock and wildlife. Additional native species are predicted to colonize reclaimed areas over time through natural successional processes. The Project would comply with this action as Simplot would continue to implement their current noxious weed program that is approved by the BLM through their CEMPP.
Action VE-2.1.4. As appropriate, chemical, biological, mechanical, and manual methods will be used in treating invasive species/noxious weeds. The use of biological control agents will be promoted when reasonable as identified through current BLM policy.	The Project would comply with this action as Simplot would continue to implement their current noxious weed program that is approved by the BLM through their CEMPP.
Action VE-2.1.5. Herbicide use will be consistent with current BLM policy (e.g., Record of Decision. Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States. Programmatic Environmental Impact Statement. US Department of the Interior, Bureau of Land Management. September 2007.)	The Project would comply with this action as Simplot would continue to implement their current noxious weed program that is approved by the BLM through their CEMPP.
Action VE-2.1.6. Projects involving the application of herbicides, pesticides and insecticides that may affect Special Status Species will be analyzed at the project level and designed such that applications will support species conservation and recovery and minimize risks of exposure.	The Project would comply with this action as Simplot would continue to implement their current noxious weed program that is approved by the BLM through their CEMPP.
Action VE-2.1.7. Control of invasive species/noxious weeds will be coordinated with adjacent land owners and local governments through cooperative management programs.	The Project would comply with this action as Simplot would continue to implement their current noxious weed program that is approved by the BLM through their CEMPP.
Action VE-2.1.8. Fuels and restoration projects will be coordinated with other programs to reduce the risk of invasive species/noxious weeds.	The Project would comply with this action as Simplot would continue to implement their current noxious weed program that is approved by the BLM through their CEMPP.
Action VE-2.1.9. Suppression equipment will be washed for invasive species/noxious weeds at designated sites.	The Project would comply with this action as Simplot would continue to implement their current noxious weed program that is approved by the BLM through their CEMPP.

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER PROPOSED ACTION AND/OR ALTERNATIVE 1
Action VE-2.1.11. Where hay or straw will be used on public lands for permitted/authorized and internal BLM activities, state-certified noxious weed free hay/straw will be required.	The Project would comply with this action as Simplot would continue to implement their current noxious weed program that is approved by the BLM through their CEMPP. Simplot would comply with this action by using only certified weed-free mulch, straw bales, etc.
Action VE-2.1.12. Integrated weed management strategies will be coordinated and developed with Tribal, Federal and State agencies and local governments at appropriate scales to restore affected BLM-administered public lands. Such strategies or actions may include but are not limited to: • coordination of treatment efforts; • identification of priority areas; • promote public awareness; and • develop educational material regarding control, prevention, etc.	The Project would comply with this action as Simplot would continue to implement their current noxious weed program that is approved by the BLM through their CEMPP.

2.3 Wildlife Resources

The CNF manages forest wildlife resources and their uses according to the CNF RFP (USFS 2003a). The DFCs and objectives for wildlife resources are achieved through the implementation of the forest-wide standards and guidelines as well as the standards and guidelines for biological elements specified in the management prescriptions of the CNF RFP. CNF uses the planning process and ongoing monitoring, evaluation, and adjustment of fish, wildlife, and rare plant standards to prevent listing of species under the ESA and to avoid the extirpation of species (USFS 2003a).

Management Prescription 8.2.2(g) of the CNF RFP lists specific standards and guidelines for wildlife in phosphate mine areas (USFS 2003a).

Bald Eagle

CNF RFP (2003a) contains a number of standards and guidelines for occupied nesting zones and home ranges. The Project would be consistent with these standards and guidelines given that no occupied nesting zones or home ranges are known to occur in or near the Study Area (**Table 7**).

Table 7 Compliance with Applicable CNF RFP Standards and Guidelines for Bald Eagle

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Activities and developments should be designed to minimize conflicts with bald eagle wintering and migration habitat.	The Project would be consistent with this guideline, as impacts to bald eagle wintering and migration habitat would be minimal relative to the species' home range size and dispersal capabilities. The nearest wintering habitat is located in Crow Creek and would not be impacted.

Boreal Owl

The CNF RFP (USFS 2003a) contains one guideline specific to boreal owls (**Table 8**).

Table 8 Compliance with Applicable CNF RFP Standards and Guidelines for Boreal Owl

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Within a 3,600-acre area around all known boreal owl nest sites, maintain over 40 percent of the forested acres in mature and old age classes.	This guideline would be met under the Project because there are no known nest sites in the Study Area, and if they are discovered, the Project would not impact enough forested habitat to change the distribution of forest age classes (which are already all either mature or old [see **Table 4.7-2**]) in the Study Area.

Columbian sharp-tailed and greater sage grouse

CNF RFP (USFS 2003a) management guidelines for Columbian sharp-tailed grouse would be the same as those described for greater sage-grouse below. In addition, the CNF RFP includes one standard specific to Columbian sharp-tailed grouse (**Table 9**). Note that the USFS management directions for greater sage-grouse were reviewed and determined to not be applicable as no PHMAs, IHMAs, GHMAs or sagebrush focal areas would be impacted by the Project.

Table 9 Compliance with Applicable CNF RFP Standards and Guidelines for Columbia Sharp-tailed and Greater Sage Grouse

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Cooperate with other state and federal agencies and private landowners to survey, inventory, and manage habitats for sage grouse and Columbian sharp-tailed grouse.	The Project would not hinder cooperation with other state and federal agencies or private landowners to survey, inventory, or manage grouse habitats.
Current guidelines for sage and sharp-tailed grouse management, such as Connelly et al. (2000), should be used as a basis to develop site-specific recommendations for proposed sagebrush treatments.	There are no known active sage or Columbian sharp-tailed grouse leks within 2 miles of the Study Area, and impacts are not expected to affect the species at the population level.
Management activities should consider proximity to active lek locations during site-specific project planning. Those within 10 miles of an active sage grouse lek and 2 miles of active sharp-tailed grouse leks should be considered further for suitability as grouse habitat.	There are no known active sage or Columbian sharp-tailed grouse leks within 2 miles of the Study Area, and impacts are not expected to affect the species at the population level.
If management activities would impact courtship, limit physical, mechanical, and audible disturbances in the breeding complex during the breeding season (March to May) within three hours of sunrise and sunset each day.	There are no known active sage or Columbian sharp-tailed grouse leks within 2 miles of the Study Area, and impacts are not expected to affect the species at the population level

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Where management actions will disturb nesting grouse, avoid manipulation or alteration of vegetation during the nesting period (May to June).	There are no known sage or active Columbian sharp-tailed grouse leks within 2 miles of the Study Area, and impacts are not expected to affect the species at the population level.

Flammulated Owl

The CNF RFP (USFS 2003a) contains one guideline specific to flammulated owls (**Table 10**).

Table 10 Compliance with Applicable CNF RFP Standards and Guidelines for Flammulated Owl

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Do not allow timber harvest activities within a 30-acre area around all known flammulated owl nest sites.	This guideline would be met under the Project because there are no known nest sites in the Study Area.

Great Gray Owl

The CNF RFP (USFS 2003a) contains the following guidelines (**Table 11**) specific to great gray owl habitat.

Table 11 Compliance with Applicable CNF RFP Standards and Guidelines for Great Gray Owl

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Within a 1,600-acre area around all known great gray owl nest sites, maintain over 40% of the forested acres in mature and old age classes.	The Project would likely not be consistent with the guideline regarding nest sites. There were two known active great gray owl nests discovered in the Study Area (**Figure 3.8-2**); however, one location was blown down as noted during baseline surveys (Stantec 2016e). The other nest site likely does not currently contain 40% of the forested acres in mature and old age classes within a 1,600-acre area because of existing vegetation communities. The Project could potentially eliminate or reduce the forested acres surrounding the nest site due to mining activities. The nest site would eventually need to be removed when it is not occupied. The Project Area is intended to be managed under Prescription 8.2.2, Phosphate Mine Areas, which applies to Federal Phosphate leases where mining is taking place and allows for the exploration or development of existing leases.

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Restrict the use of strychnine poison to control pocket gophers within a ½ mile buffer around all active great gray owl nest sites.	No strychnine use would occur for this Project.

Northern goshawk

The CNF RFP (USFS 2003a) provides standards and guidelines for management of forest habitat within active and historical northern goshawk nesting territories. Management standards and guidelines for nest areas (within 200 acres of the nest) and post-fledging family areas (within 400 acres of the nest), as described in the CNF RFP (2003a), would be followed from September to March during ground-disturbing activities, if a nest was discovered. Protective measures include, but are not limited to, no new road systems in nest and post-fledging family areas, maintain size class distribution of trees, and limit the maximum created canopy opening to less than 40 acres for post-fledgling family areas (0 acres of created openings permitted in nest areas). Because the Study Area is not currently known to contain any active nesting territories, the Project would be consistent with the RFP relative to impacts on northern goshawks.

Peregrine falcon

The CNF RFP (USFS 2003a) contains the following standard and guideline specific to peregrine falcon habitat (**Table 12**).

Table 12 Compliance with Applicable CNF RFP Standards and Guidelines for Peregrine Falcon

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Within 15 miles of all known nest sites, prohibit all use of herbicides and pesticides which cause egg shell thinning as determined by risk assessment.	The Project would be in compliance with this standard because Simplot would use only agency-approved herbicides and pesticides.
For proposed projects within two miles of known peregrine falcon nests, minimize such items as: (1) human activities (rock climbing, aircraft, ground and water transportation, high noise levels, and permanent facilities) which could cause disturbance to nesting pairs and young during the nesting period between March 15 and July 31; (2) activities or habitat alterations which could adversely affect prey availability.	This guideline would be met because there are no known peregrine falcon nests within 2 miles of the Project.

Trumpeter swan

The CNF RFP (USFS 2003a) provides one standard for trumpeter swan nesting habitat (**Table 13**).

Table 13 Compliance with Applicable CNF RFP Standards and Guidelines for Trumpeter Swan

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Maintain suitable trumpeter swan nesting habitat conditions in Elk Valley Marsh and other sites.	Since there is no known trumpeter swan nesting habitat in the Study Area, the Project would be in compliance with this standard.

General Wildlife Resources

Table 14 summarizes compliance with the CNF RFP with regard to wildlife resources for the Project. The following standards and guidelines were also reviewed but do not apply to the effects of mining on wildlife resources:

- Dead and Down Material Guideline 1
- Snag/Cavity Nesting Habitat Standards 1 through 3 and Guidelines 1 through 5
- Big Game Guideline 3

Table 14 Compliance with Applicable CNF RFP Standards and Guidelines for Wildlife Resources

STANDARD/GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Big Game Guideline 1: Provide for vegetation buffers of at least one sight distance (Thomas 1979) around big game concentration/use areas, such as wallows and mineral licks. Sight distance is the distance at which 90 percent of a deer or elk is hidden from an observer. This will vary depending on site specific stand conditions.	The Project would be in compliance with this guideline because no big game concentration areas, such as wallows or mineral licks, have been identified in the Study Area.
Big Game Guideline 2: Provide for security or travel corridors near created openings.	Over the short term, this guideline would not be met under the Project. As a result of noise and human presence, it is likely that wildlife such as big game would avoid a larger area than the actual disturbance footprint, reducing the amount of security habitat and potentially disrupting local travel corridors in the vicinity of the Project. However, the relatively small area of disturbance of the Project is not anticipated to impact security or travel corridors on a Forest-wide scale.
Prescription 8.2.2 Wildlife Guideline 1: Mining operations should be designed to accommodate big game migration.	No major big game migration corridors have been identified within the Study Area; however, because of the presence of winter range in and around the Project Area, it is likely that the Project would disrupt big game movements, at least during the short-term period of active mining. Following final reclamation and cessation of human disturbance, it is anticipated that big game would no longer avoid the area.

STANDARD/GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Prescription 2.7.1 (d) Elk and Deer Winter Range Critical and 2.7.2 (d) Elk and Deer Winter Range, Wildlife Standard 1: Biological potential for woodpeckers shall be allowed to fluctuate with natural disturbance processes and management actions designed to maintain productive winter range.	The Proposed Action would result in the long-term loss of 130 acres of elk winter range, including some aspen habitat therein that would be permanently lost. Quality of undisturbed winter range in or near the Project has the potential to be affected in the short term during construction and active mining, when human presence and noise could influence big game to avoid otherwise suitable habitats in or near the disturbance footprint. However, with final reclamation (including successful reemergence of native grass and shrub species) and cessation of human disturbance, it is anticipated that big game would return to use winter range in the impacted areas. Wildlife Standard 1 would be met as nothing would preclude the natural fluctuations of woodpeckers.
Prescription 8.2.2 Wildlife Guideline 3: Consider vegetation species that contribute to wildlife habitat needs when developing reclamation plans and create wildlife structures (slash piles, logs, rock piles) using native vegetation and materials to provide habitat diversity in created opening, where possible.	The Project would be in compliance with this guideline as a variety of native and desirable non-native grasses, forbs, and shrubs would be used in the seed mixes for reclamation to promote post-reclamation use by wildlife. Reclamation plans do not specifically incorporate the use of wildlife structures however; these structures may be used as appropriate in accordance with this guideline.
Prescription 8.2.2 Wildlife Guideline 4: Encourage construction of ledges on suitable pit walls to accommodate cliff-dwelling species.	The Project would be in compliance with this guideline as the remaining pit walls, highwalls and benches would be available for cliff-dwelling species.

Migratory Birds

Table 15 summarizes compliance with the CNF RFP with regard to migratory birds for the Project.

Table 15 Compliance with Applicable CNF RFP Standards and Guidelines for Migratory Birds

STANDARD/GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Landbirds Guideline 1: Stands of mature trees (including snags and dead-topped trees) should be maintained next to wet meadows.	Not applicable as no wet meadows occur within the Study Area.
Landbirds Guideline 2: Where feasible, maintain 30 to 50 percent of the sagebrush habitat in a 5th code HUC in contiguous blocks greater than 320 acres to support sagebrush obligate species.	The Project would be consistent with this guideline because it would not reduce any contiguous blocks of big sagebrush habitat to less than 320 acres.
Landbirds Guideline 3: Practices which stabilize or increase native grass and forbs cover in sagebrush habitats with 5% to 25% sagebrush canopy cover should be implemented.	The Project would be consistent with this guideline over the long term (though up to 55 acres of sagebrush habitat would be removed during the Project. A variety

STANDARD/GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
	of native and desirable non-native grass and forb species would be used in the seed mix.
Landbirds Guideline 4: In sagebrush habitats, manage herbaceous cover to conceal nests through the first incubation period for ground and low shrub-nesting birds.	The Project would be consistent with this guideline over the long term (though up to 55 acres of sagebrush habitat would be removed in the short term). Reclaimed areas are predicted to achieve six percent cover of sagebrush by year 90 after mining, at which point, associated herbaceous and grass cover would allow for concealment of ground and low-shrub nests.

Gray wolf

The CNF RFP includes the following management guidance (**Table 16**) for gray wolves.

Table 16 Compliance with Applicable CNF RFP Standards and Guidelines for Gray Wolves

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION OR ALTERNATIVE 1
Restrict intrusive human disturbances (motorized access, vegetation management, livestock grazing, etc.) within one mile around active den sites and rendezvous sites between April 1 and June 30 when there are five or fewer breeding pairs of wolves in the Yellowstone Nonessential Experimental Population Area (applies to the portion of the Forest east of Interstate 15) or the Central Idaho Nonessential Experimental Population Area (applies to the portion of the Forest west of Interstate 15). After six or more breeding pairs become established in each experimental population area, land use restrictions will not be necessary.	The Project would be consistent with this guidance as there are no known den sites or rendezvous sites within the Study Area.
If and when wolves are de-listed, they will be managed in accordance with approved state management plans.	The Project would be consistent with this guidance if and when the species is de-listed.

Canada lynx

Compliance with applicable USFS for Canada lynx is summarized in **Table 17**. In addition, the following management direction was reviewed and found to not be applicable to the Project:

- CNF RFP (USFS 2003a) Lands Objective 1 and Lands Standard 1

Note that Simplot, where appropriate, will reference the 2013 Canada Lynx Conservation Assessment Strategy as best available science when implementing measures per the USFS and BLM plans.

Table 17 Compliance with USFS Management Directions for Canada Lynx

MANAGEMENT DIRECTIONS	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Forest Vegetation DFC-1: Forested habitats display a diversity of structure and composition. Productive and diverse populations of plants are maintained or restored.	The Project would not hinder attainment of or progress toward this DFC. There would be an estimated removal of 583 acres of forested habitat. On a forest-wide scale, this is minor and insignificant, amounting to only 0.1 percent of the total 550,000 acres of forest habitat available in the CNF (USFS 2003).
Forest Vegetation DFC 2: In conifers, a range of structural stages exists where 30 to 40 percent of the acres are in mature and old age classes. Early successional stages are maintained through endemic insect and disease disturbance, vegetation management and fire. Patterns are within historical ranges of variability with functional corridors present.	The Project would not hinder this DFC.
Forest Vegetation DFC 3: Conifer types are maintained and disturbance processes are restored through vegetation management, endemic insect / disease disturbances, & fire.	The Project would not hinder attainment of or progress towards this DFC.
Forest Vegetation DFC 4: Quaking aspen communities are moving towards historical ranges with fire and other practices influencing structural class distribution and patterns across the landscape. Aspen forests are managed to achieve desired vegetative conditions with 20 to 30 percent in mature and old age classes, and to reduce the decline of aspen acres as a result of succession of aspen to conifer.	The Project would not hinder attainment of or progress towards this DFC. Impacts to aspen communities would be minor (90 acres). Currently, 93 percent of the aspen stands in the 5th code HUC are in old/mature age classes based on USFS mapping. All of the aspen stands that would be impacted under the Project are in mature/old age classes. On-site inventory showed that no acres that currently meet Region Four "Old-growth" definitions would be impacted. Therefore, the Project would not negatively impact the distribution of aspen forest age classes and would be consistent with maintaining at least 20 percent mature/old age classes in the 5th code HUC that encompasses the Study Area.
Non-forest DFC-1: Non-forested ecosystems: are resilient, diverse, and functioning within their site potential; display a diversity of structure and composition; and are within their historical range of variability (HRV).	The Project would not hinder attainment of or progress towards this DFC. Impacts to non-forested ecosystems would largely be temporary, and they would be reclaimed with a variety of native plant species.
Non-forest DFC-2: Non-forested ecosystems reflect a mosaic of multiple-aged shrubs, forbs, and native grasses with management emphasis on maintaining a diverse sustainable plant community. Fire regimes exist on an approximate 20 to 40-year return cycle. Patterns are within historical ranges with 30 to 50 percent of the shrubs in greater than fifteen percent canopy cover class.	The Project would not hinder attainment of or progress towards this DFC. Impacts to non-forested ecosystems would largely be temporary, and they would be reclaimed with a variety of native plant species.
Non-forest DFC-3: Rehabilitation or restoration of native shrub communities is accomplished, where site potential permits.	The Project would not hinder attainment of or progress towards this DFC.

MANAGEMENT DIRECTIONS	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Non-forest DFC-4: On areas capable of tall forb dominance, tall forb types reflect historical ranges of ground cover leading into the winter season. Composition reflects a mosaic dominance of tall forb indicator species. Disturbance regimes demonstrate stable or upward trend in tall forb indicator species. Patterns are within the historical range. Historical tall forb sites, which currently are not capable of tall forb dominance, are managed to maintain watershed stability.	The Project would not hinder attainment of or progress towards this DFC as areas capable of tall forbs would re-establish in reclaimed areas from surrounding habitats.
Non-forest DFC-5: Woodland types including mountain mahogany, juniper and maple have multiple-aged shrub layers and a balanced shrub/herbaceous understory. Patterns are within historical ranges.	The Project would not hinder attainment of or progress towards this DFC. The Study Area does not contain these woodland types.
Vegetation Goal 1: Diverse forested and non- forested ecosystems are maintained within their historic range of variability or restored through time with emphasis on aspen, aspen-conifer, mixed conifer, big sagebrush, mountain brush and tall forbs.	Short-term impacts from the Project would not be consistent with this goal; however, after reclamation activities were completed and the site had recovered to high-elevation rangeland habitat (110 years), the goal would be met.
Vegetation Goal 2: Aspen forests are managed to reduce or halt the decline of aspen acres as a result of succession of aspen to conifer.	The Project would be inconsistent with this goal, as it would permanently remove 90 acres of aspen. However, lost aspen habitat would be expected to return to high-elevation rangeland (not conifer habitat), which over time and through succession could eventually return to aspen habitat.
Vegetation Goal 3: Forested ecosystems are moving towards a balance of age and size classes in each forested vegetation type on a watershed or landscape scale. Early seral species are recruited and sustained while still providing a diversity of successional stages.	The Project would be consistent with the attainment of or progress towards this goal. The removal of 583 acres of forest habitat would not impact the distribution of forest stand age classes on the CNF or at the landscape scale. Currently, 93 percent of the aspen stands in the 5th code HUC are in old/mature age classes based on USFS mapping. All of the aspen stands that would be impacted by the Project are in mature/old age classes. On-site inventory showed that no acres that currently meet Region Four "Old-growth" definitions would be impacted. Therefore, the Project would not negatively impact the distribution of aspen forest age classes and would be consistent with maintaining at least 20 percent mature/old age classes in the 5th code HUC that encompasses the Study Area.
Vegetation Goal 4: Sagebrush steppe and mountain shrub habitats are moving toward a balance of age, canopy cover, and size class on a watershed or landscape scale that is within their HRV.	The Project would be consistent with attainment of or progress towards this goal after reclamation activities were completed and the site had recovered to big sagebrush and high- elevation rangeland habitat types.

MANAGEMENT DIRECTIONS	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Vegetation Goal 7: Biodiversity is maintained or enhanced by managing for a diverse array of habitats tied to natural process occurrence and distribution of plant communities.	The Project would be consistent with attainment of or progress towards this goal. Habitat changes resulting from the Project would be localized to the mine footprint. Maintenance of existing biodiversity on the CNF is expected.
Vegetation Standard 2: In each 5th code HUC which has the ecological capability to produce forested vegetation, the combination of mature and old age classes (including old growth) shall be at least 20 percent of the forested acres. At least 15 percent of all the forested acres in the HUC are to meet or be actively managed to attain old growth characteristics.	The Project would be consistent with this standard. Currently, 93 percent of the aspen stands in the 5th code HUC are in old/mature age classes based on USFS mapping. All of the aspen stands that would be impacted by the Project are in mature/old age classes. On-site inventory showed that no acres that currently meet Region Four "Old-growth" definitions would be impacted. Therefore, the Project would not negatively impact the distribution of aspen forest age classes and would be consistent with maintaining at least 20 percent mature/old age classes in the 5th code HUC.
Wildlife Goal 2: Wildlife biodiversity is maintained or enhanced by managing for vegetation and plant communities within their historical range of variability.	The Project would be consistent with attainment of or progress towards this goal. Habitat changes resulting from the Project would be localized to the mine footprint. Maintenance of existing wildlife biodiversity on the CNF is expected.
Wildlife Goal 3: Maintain multiple vegetation layers in woody riparian habitats that are stable or increasing with all age classes (seedlings, young plants, mature and decadent) represented to support native bird communities and other wildlife.	The Project would be consistent with this goal as no riparian areas would be impacted by the Project.
Wildlife Goal 5: Maintain, and where necessary and feasible, provide for habitat connectivity across forested and non-forested landscapes.	While localized impacts to habitat connectivity would occur during Project implementation, the revegetation and reclamation efforts would be expected to help maintain large scale habitat connectivity in the long-term. Over the short term, the haul road and other mine facilities would fragment some of the habitats in the Study Area.

Townsend's big-eared bat

The CNF RFP (USFS 2003a) includes the following guideline (**Table 18**) for sensitive bat species.

Table 18 Compliance with Applicable CNF RFP Standards and Guidelines for Townsend's Big-eared Bat

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
All abandoned underground mines should be evaluated as bat habitat prior to closure. As an alternative to collapsing mine entrances, gate abandoned mines to retain roosting and hibernation habitat for bats. (Idaho Conservation Effort, 1995, M-1)	The Project is in compliance with the applicable USFS and BLM direction for sensitive bats as no mines or caves known to be occupied by bats would be closed or otherwise impacted.

STANDARD OR GUIDELINE (FOREST-WIDE DIRECTION)	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Gating of mines should be considered where human disturbance is disturbing/displacing bats. Where gates are used, they should be designed in accordance with published literature (i.e., Tuttle and Taylor, 1994). (Idaho Conservation Effort, 1995, Appendix B)	The Project is in compliance with the applicable USFS and BLM direction for sensitive bats as no mines or caves known to be occupied by bats would be closed or otherwise impacted.
Discourage or restrict entry to mines and caves known to be occupied by hibernating bats or bats with young. Exceptions include surveys conducted by qualified personnel (Idaho Conservation Effort, 1995, I-3,4).	The Project is in compliance with the applicable USFS and BLM direction for sensitive bats as no mines or caves known to be occupied by bats would be closed or otherwise impacted.
Prior to closure of inactive or abandoned underground mines, surveys for cave-dependent species should be completed and mitigation measures implemented.	The Project is in compliance with the applicable USFS and BLM direction for sensitive bats as no mines or caves known to be occupied by bats would be closed or otherwise impacted.

North American Wolverine

Compliance with applicable USFS management directions for North American wolverine is summarized in **Table 19**.

Table 19 USFS Management Direction for the North American Wolverine

MANAGEMENT DIRECTION	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Wildlife, Desired Future Conditions, Objective 1 (Wolverine Habitat): Within two years of singing the ROD, complete a GIS analysis to identify potential wolverine natal den sites. Within four years of the ROD, survey potential wolverine natal den sites to document wolverine presence and assess suitability as natal denning habitat.	There is no potential for denning sites as the Study Area is located at too low an altitude and lacks talus slopes that could provide denning habitat.
Wolverine Guideline 1: Restrict intrusive disturbance within one mile around known active den sites, March 1 to March 15.	No wolverine den sites are known to occur within or near the Study Area. The Study Area does not provide suitable denning habitat.
Wildlife, Sensitive Species, Guideline 1: Survey for the presence of sensitive species if suitable habitats are found within a project area a minimum of once prior to or during project development.	Winter track surveys were conducted for the Project in and no tracks were observed.

Further, the BLM ARMP has several general wildlife resources goals, objectives, and actions as shown in **Table 20.**

Table 20 Compliance with BLM ARMP Goals, Objectives, and Actions for Wildlife Resources

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Goal FW-1. Manage wildlife habitats so vegetation composition and structure assures the continued presence of fish and wildlife as part of an ecologically healthy system.	The Project would be consistent with this objective over the long term because the majority of disturbed areas would be reclaimed to grassland and shrubland habitats. Over the short term, the Project would result in reduced habitat and forage for big game and other species.
Objective FW-1.1. Maintain and improve wildlife habitats to support IDFG management objectives.	The Project would be consistent with this objective over the long term because the majority of disturbed areas would be reclaimed to grassland and shrubland habitats. Over the short term, the Project would result in reduced habitat and forage for big game and other species.
Action FW-1.1.1. As appropriate and practical, elk and deer habitat on public lands will be managed as identified below in order to generally support IDFG management objectives for southeast (SE) Idaho management units. Riparian areas will be managed for habitat and population linkage areas by applying appropriate management techniques that may include but are not limited to: • Fencing, • Providing adjacent cover strips, and • Controlling noxious weeds. Aspen will be treated by applying appropriate management techniques that may include but are not limited to: • Removing encroaching conifer in Aspen clones. • Slashing old age aspen clones while leaving snags and some live trees. • Fencing degraded aspen clones. • Pursuing the use of prescribed fire. • Plowing Aspen roots to release clones. Degraded riparian areas will be restored.	The Project would be consistent with this Action because this Action item applies mostly to BLM habitat enhancement projects, which a mine is not. Reclamation activities for the Project have been designed to incorporate wildlife habitat needs as well as installing a cover on backfill and overburden that eliminates wildlife exposure to COPCs. Reclamation of disturbed areas would provide long-term wildlife habitat, although there would be habitat conversion from baseline. No riparian areas are anticipated to be disturbed by the Project.
Goal FW-2. Provide for the diversity of native and desired non-native species as part of an ecologically healthy system.	The Project would be consistent with this goal because the majority of disturbed areas would be reclaimed with a mixture of native and desirable non- native grass, forb, and shrub species. Plant species richness on reclaimed areas is anticipated to be similar to baseline species richness.

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Objective FW-2.1. Maintain or improve native and desired non-native species habitat and the connectivity among habitats.	The Project would be consistent with this objective because the majority of disturbed areas would be reclaimed with a mixture of native and desirable non- native grass, forb, and shrub species. While wildlife may avoid the mine site during active mining, the habitats in the Study Area are naturally patchy, and the Project is not anticipated to significantly disrupt habitat

2.4 Fisheries and Aquatics

Table 21 summarizes compliance with the CNF RFP with regard to AIZs for the Project. **Table 22** lists the applicable BLM ARMP goals, objectives, and actions for fisheries and aquatics.

Table 21 Compliance with Applicable CNF RFP Standards and Guidelines for AIZs

STANDARD/GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Prescription 2.8.3 Minerals/Geology Guideline 1: Locate new structures, support facilities, and roads outside AIZs. Where no alternative to siting facilities in AIZs exists, locate and construct the facilities in ways that avoid or reduce impacts to desired AIZ attributes. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity.	There would be 20.9 acres of direct disturbance to AIZs. The majority of this disturbance would be in intermittent drainages, and with the exception of a very small area near Smoky Creek where a transmission line corridor would occur, AIZs associated with perennial streams would be avoided.
Prescription 2.8.3 Minerals/Geology Guideline 4: Do not locate debris, mine overburden, excess material, leaching pads, and other facilities within Aquatic Influence Zones, unless no other alternatives are available. If no other alternative exists, ensure that safeguards are in place to prevent release or drainage of toxic or other hazardous materials onto these lands.	There would be 20.9 acres of direct impacts to AIZs. The majority of this would be direct impacts to intermittent drainage for the placement of mine facilities. These intermittent drainages do not provide aquatic habitat themselves, but may contribute to flow in downstream (unconnected) areas. Measures would be implemented to reduce COPC transport throughout the Study Area.
Prescription 2.8.3 General Riparian Area Management Guideline 1: Felled trees should remain on site when needed to meet woody debris objectives and desired AIZ attributes.	Felled trees would likely not remain on site, but would be removed. However, the AIZs impacted are intermittent drainages without defined channels or aquatic habitat and woody debris objectives are not applicable.
Prescription 2.8.3 General Riparian Area Management Guideline 2: Use herbicides, pesticides, and other toxicants and chemicals only as needed to maintain desired AIZ attributes.	There would be no herbicide, pesticide, toxicants, or chemicals used within AIZs.
Prescription 2.8.3 General Riparian Area Management Guideline 3: Avoid storage of fuels and other toxicants or refueling within AIZs unless there are no other alternatives. Any refueling sites within an AIZ should have an approved spill containment plan.	There would be no storage of fuels or toxicants, and no refueling within AIZs.

STANDARD/GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Prescription 2.8.3 Roads and Trails Guideline 1: Avoid constructing roads within the AIZ unless there is no practical alternative.	The proposed haul road would impact AIZs. Impacts would be mitigated to the extent feasible to reduce impacts to desired AIZ attributes. Measures would be implemented to reduce erosion and sedimentation.
Prescription 2.8.3 Roads and Trails Guideline 2: Culverts (permanent and temporary) should be sized so that the probability of flow exceedance is 50 percent or less during the time the culvert is expected to be in place. Consider bedload and debris when sizing culverts.	Culverts would be designed to accommodate 100-year, 24-hour or 50-year, 24-hour flow conditions.
Prescription 2.8.3 Roads and Trails Guideline 3: When feasible, use bridges, arches, and open-bottom culverts in fish-bearing streams.	No fish bearing streams would be impacted.
Prescription 2.8.3 Roads and Trails Guideline 4: Avoid placing ditch relief culverts where they may discharge onto erodible slopes or directly into streams.	Ditch relief culverts would be avoided where they may discharge onto erodible slopes or directly into streams. All culverts will be designed to minimize erosion.
Prescription 2.8.3 Roads and Trails Guideline 5: Where feasible, install cross-drainage above stream crossings to prevent ditch sediments from entering streams.	Where feasible, cross-drainage would be installed above stream crossings. Further, ditches and sediments and erosion associated with any other area of impact would be mitigated.
Prescription 2.8.3 Roads and Trails Guideline 6: New or reconstructed roads and trails should cross the AIZ riparian areas as perpendicular as possible.	No riparian areas are present in the mapped AIZs that would be impacted. However, where culverts are necessary, they would be placed perpendicular to the area to be crossed if possible.
Prescription 2.8.3 Roads and Trails Guideline 7: Avoid making channel changes on streams or drainages.	Several intermittent drainages would be changed or removed due to construction of the pit and associated facilities.
Prescription 2.8.3 Roads and Trails Guideline 8: Design and install drainage crossings to reduce the chances of turning stream flows down the road prism in case of a blocked or overflowing culvert.	Culverts would be installed to reduce the chances of turning stream flows down the road prism in case of a blocked or overflowing culvert.
Prescription 2.8.3 Roads and Trails Guideline 9: Road drainage patterns should avoid disruption of natural hydrologic flow paths.	Roads have been designed such that drainage patterns would not disrupt natural hydrologic low paths.

Table 22 Compliance with Applicable BLM ARMP Goals, Objectives, and Actions for Fisheries and Aquatic Resources

GOAL/OBJECTIVE/ACTION	COMPLIANCE UNDER PROPOSED ACTION AND/OR ALTERNATIVE 1
Action SW-2.1.4. Stream crossings, if necessary, will be designed to minimize adverse impacts on soils, water quality, and riparian vegetation and provide for fish passage, as appropriate.	Culverts would be installed to conform to the natural streambed and slope so that a minimum depth of water is always available in the culvert for fish passage. Thus, the Project would comply with BLM's action.
Action SW-2.1.5. As appropriate, new or existing roads and trails adjacent to streams or riparian areas that impact water quality may be redesigned, repaired, maintained, or re-located to a location not impacting the water quality.	Roads constructed for the Project are not anticipated to impact water quality to streams and riparian areas from new or existing roads because these resources are not present in the Project Area, plus implementation of EPMs and BMPs to control sedimentation and runoff.
Action ME-2.2.2. The following operation standards and guidelines would be applied as appropriate to reduce environmental impacts from mineral exploration and development operations: Operational Standards: 1. Locate surface disturbing activities, including support facilities, outside riparian zones (e.g., riparian habitat conservation areas (RHCAs) or areas where surface disturbance will impact the PFC of the riparian areas) and fish bearing waters. Cutthroat trout guidance will be considered as identified in Appendix C of the ARMP. Where no feasible alternative site exists, operate and construct facilities in ways that will avoid or reduce impacts on riparian zone attributes.	No riparian areas and/or fish bearing waters would be impacted by surface disturbing activities for the Project, thus compliance with this action would be met.

2.5 Land Use

The Project would comply with CNF RFP standards and guidelines for grazing management (**Table 23**) and recreation (**Table 24**).

Table 23 Compliance with Applicable CNF RFP Standards and Guidelines for Grazing Management Action

STANDARD/GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Range Resources Guideline 3: Seeding or establishment of monocultures should be avoided, and efforts should be made to establish and/or maintain a variety of desirable grass, forbs, and shrub species.	This guideline would be met for the Project. Areas no longer needed for mining would be reclaimed with a variety of predominantly native plant species that are adapted to the local climate. The seed mix includes bunchgrasses, forbs, and shrubs for structural diversity.

STANDARD/GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Forage Utilization Guideline 1: Apply upland forage utilization levels to all allotments as shown in Table 3.6 in the CNF RFP, unless determined through development of site-specific standards in the allotment management.	This guideline would be met for the Project through issuance of Annual Operating Instructions as applicable.
Livestock Grazing Permits Guideline 1: Permittees may be allowed motorized access to maintain or develop range improvements assigned in their grazing permits or for other authorized administrative activities. AMPs and Annual Operating Instructions should include direction to comply; travel permits should be issued to authorize this use.	This guideline would be met for the Project through issuance of Annual Operating Instructions as applicable.
Prescription 2.7.2(d)/Livestock Grazing Guideline 1: Livestock grazing use in the uplands should not exceed the utilization levels below unless site specific analysis shows that higher levels are appropriate: 20 percent of the current year's growth of key browse species. 45 percent of the current year's growth of key herbaceous species.	This guideline would be for the Project through issuance of Annual Operating Instructions as applicable.
Prescription 8.2.2/Livestock Grazing Guideline 1: These areas may be opened to grazing after meeting the restoration criteria identified in the mine reclamation plan.	This guideline would be met for the Project following successful restoration.

Table 24 Compliance with Applicable CNF RFP Standards and Guidelines for Recreation

STANDARD/GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Transportation/Access Guideline 1: The construction of new or maintenance of existing, motorized and non- motorized access routes should be consistent with the ROS class in which they are located.	This guideline would be met; the construction of any new ATV trails following active mining operations would be consistent with the ROS class in which they are located, although none are anticipated for the Project.
Transportation/Trails Guideline 1: Protection measures for forest system trails should be included in management activity plans and authorizations.	Not applicable as there are not forest system trails within the Project Area.

2.6 Visual Resources

Table 25 describes the CNF RFP standard for scenic resources.

Table 25 Compliance with Applicable CNF RFP Standards and Guidelines for Visual Resources

STANDARD AND GUIDELINE	COMPLIANCE UNDER THE PROPOSED ACTION AND/OR ALTERNATIVE 1
Scenic Resources Guideline 1: Opportunities to improve scenic integrity should be considered in proposed vegetative treatments.	Project design features, BMPs, and the MRP (Simplot 2015) are the elements of the Project designed to reduce environmental impacts to visual resources. Existing vegetation would be protected to the extent practical by limiting surface disturbance to those areas needed for operations. Reclamation would include providing final soil cover and replanting native vegetation. Phasing the mining and limiting the amount of disturbance at any one time would also provide opportunities to improve scenic integrity during mining activities.

APPENDIX 4B

ADAPTIVE MANAGEMENT PLAN

Adaptive Management Plan

Smoky Canyon Mine, East Smoky Panel Mine Project

Prepared for:
J.R. Simplot Company

Prepared by:
Stantec Consulting Services Inc.

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Abbreviations

AMP	Adaptive Management Plan
BLM	Bureau of Land Management
BMPs	Best Management Practices
CEMPP	Comprehensive Environmental Monitoring Program Plan
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COPC	Contaminants of Potential Concern
CTNF	Caribou-Targhee National Forest
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
IDEQ	Idaho Department of Environmental Quality
IPDES	Idaho Pollutant Discharge Elimination System
MSGP	Multi Sector General Permit
NFS	National Forest System
NPDES	National Pollution Discharge Elimination System
ODA	Overburden Disposal Area
POC	Point of Compliance
SSSC	Site-Specific Selenium Criterion
SWPPP	Stormwater Pollution Prevention Plan
USFS	U.S. Forest Service
WTPP	Water Treatment Pilot Plant

1.0 INTRODUCTION AND BACKGROUND

This Adaptive Management Plan (AMP) has been developed for J.R. Simplot Company's (Simplot) East Smoky Mine Panel Project (the Project) at the Smoky Canyon Mine, based upon comments from the Environmental Protection Agency (EPA) to the Bureau of Land Management (BLM), Pocatello Field Office and the U.S. Forest Service (USFS), Caribou-Targhee National Forest (CTNF) with cooperation from Idaho Department of Environmental Quality (IDEQ) for this Project. This AMP has been developed to address water management issues during operations and beyond.

The Smoky Canyon Mine is an open pit phosphate operation that has been in place since 1983. It is located about 10 miles southwest of Afton, Wyoming, in Caribou County, Idaho. The operation has included mining with standard open pit techniques in seven mine panels and then concentrating the phosphate content of the ore in an onsite mill. The concentrate is pumped through a buried pipeline to Simplot's existing fertilizer manufacturing plant in Pocatello, Idaho. Tailings from the Smoky Canyon milling operation are disposed in two on-site, permitted tailings disposal ponds located on private land owned by Simplot. Site-specific water management activities have been ongoing throughout operations, as well as application of numerous other best management practices (BMPs).

Despite the implementation of agency-approved water management techniques, elevated selenium concentrations in both surface waters and groundwater water were discovered down gradient of the existing Smoky Canyon Mine in the mid-1990s. Since that time, water management has continued to evolve, along with a developing understanding of the relationship between management of mined overburden materials and their effects on water quality. Due to ongoing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) investigations, Simplot has changed its overburden material handling practices as well as its water management strategies. Remediation of existing contaminated water is ongoing, including reducing the contact of surface water with overburden materials and collection/treatment of contaminated water at some major springs before it is released to the environment downstream.

Selenium is the primary constituent addressed in the ongoing CERCLA investigations and remediation activities. It has been found to be in more problematic concentrations in surface water media than other contaminants of potential concern (COPC) at the site. Mining and reclamation design at the Smoky Canyon Mine now focuses on managing seleniferous overburden to reduce its impact on surface water and groundwater quality. The Project reflects that focus.

As described in the Draft Environmental Impact Statement (EIS) for the East Smoky Panel Mine Project, Simplot proposes to: 1) mine the East Smoky Panel ore body with open pit methods; 2) transport the ore from the East Smoky Panel to the existing mill for beneficiation; 3) place initial overburden mined onto the Panel B backfill area and place the remaining overburden as backfill into the East Smoky Panel open pit; and 4) utilize an earthen evapotranspiration cover over the East Smoky Panel backfill to reduce net percolation of precipitation into the backfill material and direct surface runoff off the backfill. An Action Alternative (Alternative 1) would steepen the proposed pit slopes to eliminate mining of the Cherty Shale thereby reducing the selenium concentration in the pit backfill and potential seepage from the backfill. The Agency Preferred Alternative (Alternative 1) would reduce the proposed mine disturbance area, and reduce the amount of leachable selenium in the pit backfill.

This Project, analyzed in the Draft EIS, includes the same types of approaches to water management as are currently being used at the mine. However, the East Smoky Panel is not a component of the CERCLA action, which has informed some water management approaches that have been implemented at the mine. Designed structures would control surface water so that it does not significantly degrade other waters. Impacts to groundwater from the East Smoky Panel mining operations would be similar to the other mine panels in that surface water infiltrating through the pit backfills would leach selenium and other COPCs from the backfill and contribute dissolved contaminants to the underlying Wells Formation aquifer.

The water quality impacts for the East Smoky Panel have been estimated by groundwater modeling and selenium concentrations have been shown to temporarily (< 60 years) exceed 0.05 mg/L directly under the pit backfill and reach maximum concentrations of 0.001 mg/L or less where the groundwater discharges at Hoopes Springs. These maximum impacts are expected to arrive at the springs 80 to 90 years following mining at East Smoky Panel. No water quality impacts from the East Smoky Panel are predicted for the South Fork Sage Creek Springs.

2.0 OBJECTIVES

The overarching goal of this AMP is to ensure that the quality of surface water downstream of the Hoopes Springs would be protected to the extent necessary to meet applicable Clean Water Act and State of Idaho surface water standards both in the short term during operations and in the long term, well after the mine has been reclaimed. Several objectives will help to meet this goal:

- Implement measures for the design, installation, and maintenance of mine-site mitigation measures associated with water management that will adequately control on-site water.
- Ensure that all terms of the Points of Compliance (POC) approval between Simplot and IDEQ are met.
- Monitor the quality of on-site and off-site waters with appropriate spatial and temporal considerations to document water quality patterns and trends, with an emphasis on selenium.
- Establish specific contingencies and practices if monitoring shows that water quality is not meeting defined numeric triggers.

3.0 CONSULTATION

Several agencies are party to the East Smoky Panel Draft EIS and/or have active roles in environmental permitting/compliance issues at the Smoky Canyon Mine. This AMP has been prepared to address the individual and collective concerns of those agencies.

The BLM administers the federal phosphate leases associated with the Smoky Canyon Mine and the USFS manages the land surface within the boundaries of the CTNF. BLM and USFS are the lead agencies for the Draft EIS due to their responsibilities for the mineral resource and the National Forest System (NFS) lands, respectively. As such, they will make separate but coordinated decisions related to this Project. Their decisions will be based on the Final EIS and applicable laws, regulations, and policies.

EPA is currently responsible for administering the National Pollution Discharge Elimination System (NPDES) program under Section 402 of the Clean Water Act in Idaho. Simplot currently has permit coverage for stormwater discharges under EPA's NPDES Multi-Sector General Permit (MSGP) for industrial stormwater discharges. As this AMP is written, IDEQ is seeking approval to gain primacy over the NPDES program in the state through EPA approval of the Idaho Pollutant Discharge Elimination System (IPDES). If EPA approves the IPDES program (expected in 2018), IDEQ will administer this program in place of the NPDES program in Idaho, except for discharges to tribal water which would continue to be subject to the EPA NPDES program.

IDEQ administers Section 401 of the Clean Water Act, which includes issues related to compliance with Idaho water quality standards for surface streams. IDEQ also implements groundwater quality standards and ensures that they are complied with.

CERCLA investigations and remedial planning are ongoing at the Smoky Canyon Mine under the oversight of the EPA and/or the USFS and/or the IDEQ, exercising its authorities under state law. The BLM, Shoshone-Bannock Tribes, and U.S. Fish and Wildlife Service (USFWS) are participating as support agencies.

4.0 WATER MANAGEMENT PLAN

4.1 EAST SMOKY PANEL

Under the Agency Preferred Alternative (Alternative 1), Simplot would construct numerous stormwater management features in the East Smoky Panel area to control impacts to surface water from the active mining operations. This would include sediment ponds, ditches/channels, and associated road disturbance as presented in Chapter 2 of the East Smoky Panel Draft EIS. The design criteria and operational strategy for these features are the same as currently used for the existing operational areas of the Smoky Canyon Mine, which builds upon past experience with water management strategies and the resultant water quality implications.

While these sediment ponds would not often discharge, there would be no prohibition to them doing so, as discharge of stormwater is allowed under Simplot's existing stormwater permit. To control any such releases, all ponds would be designed with stable spillways so that any discharge does not erode the spillways or instigate structural failure of the ponds. Discharges would be sampled and assessed for COPCs as discussed in the Storm Water Pollution Prevention Plan (SWPPP) that is required by the stormwater permit.

Some of the precipitation and runoff would infiltrate into the pit backfill materials. This water would percolate through the pit backfill material, and eventually enter the underlying Wells Formation aquifer where it would be diluted and transported by the groundwater movement. The chemistry impact of this leaching of the pit backfills on percolating water has been estimated through column testing conducted with representative samples of the same overburden materials as would be incorporated into the backfills. These water chemistry inputs have then been used, along with modeling estimates of the infiltration rate into the backfill, to model potential water quality impacts to the aquifer water quality. Impacted groundwater under the East Smoky Panel moves in directions and velocities described by the groundwater modeling and can transport the added contaminants away from the pit backfill area itself. Modeling has shown that the only point where the affected groundwater would discharge to the surface environment is Hoopes Springs. All of this is described in the East Smoky Panel Draft EIS.

Past monitoring of Hoopes Springs has indicated that water quality discharging from the springs has already been impacted by the existing mining operations to a degree that Simplot has constructed a water treatment pilot plant (WTPP) and is conducting a treatability study to demonstrate treatment of dissolved selenium in the contaminated spring water. The collection and treatment technology for this pilot plant is described in the East Smoky Panel Draft EIS and various reports and planning documents in the CERCLA project record. However, the East Smoky Panel is not a component of the CERCLA action, under which the WTPP has been approved and developed. Further, there has not yet been a selection of the final remedy under CERCLA, which may or may not include the WTPP. Contaminated water discharging from Hoopes Springs is collected and piped to the WTPP where physical, biological and chemical treatment steps are used to remove dissolved selenium from the water before it is returned to the stream downgradient of Hoopes Springs. The feasibility of the treatment process is being demonstrated via the treatability study as part of the CERCLA process through two phases of construction and operation of the facility with a current design capacity of treating 2,000 gallons per minute.

Simplot has developed a Comprehensive Environmental Monitoring Program Plan (CEMPP) for the Smoky Canyon Mine that addresses required monitoring of the facilities and multiple environmental media at the mine including stormwater, seeps and springs, surface water streams, and groundwater quality at certain water supply and monitoring wells. Simplot would update this CEMPP as required by the agencies for the East Smoky Panel facilities.

4.2 GENERAL BMPS RELATED TO WATER MANAGEMENT

In addition to the ponds, basins, and ditches/channels, other structural and operational BMPs are part of Simplot's water management program or indirectly contribute to its goals. They include the following practices, among others:

- locating runoff and sediment control facilities off overburden disposal areas (ODAs) to the extent feasible to reduce infiltration of collected water into overburden fills;
- controlling snow melt by placing snow stockpiles in areas where infiltration or mixing of snow or snow melt into/with external overburden is reduced to the extent practicable;
- mining and disposing seleniferous overburden in a timely manner to reduce exposure of this material to surface weathering and oxidation;
- reducing the surface area of seleniferous ODAs to the extent practicable to limit the amount of water infiltration and potential release from these fills;
- doing pit backfilling, grading, and constructing final reclamation covers over seleniferous overburden fills contemporaneously with the mining operation in accordance with the agency-approved mining and reclamation plans;
- inspecting the facilities daily to ensure activities comply with all approvals, permits, and regulations; and,
- inspecting, maintaining, and repairing water management structures to ensure functionality.

Simplot routinely monitors and samples stormwater, groundwater, soil, sediment, aquatic biota, vegetation, and surface water, as required by the various permits and conditions of approvals. Water monitoring is described further in **Section 4.3** below.

4.3 WATER MONITORING

The CEMPP for the Smoky Canyon Mine, has incorporated any required monitoring activities for the various phases (panels) of mining at the site, and is reviewed by the Agencies each year and updated/revised as required.

Simplot also monitors stormwater that collects in various sediment ponds. This is required for compliance with the MSGP. While selenium and total suspended solids are the pollutant parameters that are required to be sampled and reported under the terms of the MSGP, additional analytes are included for some samples.

Further, CERCLA investigations include monitoring and data analysis focused on the portion of the Smoky Canyon Mine that is north of South Fork Sage Creek. The CERCLA project record provides an extensive discussion of this data.

In support of the East Smoky Panel EIS, groundwater monitoring was conducted at 32 wells at the Smoky Canyon Mine. These included 10 wells in the Wells Formation aquifer, 11 wells in the Dinwoody and Salt Lake Formations, 3 wells in the Rex Chert, and 8 wells in alluvium. The locations of these wells are shown on Figure 3.5-1 of the Draft EIS. Surface water monitoring in support of the Draft EIS was conducted at 17 springs or seeps and 21 stream channel locations. The locations of these monitoring sites are shown on Figure 3.5-13 of the Draft EIS.

Some of the above described monitoring locations are already part of the long-term monitoring program described in the CEMPP and continued monitoring of these sites would occur under that program. Other of the above described sites may be monitored on an on-going basis if they are added to the CEMPP through decisions made by the state and federal agencies authorizing the East Smoky Panel mining operations. Some baseline monitoring wells, such as ES-MW3 and ES-MW8, are located within the eventual pit footprint and for that reason would not continue to be monitored at some point. Others may be determined to be duplicative and not monitored for that reason. However, as with the entire water monitoring program currently in effect, the details on the plan's monitored locations, sites, parameters, frequency, etc. would be determined with agency input and approval on an annual basis at a minimum.

Simplot initiated coordination with IDEQ, as part of its compliance with the Idaho Ground Water Quality Rule (58.01.11), to establish "Point(s) of Compliance" (POC) outside the active mining area for the East Smoky Panel. In May 2019, Simplot submitted an application to IDEQ to establish a monitored boundary where Idaho's groundwater resources must comply with the Rule. IDEQ evaluated the hydrogeological characteristics of the mining area and surrounding land, considering the potential contaminants and their impact on groundwater quality and public health effects. They subsequently issued a POC determination wherein GW-24 will serve as a Wells Formation Aquifer POC well and wells ES-MW7, GW-27, GW-29, and GW-30 will serve as Wells Formation Aquifer indicator wells.

The potential site for groundwater discharge that could be impacted by the East Smoky Panel backfill is Hoopes Springs. The water quality at Hoopes Springs has been monitored for years and there is an extensive database of water quality records for this site. Sampling is done quarterly for a list of analytes including dissolved and total selenium.

Proactive, or indicator monitoring, for selenium contribution to Hoopes Springs via the groundwater pathway would be difficult because the predicted selenium concentrations at that location are so low (0.001 mg/L). The current (last 8 data points = baseline condition for East Smoky Panel) mean selenium concentration at the springs is 0.119 mg/L with a standard deviation of 0.008 mg/L, well above the predicted future contribution from the East Smoky Panel of 0.001 mg/L. Remedial actions at the Smoky Canyon Mine are anticipated to reduce the selenium concentration at the springs to a predicted future concentration of 0.025 mg/L in about 2050.

Even at this lower future concentration the standard deviation of the future "baseline" could be greater than the predicted contribution from East Smoky Panel. Thus, being able to discriminate the arrival of the selenium contribution from the East Smoky Panel at Hoopes Springs is likely not technically feasible. Therefore, monitoring of the total (baseline plus any addition from East Smoky Panel) selenium concentration at Hoopes Springs, without trying to discriminate the contribution from the East Smoky Panel, is the most reasonable approach to future monitoring at the site.

5.0 ADAPTIVE MANAGEMENT PLAN

Water management at the Smoky Canyon Mine has evolved over the years to respond to changing conditions and evolving understanding of site characteristics. This flexibility will continue in the future, as aided by this AMP.

5.1 ELEVATED SELENIUM CONCENTRATIONS IN HOOPES SPRINGS

It is expected that the CERCLA process at the Smoky Canyon Mine will eventually certify the pilot collection/treatment system as ready for ongoing remediation of the selenium concentration in Hoopes Springs. The current information from the CERCLA process predicts that the long-term selenium concentration at Hoopes Springs from existing sources will exceed the applicable Clean Water Act and Idaho selenium standards for the Sage Creek drainage downstream of the springs even with the recently approved 0.0167 mg/L Site-Specific Selenium Criteria (SSSC) for the water column element in Hoopes Springs and Sage Creek below the springs. Thus, long-term operation of the water treatment plant such that treated water complies with the applicable SSSC is reasonably foreseeable.

The predicted contribution of selenium from the East Smoky Panel (0.001 mg/L) would be a minor addition to the predicted long-term baseline concentration at Hoopes Springs (0.025 mg/L). The on-going collection and treatment of the contaminated water from the springs would mitigate the combined selenium load of the baseline and East Smoky Panel contribution. If source remediation and natural changes in the selenium concentration at Hoopes Springs results in total selenium concentrations in compliance with the applicable receiving stream standards, operation of the collection/treatment system could be discontinued.

The Smoky Canyon Mine is committed to the development of effective collection and treatment of South Fork Sage Creek Spring water and Hoopes Spring water to comply with the applicable SSSC for Sage Creek, downstream of the South Fork Sage Creek Springs and Hoopes Spring. This treatment work, performed by Simplot, is conducted under a CERCLA settlement agreement with the USFS to address past contamination plumes. The treatment technology is expected to address existing impacts to Hoopes Spring water quality, and the possibility of future impacts from the East Smoky Panel. The USFS and the State of Idaho will require Simplot to achieve compliance with water quality standards and maintain compliance into the future.

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APPENDIX 6A

COMMENT-RESPONSE TABLES

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Appendix 6A - Table 1 - Unique Comments and Response

This table excerpts unique comments received during the public comment period on the Draft EIS. The first column (ID number) is the letter numbering system for the nine received letters. The second column (Co ID No.) is the comment numbering within each letter. Name/Entity is the provider of the comments for each comment letter. The comment language in the Comment column is taken verbatim from the comment letter; the Comment Response column contains the Agency response to each specific comment.

ID No.	Co ID No.	Name/ Entity	Comment	Comment Response
1	1.1	OEMR	Section 2.4.3.2, page 2-12 begins a paragraph with "as needed to reduce ... ". This appears to be a portion of something that was deleted and is an incomplete paragraph. Please check this sentence and correct as needed.	A page was inadvertently deleted from the final file and resulted in missing text in the DEIS. It has been reinserted for the FEIS, which also caused some Chapter 2 section renumbering which has been fixed.
1	1.2	OEMR	Section 2.4.11, page 2-24 discusses financial assurance and that the Bureau of Land Management would require Simplot to post an actual cost reclamation performance bond in addition to those already existing for operation at the Smoky Canyon Mine. The Idaho Department of Lands also holds a surety bond for the Smoky Canyon Mine and should be included in this section for private lands.	Text added to state that IDL holds a bond for the private lands. Due to section renumbering, this edit was made to FEIS Section 2.4.13 instead of Section 2.4.11.
1	1.3	OEMR	Idaho supports the development of mineral exploration and environmental stewardship at the East Smoky Panel Mine.	Comment noted.
2	2.1	Simplot	The DEIS represents a thorough and reasoned analysis of the Proposed Action, and is apparent from the document that the agencies took a hard look at the environmental impacts. More specifically, the overall approach presented in the DEIS for evaluating potential impacts is consistent with the level of analysis expected to provide a basis for agency decisions under the National Environmental Policy Act (NEPA) and its implementing regulations.	Comment noted.
2	2.2	Simplot	Simplot supports the agency preferred alternative, which is a product of thorough analysis and careful consideration of site-specific data to conservatively develop a reasonable alternative to meet the project's purpose and need. It is also an example of the agencies utilizing the NEPA process properly by selecting appropriate mitigation based on project specific potential impacts while utilizing conservative analysis and adaptive management.	Comment noted.
2	2.3	Simplot	Due to the unique stratigraphy at the East Smoky Panel, this is the first opportunity at SCM to selectively mine overburden and leave in-situ overburden that has been tested and proven to pose the greatest risk to leaching selenium. Simplot is supportive of this approach...	Comment noted.
2	2.4	Simplot	As analyzed in the DEIS, Simplot agrees that the Proposed Action and Alternative 1 would be in compliance with the Clean Water Act (CWA) and State of Idaho water quality standards.	Comment noted.
2	2.5	Simplot	Page 4-95, last paragraph, 3rd sentence. Recommend inserting "Significant" preceding deformities as some levels of minor deformities often occur in natural populations where exposure to elevated levels of selenium is not an issue and these minor deformities do not likely affect fish population resilience.	The word "significant" has a distinct meaning in NEPA documents. In any case, the source document (EPA 2016b) references many types of deformities that have been associated with selenium exposure, thus the recommended insertion was not made, although a few edits were made to that sentence. Reference EPA. 2016b. Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016. U.S. Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, D.C. June.
2	2.6	Simplot	Page 4-96, 1st full paragraph, 4th and 5th sentences. Recommend revision of the sentence to accurately reflect the final Site Specific Selenium Criterion (SSSC) proposal. Section 3.9.5.1 also describes the adoption of site- or species-specific criteria and derivation of a whole-body threshold for brown trout of 13.6 mg/kg dw. EPA (2016b) utilized a slightly more conservative threshold for brown trout of 13.2 mg/kg dw. Both the proposed SSSC value and EPA's value for brown trout are more sensitive than thresholds for Yellowstone cutthroat trout (YCT).	Text changes to reflect the recently approved Idaho selenium criteria for aquatic life, including relevant SSSCs have been made in FEIS Sections 3.9.5.1 and 4.9.2.1 and throughout the FEIS as necessary.

ID No.	Co ID No.	Name/ Entity	Comment	Comment Response
2	2.7	Simplot	Page 4-97, assumptions… In Table 4-9.3, the DEIS uses the estimated increase in surface water concentrations to predict potential increases in brown trout whole body tissues using current (2006 to 2011) trophic transfer factors (TTFs) and enrichment factors (EFs) from the Site-specific selenium criterion (SSSC) proposal (Formation 2017). The DEIS derived the site TTFs and EFs for HS-3, LSV-2C, LSV-4, CC-1A, and CC-3A by calculating the median values from 2006 to 2011 for each site. Upon review of the data and assumptions, median EFs derived and presented match those independently derived for each site, except at CC-1A where the median EF for the available EF values was 0.77 as opposed to the reported value of 0.88. Similarly, the median TTFs reported are also correct except for CC-1A which had a median TTF of 2.64 as opposed to 2.66. The resulting whole body predicted tissue concentration increase based on these changes would be 0.28 mg/kg dw versus the reported 0.32 mg/kg dw increase.	Comment noted. Follow-up with Formation determined that no change was actually needed, but that Formation's independent verification came up with similar values.
2	2.8	Simplot	Page 4-97, last full paragraph, 3rd sentence. Recommend deletion of the reference to South Fork Tincup Creek, as there are no brown trout in SF Tincup Creek.	The sentence was not meant to imply that brown trout are in South Fork Tincup Creek (though other trout species were found per Section 3.9.5.1). Instead it was meant to refer to the brown trout threshold and the use of South Fork Tincup Creek as a reference location. However, to avoid misunderstanding the reference to South Fork Tincup has been deleted in this sentence.
2	2.9	Simplot	Simplot advances three main points in these comments as they relate to mitigation in the DEIS. First, the DEIS at 1-11 appropriately recognizes the direction contained in IM 2018-093 that limits BLM's authority to impose compensatory mitigation under FLPMA. Second, the FEIS would benefit from an explanation similar to the analysis contained in IM 2019-018 as to how the IM, FLPMA, Caribou Forest Plan, NEPA and the Council on Environmental Quality's (CEQ) mitigation hierarchy (i.e., avoid, minimize and mitigate) collectively operate to meet the agencies' various regulatory obligations with the Proposed Action and Reduced Pit Shell Alternative.	Agreed that the IM (2019-018, which now supersedes IM 2018-093), FLPMA, Caribou Forest Plan, NEPA, and CEQ represent a mitigation hierarchy (i.e., avoid, minimize and mitigate) that collectively operates to meet the agencies' various regulatory obligations. Because this EIS does not and will not include any compensatory mitigation, it is not appropriate or necessary to include a more comprehensive description of the contents of the IM. DEIS Section 1.5.3 concisely references and summarizes the IM and the IM itself is readily available to the public. Section 1.5.3 was updated to denote the current IM 2019-018.
2	2.10	Simplot	As IM 2019-018 makes clear that when BLM is considering compensatory mitigation as a component of the project proponent's submission, BLM's NEPA analysis should evaluate the need for compensatory mitigation by 1) considering the effectiveness of compensatory mitigation in reducing, resolving, or eliminating impacts of the proposed project(s), and 2) comparatively analyzing the proposal with and without the offsite compensatory mitigation. This is one of the major shortcomings of including a wide-ranging HEA analysis in a proposed action under FLPMA and NEPA.	Comment noted. There is no voluntary compensatory mitigation as part of the Proposed Action or Action Alternative. Hence, there is no subject mitigation to consider the effectiveness of or comparatively analyze. Further, as described in Section 1.5.4, the BLM is using the HEA to inform its direct and indirect effects analysis and to compare alternatives within the area of impact and the use of HEA will not be to exact mitigation.
2	2.11	Simplot	Simplot believes, as the Company has done with other similar projects, that a project-by-project voluntary and collaborative approach to mitigation is optimal for both meeting the agencies' multiple-use mandates and eliminating or minimizing unacceptable residual impacts by achieving positive results on the ground with a variety of stakeholders.	Comment noted.
2	2.12	Simplot	It needs to be noted, that to the best of Simplot's knowledge, phosphate mining in Idaho is the only activity nation-wide being required to use HEA as a part of the NEPA process and for such a method to then be used for potential off-site or compensatory mitigation determinations. This use of HEA for these purposes is problematic for a number of reasons.	Section 1.5.4 clearly states that "*The BLM will use HEA to inform its direct and indirect effects analysis and to compare alternatives within the area of impact. The use of the HEA will not be to exact mitigation.*" The DEIS does not nor will not use HEA for potential off-site or compensatory mitigation determinations.
2	2.13	Simplot	Simplot recognizes and appreciates the agencies' acknowledgement that because of the limitations inherent in the HEA model and other legal constraints, as described below, the DEIS 1-11 appropriately explains that "[t]he use of the HEA will not be to exact mitigation."	Comment noted.
2	2.14	Simplot	Simplot encourages the agencies in the FEIS to more fully explain the proper scope of the HEA analysis, and where the analysis is both useful in disclosing effects and limited because of the underlying assumptions.	The role of HEA in the EIS is adequately explained in Section 4.7.2.1. Further, HEA's limited use therein does not warrant a lengthier description of the HEA process in the EIS. The HEA study plan and metric report are part of the administrative record.

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2	2.15	Simplot	Without a substantial and transparent analysis of the HEA input variables and assumptions, presentation of model outputs can be misleading. Moreover, evaluating mitigation requirements can be, and has been performed for many years without the use of HEA. And as described in Section 4 of these comments, the use of HEA in trying to determine mitigation requirements is very problematic because it often fails to recognize BLM's authority under FLPMA and CEQ's mitigation hierarchy.	The HEA study plan and metric report are part of the administrative record. Further, the DEIS does not use HEA to determine mitigation for either vegetation (habitat) or wildlife. See Sections 4.7.3 and 4.8.3, to see that, in fact, the DEIS does not call for any additional mitigation for vegetation or wildlife resources.
2	2.16	Simplot	As stated in Section 1.5.4 of the DEIS, BLM uses the HEA to "inform its direct and indirect effects analysis and to compare alternatives within the area of impact". Expected acreage of habitat-type disturbance over the duration of mining, while considering habitat gained post reclamation, are translated into Discounted Service Acre Years (DSAYs) using assumptions for relative habitat service-level values and the economic discount rate applied to the impacts. Since the comparison is first and foremost based on the extent of physical disturbance over the life of the project, conversion to equivalent habitat units is not appropriate. It would be more informative to use the HEA model framework to quantify the disturbances for each alternative by habitat type and as habitat-acre years for each of the habitat types identified in the DEIS. The current use of the term DSAYs unnecessarily incorporates unsupported assumptions (e.g., relative habitat value and discounting) and may be misleading.	Comment noted. However, HEA and the associated reporting of DSAYs is appropriate, thus no changes will be made.
2	2.17	Simplot	Again, considering that the logic for comparison *[of DSAYS]* is based on changes in physical habitat conditions over the duration of the project, it is important to note that private lands have the potential for ever changing land use. The analysis should therefore distinguish between impacts to existing habitat provided by NFS lands versus private lands. Projections of future habitat conditions on private land is speculative in that the land owner has control of surface conditions, and those conditions may change in the future independent of this project. Quantifying the disturbance by habitat type (HAYs) as recommended above and including a break down between public and private land, as acre years, including DSAYs, better informs the public of the relative impacts of each alternative.	Comment noted and agreed regarding projections of future habitat conditions on private land. However, HEA and the associated reporting of DSAYs is appropriate, thus no changes will be made. Chapter 4 impacts are not broken out by private/public lands, thus it is not necessary to break these out for various resources in Chapter 4, including vegetation and habitat.
3	3.1	EPA	We support the reduced footprint and maximizing backfilling of the existing mine at Panel B to reestablish a more natural topography. We also acknowledge the inclusion of an adaptive management plan in response to our request during agency meetings.	Comment noted.
3	3.2	EPA	Our main concerns with the preferred alternative identified are the potential impacts to surface waters not currently meeting water quality standards for selenium and the potential to impact clean-up activities under the Comprehensive Environmental Response, Compensation, and Liabilities Act.	Comment noted. See responses that address EPA's more detailed concerns on these topics as expressed in the remaining EPA comments.
3	3.3	EPA	We support an approach to long-term site management that addresses the uncertainties with predictive modeling. Sampling at active mine sites in Southeast Idaho have shown higher than anticipated precipitation during recent periods and infiltration rates have been underestimated compared to the modeling that was conducted for these sites originally. In addition, conclusions in the DEIS regarding compliance with water quality standards rely on several assumptions related to a CERCLA remedy. A CERCLA remedy has not yet been selected.	Sections 2.2.3, 2.4.1, 2.4.3.2, 2.6.1.1, 4.5.2.3, and 5.4.6 have been revised to note that a CERCLA remedy has not yet been selected. Further, note that the Proposed Action and Alternative 1 impact assessments do not rely on any CERCLA remedy; those water quality impacts are assessed based only upon the Project, and not the impacts from past or current mining or future treatment options. The DEIS cumulative effects discussion does carefully analyze and predict that impacts to groundwater from the existing Smoky Canyon Mine are not expected to continue in perpetuity because CERCLA actions are expected to eventually reduce contaminant levels in Hoopes Spring, which are sourced from Pole Canyon, Panel A, Panel D, and Panel E. This is a reasonable conclusion even though a permanent CERCLA remedy is not in place. It is also reasonable for the Draft EIS to conclude that selection and implementation of a future permanent remedy, in combination with past remedial actions and the treatability study of Simplot's WTPP, will have a beneficial impact on the environment and returning these impacted water bodies to compliance in the long-term. For No Action, which did include the water treatment pilot plant, which has not yet been selected as a CERCLA remedy, clarification was added to Table 2.8-1 and Section 4.5.2.3.

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3	3.4	EPA	The DEIS is thorough in many aspects and provides pertinent details regarding current conditions at the site, clean-up activities under CERCLA, and predicted impacts. We acknowledge that there is ongoing monitoring at the site as part of active mining and a feasibility study is being developed as part of the clean-up process. These efforts provide valuable field data for the analysis. We appreciate the BLM's coordination and providing reference documents to assist in our review.	Comment noted.
3	3.5	EPA	The EPA is currently reviewing the state site specific criterion and anticipates taking action in 2019. Because new standards may be in effect when mining commences, we recommend comparing the impacts of the project to both the previously approved criterion (5 µg/L) and the current State adopted criterion. In the event that the current State adopted standards are approved by the EPA prior to the release of the Final EIS, we suggest including the newest approved standards in the FEIS. We also recommend expanding on the summary of water quality standards in the FEIS by discussing the implication of the Idaho site specific chronic aquatic life criterion on the project.	The DEIS compared predicted water quality estimates against the effective water quality thresholds for both groundwater and surface water that were in place at the time of the DEIS. The FEIS has been revised to reflect the recent regulatory changes to surface water standards that the comment mentions. The IDEQ will determine how surface water criteria including the newly approved Idaho selenium criteria for aquatic life, including the various site-specific criteria are applied. The POC determination, establishing compliance and indicator wells and what/how thresholds are to be met has been completed by IDEQ. Simplot was required to submit a background groundwater quality analysis for the determined POC and indicator wells to IDEQ for review and approval by January 3, 2020 (IDEQ 2020). Reference: IDEQ. 2020. Final Determination Letter from Bruce Olenick, IDEQ, to Lori Lusty, J.R. Simplot Company with enclosed determination. January 7, 2020.
3	3.6	EPA	We support considering the more conservative, higher infiltration value. The groundwater plume maps and simulations that illustrate the flow of groundwater and discharge to surface water at Hoopes Springs are helpful.	Comment noted.
3	3.7	EPA	The EPA has concerns regarding the level of detail provided regarding compliance with the Idaho groundwater rule, as well as with the increase of selenium to Hoopes Springs, a water body identified as impaired under Section 303(d) of the Clean Water Act.	The results of the groundwater fate and transport modeling for the COPCs at four locations in the impacted aquifer are presented in Table 4.5-6 and discussed in the narrative sections for each COPC that follow the table. These sections also compare the predicted COPC concentrations at Hoopes Springs to the Clean Water Act standards for Sage Creek downstream of the springs, using the newly approved Site-Specific Selenium Standards (SSSC). Additional narrative has been added to Section 3.5.2.3 (Surface Water Quality) and the subsection on selenium impacts to stream flow under Section 4.5.2.1 in the FEIS related to compliance with IDEQ requirements, including 303(d) listed stream segments.
3	3.8	EPA	GW 24 appears unimpacted and therefore could be a valid point of compliance. The flow and function of the well should be verified to ensure that an adequate baseline exists since the other wells in the vicinity have shown that groundwater contains elevated levels of selenium. We recommend that additional information be included in the FEIS regarding the proposed points of compliance, including a discussion of how the project would comply with the Idaho groundwater rule under this process.	The identification of Point(s) of Compliance with the Idaho Ground Water Quality Rule is under the control of the IDEQ and the timing of when that process will be completed is independent of the federal NEPA process. Narrative has been added in Section 4.5.2 in the FEIS that describes the status of that process. IDEQ has determined which existing monitoring wells will be used as compliance (GW-24) and indicator (ES-MW7, GW-27, GW-29, and GW-30) wells. Simplot is required to submit a background groundwater quality analysis for these five wells to IDEQ for review and approval by January 3, 2020 (IDEQ 2020). Reference: IDEQ. 2020. Final Determination Letter from Bruce Olenick, IDEQ, to Lori Lusty, J.R. Simplot Company with enclosed determination. January 7, 2020.
3	3.9	EPA	While the contribution of selenium to surface water expected from groundwater is anticipated to be below the previously approved and the Idaho-adopted chronic aquatic life criterion for selenium (modeling results show a value of 0.0007 mg/L) and not reach Hoopes Springs for decades, we are concerned that this may not be the case if clean-up activities are not successful within the projected timeframe.	This EIS does not need to analyze past sources of selenium contamination or to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. That said, the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects section (Section 5.4) briefly discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Mine project would make negligible to minor contributions to the environmental impacts while progress is being made on remediating existing problems.
3	3.10	EPA	Similarly, while we agree that treatment may be an option, we also have concerns about deferring to a pilot study, particularly when a CERCLA remedy has not yet been selected. These are critical considerations within an impaired waterbody.	See Comment Response 3.3.
3	3.11	EPA	We recommend that the FEIS clearly discuss how additional selenium loading would meet and not contribute to further degradation of water quality.	Selenium loading and implications to groundwater were discussed in the subsection titled "*Potential Mobilization of COPCs/Impact to Wells Formation*" under Section 4.5.2.1. Selenium loading and implications to surface waters were discussed in the same section under the subsection titled "*Selenium and other COPCs in stream flow*". It is clearly acknowledged that the Proposed Action would incrementally add to existing degraded water quality.
3	3.12	EPA	We acknowledge the challenge with approving a mine plan of operations interconnected with a CERCLA site.	Comment noted.

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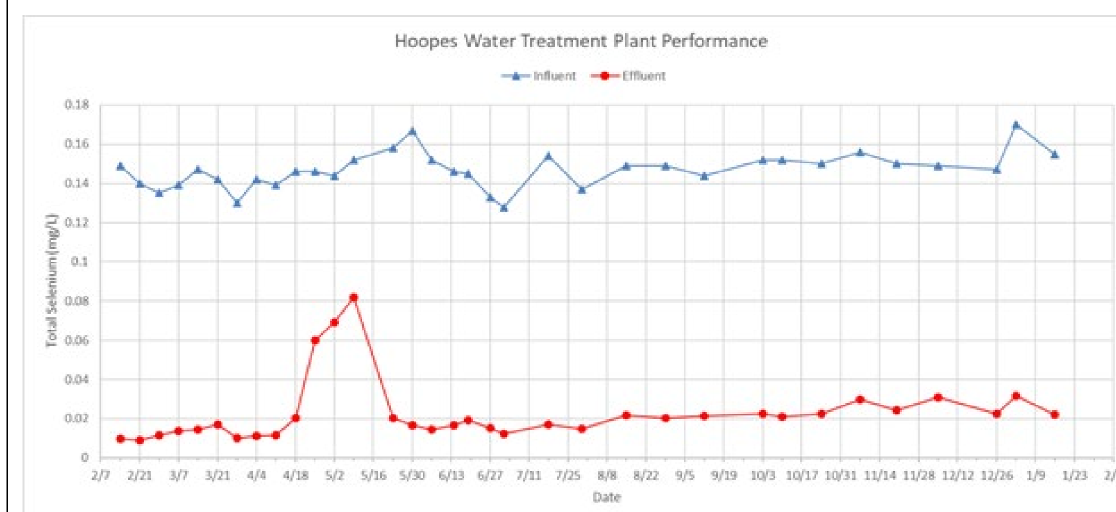
3	3.13	EPA	…the EPA is concerned with the reliance on water treatment and the assumption that clean-up will be successful in a given timeframe.	The Proposed Action and Alternative 1 impact assessments do not rely on the treatability study, a treatment plant, or any CERCLA remedy; those water quality impacts are assessed based only upon the Project, and not the impacts from past or current mining or future treatment options. Only the No Action Alternative included a discussion on the WTPP. Further, the purpose of this EIS is to evaluate the potential effects of the Proposed Action and alternatives. This EIS does not need to analyze past sources of selenium contamination or to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies.
3	3.14	EPA	The treatment plant is a vast improvement; however, the latest report shows that influent selenium concentrations from Sage Creek near Hoopes Springs are upwards of 0.152 mg/L and the effluent selenium concentration leaving the treatment plant to Crow Creek is approximately 0.02 mg/L. The treatment plant is currently not treating to the previously approved 0.005 mg/L standard or the Idaho adopted site specific criteria for selenium for Hoopes Springs of 0.017 mg/L (16.7 µg/L). Based on the current technology, it is technically challenging to remove all the selenium and the forecast of clean-up success is uncertain.	The Agencies acknowledge that the WTPP is currently not treating to the previously approved selenium standard of 0.005 mg/L or the Idaho adopted (and EPA-approved) site specific criteria for selenium for Hoopes Springs. However, the following paragraph on the WTPP has been added to Section 4.5.2.3 of the FEIS: *After the initial WTPP Phase 1 study results were considered positive, Simplot ramped up to the Phase 2 study, with a treatment capacity design of up to 2,000 gpm. The Phase 2 WTPP operations have been fully functional since mid-February 2018. From February 2018 through December 2018, average monthly flow rates ranged from 1,546 to 1,870 gpm and the average of these monthly values was 1,700 gpm. Selenium removal efficiency rates range from approximately 80 to 90 percent, except for a period in the spring where there was a problem with a component of the system due to contractor work on the WTPP. Once the problem was discovered and repaired the system recovered quickly. While the Phase 2 system is operating well and at high removal efficiencies, effluent remains above 0.005, mg/L.* Continued improvements are being sought. In addition, the following figure shows the WTPP performance between approximately February through December 2018.  The following figure shows the measured total selenium concentration and the estimated downstream concentration without the WTPP operation. As shown in the figure, current downstream selenium concentrations in Sage Creek (just upstream of the confluence with Crow Creek) are approximately 35-45% lower as a result of the WTPP.

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				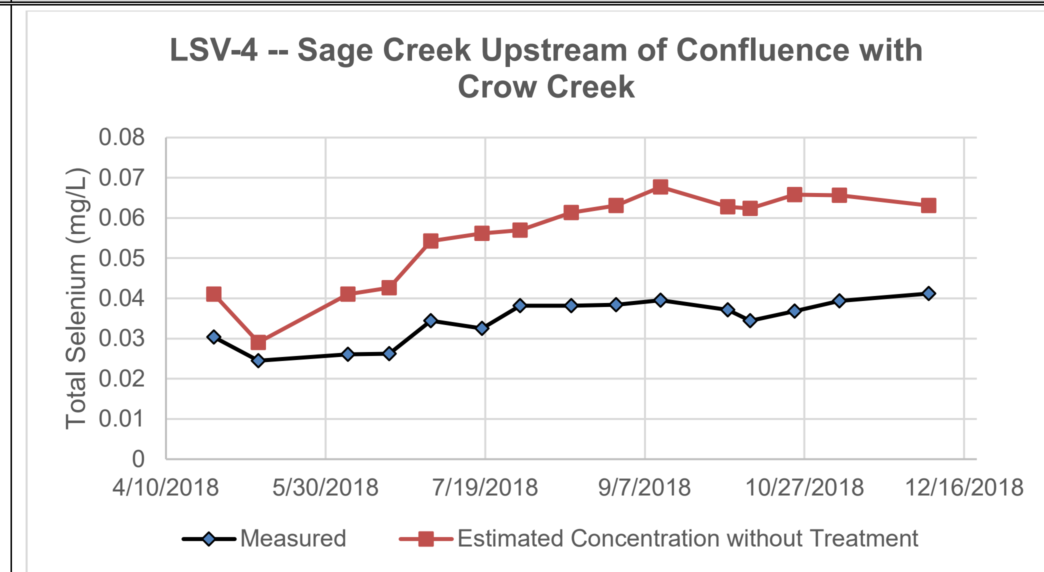
3	3.15	EPA	We acknowledge that the preferred alternative reduces mining in the seleniferous cherty shale member. However, given current conditions, we remain concerned about the inherent uncertainties with modeling, and the lack of a clean-up remedy. We recommend that the FEIS should include the most recent CERCLA predictive modeling and provide a comparison to the previously approved and the Idaho-adopted site specific chronic aquatic life criterion for selenium to demonstrate that water quality would meet the Idaho-adopted chronic aquatic life selenium criterion, if approved by the EPA, at Hoopes Springs.	The DEIS groundwater modeling incorporates a robust analysis of the uncertainties related to the modeling through use of robust stochastic modeling that included approximately 2,000 separate model runs. The results of these many model runs are analyzed statistically so the COPC concentrations reported in the DEIS are the 95% upper confidence limit of the population means predicted by the modeling. This approach to modeling increases the relative reliability of the results compared to deterministic modeling approaches. The narrative on page 4-49 of the DEIS discusses the results of the latest CERCLA groundwater modeling that was available at the time the document was written. As applicable, this narrative has been updated in the FEIS for any subsequent CERCLA modeling results that are available at the time the Final EIS is prepared. Text changes have been made in Sections 3.9.5.1 and 4.9.2.1 and elsewhere in the FEIS to include the recently approved Idaho selenium criteria for aquatic life, including SSSCs. Aquatic impacts have been updated to describe them in the context of the applicable SSSC criterion for whole-body fish tissue.
3	3.16	EPA	We appreciate the inclusion of an adaptive management plan (Appendix 4B) to consider how monitoring can be used in contingency planning to address issues with water quality.	Comment noted.
3	3.17	EPA	The current adaptive management plan provides general information and we recognize the complexities given the length of time involved in identifying an issue (-80 years). However, we recommend that additional detail be considered to demonstrate how WQS exceedances due to the project would be avoided under various potential scenarios (i.e., CERCLA remedy not completed or contaminated groundwater plume reaching Hoopes Springs sooner than anticipated). The level of detail should include the concern or issue; existing mitigation to address the issue; monitoring; standard or trigger to take further action; potential corrective actions; and the responsible party.	The selenium impact analysis for the Project on Hoopes Springs, in concert with the CERCLA modeling results is described in narrative beginning on page 4-37 of the DEIS. It shows that the increase in selenium at the springs from the Project would be about 0.001 mg/l, which by itself is well below any current or proposed WQS for selenium. The cumulative impact of adding this selenium contribution to existing and future concentrations predicted by the CERCLA modeling is also described. The reason for predicted future WQS exceedances in the springs and downstream monitoring locations is clearly not caused by the East Smoky Panel Project but by existing sources that are already the focus of CERCLA remedial actions. The timing of the appearance of selenium from the Project is not a factor in the predicted WQS exceedances. Besides the cumulative impact analysis discussion provided in Section 5.4, no further discussion on future compliance with WQS due to existing sources at the Smoky Canyon Mine was determined to be needed.
3	3.18	EPA	We appreciate the discussion in the adaptive management plan about water treatment and suggest clarifying that the new East Smoky panel is not a component of the CERCLA action.	The requested clarification has been added to Section 1.0 of the Adaptive Management Plan (Appendix 4B) for the FEIS.

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3	3.19	EPA	The DEIS states that the preferred alternative includes utilizing the currently approved overburden cap for Panel B, unless a different designed cap is selected in the CERCLA remedy. The proposed action includes a store and release cover while the preferred alternative proposes a soil-only cover. We have concerns about the cumulative effects from the existing panels, current contaminated groundwater, and the development of a new pit. To address these concerns, we recommend considering a more robust cover than the preferred alternative or deferring to the cover designed under the CERCLA remedy.	The Agency Preferred Alternative reduces the surface area of disturbance by 78 acres, further backfills Panel B to a more natural configuration, and reduces the overall selenium content of the pit backfill compared to the Proposed Action. It is very important to note that the predicted PV1, 2, and 3 selenium concentrations of the proposed backfill for the Preferred Alternative (DEIS page 4-22) are 29, 12.6, and 13.2 percent, respectively of those for Panel B (Table 4.5-3). Such low seepage concentrations, when added to the underlying groundwater, are predicted to result in selenium concentrations in the aquifer that are barely over the groundwater standard early in the modeled period but then decrease to well below the groundwater standard by 40 years into the simulation. Because there is not a predicted exceedance of the groundwater standard with the soil-only cover, the BLM believes requiring a more robust cover would be consistent with a worst-case impact analysis that is not required under NEPA.
3	3.20	EPA	We also recommend including a commitment in the FEIS that any action taken at East Smoky, such as backfilling and covering Panel B will be consistent with any future CERCLA remedy selected at the site.	The recommended commitment has been added to Sections 2.4 (Proposed Action), 2.4.3.2, (Panel B), and 2.6.1.1 (Alternative 1).
3	3.21	EPA	The DEIS mentions several types of geochemical analyses but does not mention humidity cell tests. HCTs are commonly utilized in the geochemical characterization of mine projects. The analysis for East Smoky focuses on using column tests instead, which can be appropriate given the non-acid generating nature of the overburden and orebody in this area. We recommend that the FEIS make a stronger case in the introduction about the nature of element releases from this site being independent of acid generation.	Section 3.2.3 of the FEIS has been revised to expand the discussion about the acid generation potential and release of constituents of potential concern from the proposed overburden. We note that the column testing method is designed to evaluate the kinetics of acid generation using alternating wet and dry cycles that are conceptually similar to HTCs. For this reason, HTCs were not considered to be a necessary component of the testing program. Column testing has precedent in the Western Phosphate Field and the method was used to provide data that can be directly compared to other phosphate mining sites.in the district.
3	3.22	EPA	The EIS should also provide information on the duration of the column tests and the criteria applied when determining to terminate the tests. We appreciate the BLM providing us with the East Smoky geochemistry report (referred to as Whetstone 2017) which discusses details regarding the geochemistry testing. From reviewing this document, the total duration of the column tests is unclear. We assume they were run for approximately 16 weeks, since each cycle was 19 days and there were 6 cycles, which is a shorter duration than most HCTs. We note that a shorter duration can be justified if there is sufficient reason to believe that a longer test would not generate acidic conditions or result in increased leaching rates. We recommend that the rationale for the duration of the HCTs be discussed either in the FEIS or in a supporting document.	Discussions about the duration of the column tests and adequacy of the testing period have been added to Section 3.2.3 of the FEIS. The columns were operated for six 19-day cycles (16.3 weeks), but only leachates from cycles one through four (10.9 weeks) were submitted for laboratory analysis because the results had become stabilized. Leachates from cycles five and six were held in reserve to provide head solution for optional attenuation testing described in the Study Plan (Whetstone 2015a). Ultimately, the Proponent elected not to pursue the attenuation testing and the leachates were not analyzed. Phosphatic shales of the Meade Peak Member of the Phosphoria Formation are a well-studied type of mineral deposit that has similar physical, chemical, and lithologic characteristics throughout the Western Phosphate Field (Mansfield 1927; McKelvey et al. 1955, Petrun 1999). Geochemical testing for other sites in the district (Maxim 2000, 2002a, 2002b, 2005, 2006; Whetstone 2010, 2014, 2015b; and Stantec 2015) and observation of the leaching behavior of historic overburden piles and backfills that have been in place for up to 100 years (Formation 2016; MWH 2014; Maxim 2006) and have indicated little potential for the release of acidic drainage from Idaho phosphate mine overburden. This is consistent with acid base accounting analyses (ABA) for the East Smoky Panel that indicate the average ratios of acid neutralizing potential to acid generating potential (ANP:AGP) exceed the threshold for materials with low potential to generate acidic drainage by multiplication factors ranging from 2.6 to 301. Column tests have been used to evaluate the leaching behavior of overburden in the Western Phosphate Field since 2002 (Maxim 2002a). At the request of the Agencies (USFS and BLM), a standardized column testing method was developed for the district in 2013 (Whetstone 2013). The purpose for standardization of the method was to ensure that new characterization data would be comparable to data for previously permitted sites. The columns for the East Smoky Panel were prepared and operated following the 2013 guidance. Data from the East Smoky Panel columns are consistent with previous column studies in the district that show well-defined washout curves with initial high concentrations decreasing to near steady-state levels by about the third leaching cycle (Maxim 2002a, 2002b, 2005, 2006; Whetstone 2010, 2014, 2015b). Although the other columns were operated for 7 to 20 cycles (i.e. 19 to 54 weeks), they did not demonstrate any significant trends of decreasing pH and alkalinity or increasing acidity and sulfate that would suggest the potential to go acidic. Trace metal releases for later cycles in the other columns tended to be near asymptotic at lower levels than observed during for the first two cycles. Data generated during the first four leaching cycles of the East Smoky Panel columns are sufficient to confirm this same general pattern of release. One of the primary goals of the column study for the East Smoky Panel was to provide quantitative data that could be used to specify source terms for the contaminant fate and transport analysis. The convention for source terms within the district

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				has been to use a pore volume approach based on the time required for a volume of water equal to the pore space in the stored overburden to infiltrate through a facility (BLM 2003, 2011, 2016). The assumption is that concentrations in sequential column leachates can be applied to simulate sequential pore volumes of seepage moving through field-scale overburden piles and backfill. In most cases the pore volume times for overburden storage facilities are measured in decades or hundreds of years, and only the first three or four column leachates are used for source term development. The calculated pore volume transit times for the East Smoky Panel range from 74 to 260 years based on infiltration rates for the Proposed Action modeled by Stantec (2017). The column data supported development of the source terms for four pour volumes which met the requirement of the 300-year-long contaminant transport simulation. References: BLM, 2003. Final Environmental Impact Statement, North Rasmussen Ridge Mine. BLM Pocatello Field Office, Field Office, Pocatello, Idaho. BLM, 2011. Final Environmental Impact Statement, Blackfoot Bridge Mine. BLM Pocatello Field Office, Field Office, Pocatello, Idaho. BLM, 2016. Final Environmental Impact Statement, Rasmussen Valley Mine. BLM Pocatello Field Office, Field Office, Pocatello, Idaho. Formation Environmental, 2016. Conda/Woodall Mountain Mine Remedial Investigation Report. Prepared for J.R. Simplot Company Mansfield, G., 1927. Geography, Geology, and Mineral Resources of Part of Southeastern Idaho: U.S. Department of the Interior, Geological Survey, Professional Paper 152. McKelvey, Armstrong, Gulbrandsen, and Campbell, 1955. Stratigraphic Sections of the Phosphoria Formation in Idaho, Part 2. US Department of the Interior Geological Survey Circular 301. Maxim Technologies, Inc., 2000. Baseline Overburden Environmental Geochemistry Report for the Smoky Canyon Mine, Caribou County, Idaho. Technical Report prepared for J.R. Simplot Company November 2000. Maxim Technologies, Inc., 2002a. North Rasmussen Ridge Mine Expansion Final Environmental Geochemistry Study. Prepared for Agrium Conda Phosphate Operations. Maxim Technologies, Inc., 2002b. Revised Final Simplot Smoky Canyon Expansion EIS Column Test Report. Prepared for J.R. Simplot Company. Maxim Technologies, Inc., 2005. Final Baseline Technical Report on Environmental Geochemistry for Manning and Deer Creek Phosphate Lease Areas (Panels F and G) at Smoky Canyon Mine. Prepared by Maxim Technologies for J.R. Simplot Company, March 2005. Maxim Technologies, Inc., 2006. Agrium Dry Valley Mine Operational Geochemistry Baseline Validation Study. Prepared for Agrium Conda Phosphate Operations. MWH, 2014. Remedial Investigation Report for P4's Ballard Mine. Prepared for P4 Production LLC. Petrun, R., 1999. Field Guide to the Southeast Idaho Phosphate District. In Guidebook to the Geology of Eastern Idaho, Hughes and Thackray, G., eds. p. 269-279 Stantec 2015. Geochemical Characterization Baseline Report, Simplot Dairy Syncline Mine, Caribou County, Idaho. Prepared for J.R. Simplot Company, August 2015. Stantec. 2017. Unsaturated Flow Modeling for the East Smoky Panel Mine Proposed Action Cover. Smoky Canyon Mine, East Smoky Panel Mine EIS. March. Whetstone, Associates, Inc., 2010. Revised Final Baseline Geochemical Study, Blackfoot Bridge Mine EIS. Prepared for U.S. Department of Interior Bureau of Land Management, Pocatello Field Office. March 2010. Whetstone Associates, 2013. Guidelines for Column Testing of Mine Rock in the Southeast Idaho Phosphate District. Prepared for U.S. Department of Interior Bureau of Land Management, Idaho Falls District, Pocatello Field Office and U.S. Department of Agriculture, United States Forest Service, Caribou-Targhee National Forest, Soda Springs Rangers District. Whetstone Associates, 2014. Final Baseline Geochemistry Study for the Paris Hills Phosphate Project. Prepared for Paris Hills Agricom, Ltd. Whetstone Associates, 2015a. Final East Smoky Panel Baseline Geochemistry Study Plan. Prepared for U.S. Department of Interior Bureau of Land Management, Idaho Falls District, Pocatello Field Office and U.S. Department of Agriculture, United States Forest Service, Caribou-Targhee National Forest, Soda Springs Rangers District. Whetstone Associates, 2015b. Revised Final Baseline Geochemistry Study for the Rasmussen Valley Mine Project. Prepared for U.S. Department of Interior Bureau of Land Management, Idaho Falls District, Pocatello Field Office and U.S. Department of Agriculture, United States Forest Service, Caribou-Targhee National Forest, Soda Springs Rangers District.
3	3.23	EPA	Another important factor that can affect the leaching rates is the grain size used in the columns relative to the grain size of the material expected under field conditions. Information on grain size of the column materials is provided in Whetstone 2017, which includes a discussion on how grain size in general may affect the test results. However an actual comparison or discussion of the grain sized used in the tests in this study versus the expected grain sizes in the materials in the field is missing in the DEIS.	A discussion that compares the grain sizes of material in the columns to field-placed overburden has been added to section 3.2.3 of the FEIS.
3	3.24	EPA	Whetstone 2017 provides a description of a study from the Blackfoot Bridge project indicating that grain size may not a good predictor of leaching rates. This may be the case for that particular study, although the Whetstone 2017 study of East Smoky does not appear to provide enough evidence to suggest that grain size did not impact the translation of the column tests to field conditions. We recommend including a discussion of the potential impact of grain size on the leaching results and comparing the results from the column tests to expected field conditions in the FEIS.	A discussion about potential experimental bias related to differences in grain size between the columns and field-placed overburden has been added to Section 3.2.3 of the FEIS with a reference to supporting data that are included in the baseline report (Whetstone 2017). In general, reaction rates between solids and liquids are proportional to the surface areas of the solids. Other considerations being equal, solids with large surface areas have faster reaction rates than solids with small surface areas. The potential for particle sizes to bias column leachate concentrations either high or low in comparison to seepage from field-scale facilities was evaluated by comparing particle sizes in the columns to particle sizes in backfill and overburden dumps at Enoch Valley Mine (EVM), South Rasmussen Ridge Mine (SRRM), and Smoky Canyon Mine (SCM). Data for

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				the comparison were obtained from a study by Tetra Tech (2008) that used sonic cores to sample field-placed material in the Luxor Backfill (SRRM), Enoch Valley Backfill (EVM) A-Panel External Dump (SCM), and D-Panel Backfill (SCM). The results of the comparison are presented in the following table and indicate that columns generally contain a higher percentage of sand- plus gravel-sized material and less silt- and clay-sized material than observed in field-scale facilities. This analysis suggests that column particle sizes have the potential to bias leachate concentrations low in comparison to seepage from overburden dumps and backfill. However, the relationship between particle size and reactive surface area for overburden in the Western Phosphate Field is not as direct as it first appears. A study completed for the Blackfoot Bridge Mine (Whetstone, 2010) indicated that the reactive surface area of clastic rocks from the Phosphoria Formation is independent of particle size. The study used Brunauer, Emmett, and Teller (BET) testing to determine the specific surface areas of materials in the Blackfoot Bridge columns and compared the results to calculations of surface area based on particle size. BET testing is performed by adsorbing a monolayer of nitrogen gas to the surface of the particles. The moles of adsorbed gas are then measured and used to calculate specific surface area based on the interatomic spacing of the monolayer. The results of the study indicated that the surface areas of the clastic rocks were several orders of magnitude larger than could be explained by simple geometric models based on particle size and concluded that the effective surface areas of the samples were dominated by internal pore spaces. A secondary conclusion of the study was that equal masses of large and small particles had similar surface areas. Given that overburden for the East Smoky Panel would be derived from the same geologic units as Blackfoot Bridge and has similar lithologic characteristics as Blackfoot Bridge overburden, these conclusions are considered to be directly applicable to the East Smoky Panel columns.

Weighted Average Particle Size in East Smoky Panel Columns	**Gravel**	**Sand**	**Silt and Clay**
SLF-U1	42%	47%	11%
DIN-U1	30%	55%	16%
CSH-U1	32%	53%	15%
REX-U1	25%	61%	14%
MPW-U1	28%	48%	25%
LST-U1	24%	57%	19%
ROM-U1	27%	54%	19%
Average of All Columns	29%	54%	17%

Observed Particle Sizes in Overburden Piles and Backfills	**Gravel**	**Sand**	**Silt and Clay**
South Rasmussen Ridge Luxor Backfill (5 - 7ft depth)	55.0%	23.2%	21.8%
South Rasmussen Ridge Luxor Backfill (80 - 81ft depth)	29.6%	33.2%	37.2%
South Rasmussen Ridge Luxor Backfill (99 - 101ft depth')	22.3%	32.5%	45.2%
Enoch Valley Backfill (2 – 5ft' depth)	30.2%	27.4%	42.4%
Enoch Valley Backfill (167 - 169ft depth)	17.5%	27.3%	55.2%
Smoky Canyon A Panel External Dump (3 - 4ft depth)	57.7%	27.1%	15.2%
Smoky Canyon D Panel Backfill (1 – 7ft' depth)	55.2%	36.2%	8.6%
Smoky Canyon D Panel Backfill (65 - 67ft depth)	22.5%	31.4%	46.1%
Average of all Field Data	**36.3%**	**29.8%**	**34.0%**

Based on considerations discussed in the preceding paragraph, the particle size distribution in the East Smoky Panel columns is not believed to result in significant high or low bias of leachate concentrations compared to field-scale facilities.

References
Tetra Tech, 2008. Geochemical Characterization of Phosphate Mining Overburden. Characterization of Solids and Vapor Composition in Overburden Disposal Facilities with Implications for Weathering and Selenium Release. Prepared for Idaho Phosphate Working Group.
Whetstone, Associates, Inc., 2010. Revised Final Baseline Geochemical Study, Blackfoot Bridge Mine EIS. Prepared for U.S. Department of Interior Bureau of Land Management, Pocatello Field Office. March 2010.
Whetstone. 2017. Final East Smoky Panel Baseline Geochemistry Study. Prepared for U.S. Department of Interior Bureau of Land Management, Idaho Falls District, Pocatello Field Office and U.S. Department of Agriculture, United States Forest Service, Caribou-Targhee National Forest, Soda Springs Rangers District. Document 4191A.170306. March

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3	3.25	EPA	As discussed earlier, the analysis considered three percolation rates of 2, 7 and 15 inches/year. We reviewed the groundwater modeling report and were unable to locate a reference or basis for selecting the infiltration rates. The analysis would benefit from including an explanation of how these rates were selected for the numerical model. In addition, please provide a reference to the ongoing monitoring data that supports the 15-inch percolation rate evaluated for the preferred alternative. This is an important variable in predicting the impacts of the proposed action and the model input parameters need to be fully documented and representative of expected conditions.	The process for selection of the three percolation rates is described in the "*Percolation through Reclaimed Mine Panels*" subsection beginning on page 4-20 of the DEIS. The 2- and 7-inch rates result from site-specific unsaturated flow modeling conducted on the East Smoky Panel Proposed Action cover design using measured properties of the proposed construction materials. Narrative was added to this section in the FEIS to also describe the source of the 15-inch percolation rate used in the modeling.
3	3.26	EPA	The DEIS states that a reclamation performance bond that considers the cost of complying with all permits and leases will be required. The bond would ensure that adequate funds are available to the federal government to close and reclaim the project in the event that Simplot is unable to fulfill its reclamation responsibilities. As mentioned previously, the adaptive management plan includes the potential for water treatment. We encourage the BLM to secure financial assurance for water treatment costs. Water treatment plants require maintenance and typical standard engineering practices assume replacement costs at various intervals. The EPA has previously recommended including capital replacement costs of water treatment every 50 years, at a minimum, for mines that require long-term water treatment. Because the contaminated groundwater plume is anticipated to reach the springs in over 50 years, we believe this could be an important line item in the cost estimation of the financial assurance needed. We also recommend that details regarding the estimated financial assurance be disclosed in the FEIS and the Record of Decision.	Reclamation bonding is part of BLM's inspection and enforcement program, but it is not an environmental impact or mitigation to be addressed under NEPA. Section 2.4.11 of the DEIS (Section 2.4.13 of the FEIS) describes the timing of the reclamation performance bond determination and posting, and notes that the calculation methodology would be described in the Record of Decision. Whether or not the bond calculations will include water treatment costs will be determined as part of that process.
3	3.27	EPA	Update the list of references and information in the FEIS to reflect more current data, including: • Simplot. 2017. Aquatic Resources and Fisheries Monitoring Report. • Simplot. 2018. Draft Feasibility Study Technical Memorandum #1. • Simplot. 2018. Smoky Canyon Mine "F" and "G" Panels Expansion - Deep Dinwoody Cover System Field Performance Trial 2017 Annual Performance Monitoring Report • Whetstone. 2017. Final East Smoky Panel Baseline Geochemistry Study.	In most cases in the FEIS, the Agencies have chosen not to update the baseline data sets presented in Chapter 3 or the information used to support Chapter 2 as it has been determined that the current information is sufficient to conduct an appropriate impact analysis. However, the final Whetstone 2017 geochemistry study report is now referred to throughout the FEIS instead of the draft 2016 study report that was referred to in Chapter 3 of the DEIS. Further, more recent aquatic, fisheries, water treatment effectiveness, and selected other water data were reviewed and are reported in response to various comments in this matrix. Those responses were prepared in part using information provided by Simplot and its consultants that was summarized from: • Formation Environmental. 2017. Proposed Site-Specific Selenium Criterion for Hoopes Spring, Sage Creek, and Crow Creek Near the Smoky Canyon Mine. • Formation Environmental. 2018. 2017 Aquatic Resources and Fisheries Monitoring Report. • Formation Environmental. 2019. Unpublished Voluntary monitoring data collected in 2018.
3	3.28	EPA	Include a table of water quality standards applicable to the project;	A table showing groundwater standards has been added to FEIS Section 3.5.1.2 and a table showing surface water standards has been added to FEIS Section 3.5.2.3.
3	3.29	EPA	Consistently quantify/qualify information in the FEIS, i.e., the terms "negligible" and "minor" are used to describe impacts to pertaining to the same parameter. We recommend using a consistent term to describe impacts;	The comment does not provide enough detail about where perceived inconsistencies appear. However, a review of these terms was conducted, and it was determined that they have been appropriately assigned based upon the definition of intensity terms in DEIS Table 4.1-1.
3	3.30	EPA	Section 2.3.3 Provide additional information on dual use monitoring wells and clarify whether the well network would be expanded;	Narrative has been added to this section of the FEIS generally describing the numbers of monitoring wells in the existing monitoring well network and referring the reader to Section 3.5 and Appendix 4B for more details. Additional groundwater monitoring locations are not proposed in the EIS. As described in Appendix 4B, the determinations by the IDEQ of Point(s) of Compliance have been made, with existing monitoring wells approved for use as compliance (GW-24) and indicator (ES-MW7, GW-27, GW-29, and GW-30) wells.
3	3.31	EPA	Section 2.5.5 Include a detailed monitoring plan as an appendix and discuss how the program would be expanded per the EIS text;	Section 2.5.5 of the DEIS already states that Simplot would continue -- and expand if needed -- the comprehensive water monitoring program that exists and is already in place. As also described in the Adaptive Management Plan (EIS Appendix 4B), IDEQ will be determining the need for changes to the Point(s) of Compliance groundwater monitoring network and associated indicator monitoring wells that would be used to determine if groundwater quality is out of compliance. The current and existing monitoring plan in place would be updated as a result of that process.

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3	3.32	EPA	Section 3.5.1.2 Provide a discussion regarding concentrations in groundwater and surface water considered as baseline relevant to compliance monitoring of the new panel;	Information in Section 3.5 of the DEIS was the best available information on water quality in the groundwater and surface water monitoring locations used to characterize baseline conditions for the NEPA analysis. The IDEQ will make determinations regarding what groundwater quality baseline information will be used for compliance monitoring with the Idaho Ground Water Quality Rule. The method for determining baseline conditions and increasing trends will be included in the comprehensive water monitoring program. IDEQ has finalized the Point of Compliance determination (IDEQ 2020), and baseline characterization at the compliance and indicator wells is underway. Reference: IDEQ. 2020. Final Determination Letter from Bruce Olenick, IDEQ, to Lori Lusty, J.R. Simplot Company with enclosed determination. January 7, 2020.
3	3.33	EPA	Section 3.23 We recommend that the FEIS clarify which types of analyses listed address biologically mediated reduction and oxidation of selenium. From looking at the list of analysis, they seem to focus on abiotic processes and would not cover biologically mediation reactions. In addition, Whetstone 2016 does not provide much information on the column tests apart from a discussion of what materials were selected for these tests. However, Whetstone 2017 does provide this information and we recommend that it be added to the references here;	A statement regarding bacterial mediation of redox reactions for selenium has been added to section 3.2.3 of the FEIS and references to the preliminary data memorandum (Whetstone 2016) have been modified to refer to the final geochemistry report (Whetstone 2017) where appropriate. We note that the laboratory analyses completed for the column study do not differentiate between abiotic or biologically mediated releases of selenium, but instead focus on the total mobility of selenium in water. The 2013 column testing guidance for the Southeast Idaho Phosphate District (Whetstone 2013) specifies that the columns are not to be inoculated with bacteria or sterilized to eliminate bacteria that naturally exist in the solid sample material. This provision is in response to Agency concerns regarding the feasibility of collecting, identifying, and culturing representative populations of bacteria in the inoculant and column, and of monitoring the constructed facilities to determine if the biologic communities reflect those modeled in the column. It is noted, however, that available data suggest that inoculated and un-inoculated columns will produce leachates with similar selenium concentrations (Maxim 2005). References Maxim Technologies, Inc., 2005. Final Baseline Technical Report on Environmental Geochemistry for Manning and Deer Creek Phosphate Lease Areas (Panels F and G) at Smoky Canyon Mine. Prepared by Maxim Technologies for J.R. Simplot Company, March 2005. Whetstone Associates, 2013. Guidelines for Column Testing of Mine Rock in the Southeast Idaho Phosphate District. Prepared for U.S. Department of Interior Bureau of Land Management, Idaho Falls District, Pocatello Field Office and U.S. Department of Agriculture, United States Forest Service, Caribou-Targhee National Forest, Soda Springs Rangers District. Whetstone Associates. 2017. Final East Smoky Panel Baseline Geochemistry Study. Prepared for U.S. Department of Interior Bureau of Land Management, Idaho Falls District, Pocatello Field Office and U.S. Department of Agriculture, United States Forest Service, Caribou-Targhee National Forest, Soda Springs Rangers District. Document 4191A.170306. March
3	3.34	EPA	Section 3.2.3 In terms of characterizing the geochemistry of the site, the document states that other Meade Peak units were analyzed separately. We recommend that the FEIS clarify what is meant by “separately". Please clarify in the FEIS whether this means that the same type of analysis was conducted on the other Meade Peak units using a different lab, conducted at a different time period, or that the other materials were subjected to a different type of analysis;	The DEIS narrative includes the statement, "Upper, middle, and lower Meade Peak units were analyzed separately". This is intended to communicate that the Meade Peak Member was not analyzed as a composite of the three units within it. Rather, each of the Meade Peak units were individually analyzed at the same time and by the same lab as part of the geochemical characterization efforts.
3	3.35	EPA	Section 3.2.3 We recommend that it is important to include a discussion on the representativeness of the materials used in the geochemical characterization. Table 13, along with the narrative in sections 3 and 5 in Whetstone 2016 address this; and we recommend that it would be helpful to see all of this information summarized in a single table that includes the estimated material from each unit (i.e.> the information in Table 13), including a column that shows the percentage of samples used for the different geochemical characterizations from each unit. Adding this additional column to Table 13 could be used to replace some of the narrative text in sections 3 and S, if needed;	A simplified summary of this information, with references to the mine plan and baseline report, has been added to Section 3.2.3.
3	3.36	EPA	Section 3.3.3.1 We recommend that the FEIS indicate whether any adjustments were made to the precipitation values used in the water quality modeling based on the expected deviations from the Soda Springs dataset;	Narrative has been added to Section 4.5.2 of the FEIS indicating that the groundwater modeling utilized NOAA precipitation data for the eastern highlands of Idaho and for the period of 2000 to 2012 (HGG 2015). These data show an annual average precipitation of 15.44 inches which correlates well to the Soda Springs data shown in Table 3.3-4. Reference: HydroGeo Group (HGG). 2015. Plan of Study for Numerical Modeling, East Smoky Panel, Smoky Canyon Mine. Caribou, County, Idaho. October.

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3	3.37	EPA	Section 3.5.1.2 We recommend that the FEIS provide a discussion about why the results from GW-27 are different from the other sites mentioned in the preceding sentences;	The narrative in this section already states that the groundwater chemistry of GW-27 is based on a single sample compared to eight sampling events for most of the other wells discussed in this section. That difference in sampling frequency can be responsible for some of the differences in solute chemistry between GW-27 and the other wells. However additional data collected from that well under other monitoring programs (e.g., the Remedial Investigation) is available (see Comment Response 4.19). Additionally, GW-27 is located on the southern limit of the Project Area boundary for the EIS and is furthest away from the majority of the mining activities in the Study Area. This additional narrative has been added to this section in the FEIS.
3	3.38	EPA	Section 3.5.2 We recommend that the FEIS provide information regarding the potential for fugitive dust to contribute to surface loadings;	Compliance with the air permit would ensure only negligible impacts to surface water from airborne dust settling. No additional text was deemed necessary to be added.
3	3.39	EPA	Section 4.1.1.3 The text states that mitigation is proposed where applicable. We recommend including a comprehensive list of proposed mitigation measures here;	Text has been added as requested to reference subsections where resource-specific mitigation is not proposed and to list mitigation for the few resources where new mitigation is proposed.
3	3.40	EPA	Section 4.5.2 We recommend that the FEIS provide a reference to the document where the input parameters are described, which is equally as important as providing information on the model outputs. Of specific interest to agency decision makers and the public would be the details regarding the precipitation rates used in the model. We recommend that the FEIS state how these rates were determined for this specific area and whether they take years with above average precipitation levels into consideration. In addition, we recommend that the FEIS discuss how the infiltration rates were determined. Infiltration rates can be an important input parameter in environmental models and therefore, we recommend that the source of this information be reviewed critically to determine that the samples used are representative of the spatial variability within the area being modeled;	The groundwater model assumptions are described in Chapter 3 of the groundwater modeling report which is cited in the EIS narrative as (HGG 2018). The model inputs, including precipitation and recharge rates, are described in chapter 4 of the modeling report. The precipitation inputs used for the groundwater model were obtained from the USDA monthly PRISM database for the model domain. This resulted in a range of annual precipitation rates ranging from 22 to 38 inches per year with an average for the model domain of 29 inches. The cover annual percolation rates were modeled using a 111-year daily precipitation database for 1904 to 2015 that produced an average annual precipitation of 31.4 inches per year (Stantec 2017f). As described in Section 6.2.1.1 of the cover modeling report, other climate datasets used in the cover modeling included: 1) the 1-year above average used for initial model conditions (34.4 inches), the last 7 years of the 111-year period (33.1 inches), and the wettest 5 consecutive years from the 111-year database (41.5 inches). References: HGG. 2018. Technical Memorandum: East Smoky Panel of the Smoky Canyon Mine, Numerical Modeling Report. Final. January. Stantec. 2017f. Unsaturated Flow Modeling for the East Smoky Panel Mine Proposed Action Cover. Smoky Canyon Mine, East Smoky Panel Mine EIS. March.
3	3.41	EPA	Section 4.5.2.1 We recommend that the FEIS include an uncertainty analysis on this calculation, using a range of potential values to identify the degree to which this affects the predicted groundwater concentrations;	Please see Section 4.5.2, which describes the stochastic modeling approach used to predict the groundwater impacts from the Proposed Action and Alternative 1. The stochastic approach inherently includes analysis of variability in the most important model parameters and presents the results statistically to the 95% UCL.
3	3.42	EPA	Section 4.5.2.1 We recommend that the FEIS discuss whether there were any temperature corrections made in translating the column data to the field predictions given the difference in temperatures;	Column leaching data were not corrected for temperature for use in the contaminate fate and transport analysis. The average temperature in the column room during testing was 19.8 °C with a median value of 20.0 °C and standard deviation of 0.45 °C. Internal temperature measurements for the Luxor (South Rasmussen Valley Mine), Enoch Valley (Enoch Valley Mine), and Smoky Canyon D Panel (Smoky Canyon Mine) backfills during August 2006 ranged from 10.4 to 11.9 °C (Tetra Tech 2008). The Luxor, Enoch Valley and Smoky Panel D backfills are located near the Project and provide reasonable analogs for the expected temperature conditions in the East Smoky Panel. Given that the solubility for most elements increases with increasing temperature, it is a conservative assumption to omit a temperature correction from the fate and transport analysis. There are a number of other factors that make it difficult to scale laboratory testing results to a field setting with confidence. These factors include the lower infiltration rate and longer duration of the water-rock contact time in a pit backfill compared to columns and the development of well-flushed preferential flow paths in backfill that result in the leaching of a relatively small percentage of the overburden compared to the columns. Because these factors cannot be quantified with accuracy, it is generally more appropriate to evaluate the uncertainty of the impact predictions using a sensitivity analysis approach. Reference: Tetra Tech, 2008. Geochemical Characterization of Phosphate Mining Overburden. Characterization of Solids and Vapor Composition in Overburden Disposal Facilities with Implications for Weathering and Selenium Release. Prepared for Idaho Phosphate Working Group.
3	3.43	EPA	Section 4.5.2.1 One of the columns appears to have been run as a replicate. Some of the selenium data have relative percent differences of over 200% between the two replicate samples. We recommend that the FEIS include a discussion of how this variability and uncertainty within the column tests is incorporated into the water quality modeling predictions	Total analyses for leachates from column ROM-U1 were used to develop the source terms for the four COPCs considered in the DEIS contaminant fate and transport analysis. The COPCs include sulfate, manganese, selenium, and total dissolved solids. The replicate column ROM-U2 was developed to provided data that could be used to evaluate experimental reproducibility. ROM-U2 was designated as the QC column prior to the start of the leaching tests.

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				With the exception of the sulfate analysis for Cycle 2 (RPD = 40%) and the selenium analysis for Cycle 1 (RPD = 229%) all analyses for the modeled COPCs from column ROM-U1 met the RPD measurement quality objective (MQO) of <35% stated in the study plan (Whetstone 2015). Inspection of the data pairs in question indicates that the analyses for both analytes from both columns were below regulatory standards for surface water and groundwater. The reported values (ROM-U1/ROM-U2) are 54.3/32.4 mg/l for Cycle 2 sulfate and 0.0014/0.0046 mg/l for Cycle 1 selenium. The source of variation in the analyses for the two sample pairs is unclear; however, the variability is not sufficient to change the conclusions of the impact prediction or result in predicted exceedances of water quality standards. The reproducibility of column data is included as part of the updated uncertainty discussion in Section 4.5.2.1 of the FEIS. Reference: Whetstone Associates, 2015. Final East Smoky Panel Baseline Geochemistry Study Plan. Prepared for U.S. Department of Interior Bureau of Land Management, Idaho Falls District, Pocatello Field Office and U.S. Department of Agriculture, United States Forest Service, Caribou-Targhee National Forest, Soda Springs Rangers District.
3	3.44	EPA	Section 4.5.2.1 We recommend that the FEIS provide information in the text associated with this table (as well as others where column data are compared to water quality standards) as to whether the data from the tests represents filtered or whole water samples (i.e., dissolved metals or total recoverable metals?)	Several clarifications on whether the metals concentrations apply to dissolved or total recoverable were added to the FEIS text and tables associated with the column data.
3	3.45	EPA	Section 4.5.2.1 We recommend that the FEIS include information on the time increment that the mean values represent, i.e., whether the values represent daily, monthly, or annual mean values;	The mean values at GW-16 and GW-29 as referenced on pages 4-19 and 4-41 of the DEIS reflect the average of the monitoring data collected during the two-year baseline study. See footnotes for DEIS Figure 3.5-4. A reference to that figure and note has been added to the FEIS text where those means are mentioned.
3	3.46	EPA	Section 5.4.3.1 We recommend that the FEIS discuss how the CERCLA action monitoring and East Smoky monitoring will be integrated; and	Text has been added to the end of Section 5.4.3.1 to note that Simplot currently integrates water monitoring required by various programs, including CERCLA, and to confirm that process would continue with the current Project.
3	3.47	EPA	Section 5.4.5.2 The text refers to anticipated selenium reductions at Pole Canyon occurring 10 years from the removal action. We recommend that the FEIS include information about the results from monitoring this action and how it is connected to the proposed project.	Per the text in Section 5.4.5.2, Pole Canyon is one of the contributing sources of selenium to Hoopes Springs. Selenium from the Project would also eventually reach Hoopes Springs, thus Pole Canyon is described as related to cumulative effects. Otherwise, it is not connected to the Project. Regarding the effectiveness of the Pole Canyon removal actions including monitoring results, please see Section 4.5.2.3 (No Action Alternative). Although additional information will not be added to the FEIS, a brief summary of the results of the monitoring of the Pole Canyon is provided below. <u>Background Information:</u> More recent publications are available that provide effectiveness monitoring data associated with the Pole Canyon Non-Time-Critical Removal Actions (NTCRAs) (Formation Environmental 2018) and predictions of future discharge concentrations at the Hoopes Spring complex (Formation Environmental 2014, Appendix H). Two NTCRAs were completed to reduce selenium discharges from the Pole Canyon overburden disposal area (ODA) which was constructed as a cross valley fill. The first NTCRA consisted of diverting Pole Canyon Creek around the ODA via a pipeline and construction of an infiltration basin and was completed in 2007. A run-on control channel was also completed as part of this action in 2008. The second NTCRA, completed in 2015, consisted of construction of a cover to limit infiltration into the ODA along with additional storm water run-on and runoff controls. The 2007 NTCRA resulted in a sharp decrease in the flow of surface water at the toe of the ODA, as measured at station LP-1. In the spring of 2008, the discharge measured at LP-1 was 0.43 cfs with 7.4 cfs diverted through the pipeline. While the concentration of selenium in the discharge went up after implementation of the 2007 NTCRA, the overall selenium load has decreased. The load reduction is calculated annually and varies annually according to the variations in precipitation; over the period from 2008 to 2014 it is estimated that the annual load reduction was reduced from 77 to 95% (Formation 2018, Table 4-4). Selenium transport pathways were also altered as a result of the diversion. Except in very wet years, the discharge at LP-1 completely infiltrates into the subsurface prior to reaching the pipeline discharge point, which is located about 750 feet down stream. As a result, the selenium load from the ODA no longer reports in the surface water to Sage Valley which is typically comprised of only the discharge from the pipeline. This has resulted in improvement in surface water quality in the north fork of Sage Creek as observed at monitoring station NSV-6. The 2015 NTCRA has further reduced selenium loading from the ODA by reducing percolation through the seleniferous material. Prior to regrading of the ODA and construction of the cover, percolation through the ODA resulted in direct

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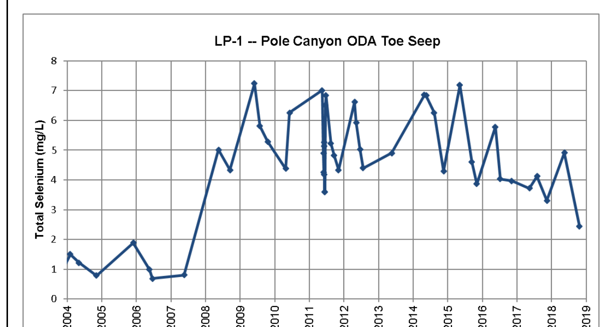
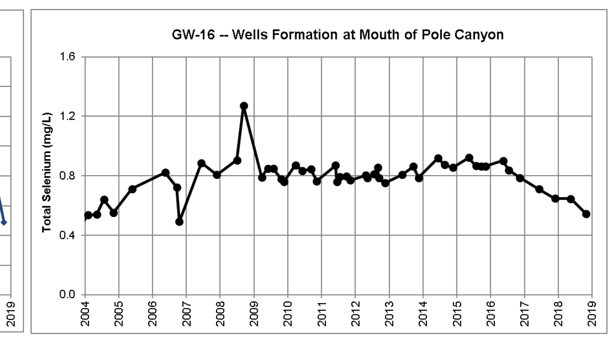
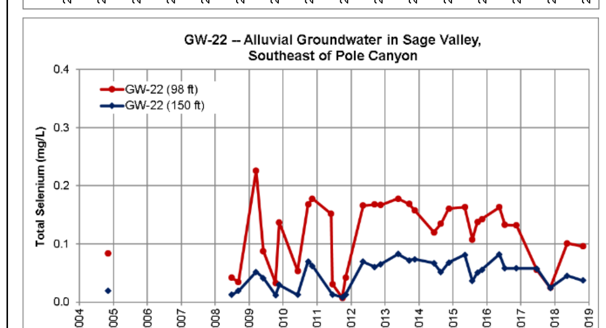
				selenium loading to Alluvial and Wells Formation groundwater. The NTCRA has resulted in a reduction in this load and is resulting in decreasing concentrations in the discharge at LP-1 and in groundwater monitoring wells located downgradient. The peak selenium concentration at LP-1 has decreased from 7.18 mg/L in 2015 to 4.91 mg/L in 2018; peak selenium concentration in Wells Formation groundwater at GW-16 has decreased from 0.901 mg/L in 2016 to 0.543 in 2018; and peak selenium concentration in Alluvial groundwater at GW-22 in Sage Valley has decreased from 0.226 mg/L in 2009 to 0.101 mg/L in 2018 (time-series charts attached for reference). The selenium concentration decreases observed in groundwater reflect the reduced selenium loading and will result in decreasing concentrations at Hoopes Springs. The RI Report provides the most recent assessment of this effect and is detailed in Appendix H. Concentrations of selenium resulting from contributions from the Pole Canyon ODA are predicted to begin decreasing in 2026 to 2040 (Figure H.5-20 attached for reference). This is relevant to the East Smoky Panel Project only in the fact that affected groundwater from the Project also discharges at Hoopes Springs. Source controls at Pole Canyon, and other areas that are contributing selenium concentrations to Hoopes Springs, are continuing to be evaluated as part of the CERCLA process. References Formation Environmental. 2014. Final Smoky Canyon Mine Remedial Investigation/Feasibility Study. Remedial Investigation Report. Prepared for J.R. Simplot Company. September. Formation. 2018. Final 2017 Annual Report, Pole Canyon Non-Time-Critical Removal Actions Performance and Effectiveness Monitoring. Prepared for J.R. Simplot Company, October.







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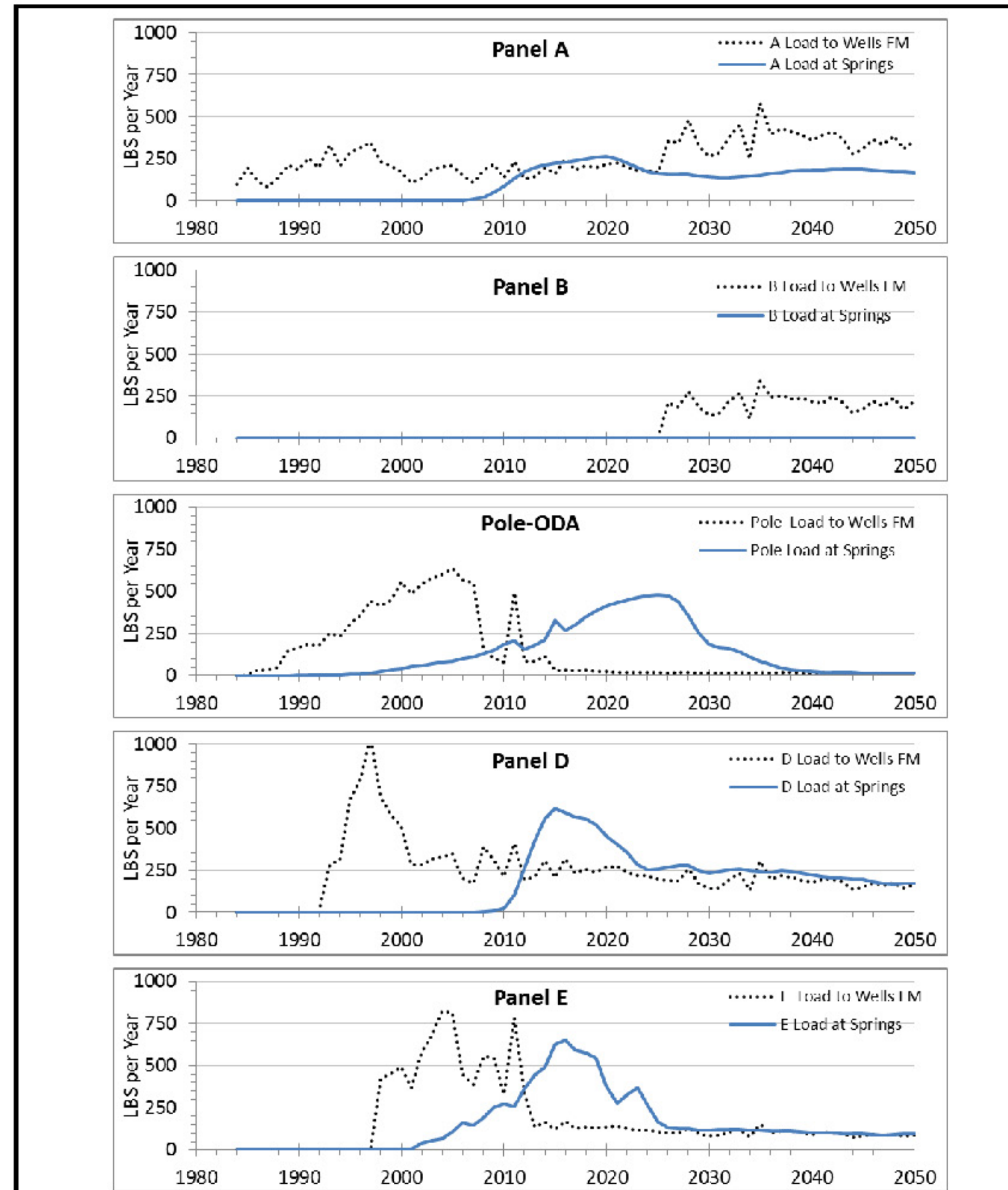

FIGURE H.5-20
ESTIMATED SELENIUM MASS LOAD TO THE WELLS FORMATION AND ARRIVAL AT SPRINGS COMPLEX FOR EACH SOURCE AREA

J.R. SIMPLOT COMPANY
SMOKY CANYON MINE RI/FS
REMEDIAL INVESTIGATION REPORT

DATE: May 29, 2014
BY: PT
FOR: FC

FORMATION ENVIRONMENTAL

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4	4.1	GYC/ICL	ICL and GYC agree that Alternative 1: Reduced Pit Shell with Soil-Only Cover would ultimately be the better of the two action alternatives presented.	Comment noted.
4	4.2	GYC/ICL	We also appreciate project designs such as backfilling previous pits and concurrent reclamation of the East Smoky mine pit to reduce the open pit footprint and allow for faster revegetation.	Comment noted.
4	4.3	GYC/ICL	We recommend that the Bureau of Land Management (BLM), United States Forest Service (USFS), contractor, and project proponent prepare a Supplemental Draft Environmental Impact Statement (SDEIS) to review additional alternatives, provide a thorough review and assessment of the proposed project, provide an additional analysis of these issues, and allow for an additional public comment period on the SDEIS.	The Agencies do not believe that an SDEIS is necessary. Potential alternatives were appropriately examined (see also Comment Response 4.4), all information required by NEPA was thoroughly reviewed, assessed, and analyzed. A 90-day comment period was provided for the DEIS; an SDEIS is not necessary or appropriate.
4	4.4	GYC/ICL	We believe that the project analysis and Plan of Operations would benefit from further analysis of several alternatives and that consideration of these additional alternatives is required. We are concerned that the analysis prematurely disregarded several issues that may have further informed project development. The DEIS makes the assumption that some of these other alternatives would be too costly, too similar in design to the action alternative, or that the effects would be so similar to the analyzed alternative so as not to warrant their full development. However, without the completion of this additional analysis and disclosing the anticipated results in a SDEIS, it is difficult to conclude that there would not be any practical difference from these modifications. Issues to examine further in the supplemental documents include water quality effects, operating costs, reclamation, and bonding.	An adequate and appropriate array of alternatives was considered in the EIS. NEPA and agency policy on how to develop, select, and screen alternatives was followed. Section 2.6.3 included nine additional alternatives for consideration, in addition to the Proposed Action and Action Alternative that were fully analyzed. These additional nine were described in Section 2.6.3 and a brief summary of the rationale for not fully analyzing them was included. See Comment Responses 4.5 and 4.6 regarding not including mining beneath the water table as an action alternative to be full analyzed.
4	4.5	GYC/ICL	We note that Alternative 1 allows for mining beneath the water table for a short period of time. The DEIS assumes that because the area of the mine pit below the water table is relatively small relative to the overall pit and that the duration of mining below the water table will be limited, that there will be no substantive difference between mining this additional area or not. The SDEIS should further develop an alternative of not mining below the water table. Mining below the water table can negatively affect ground water quality and complicate water quality management.	The Agencies disagree that not mining beneath the water table needs to be fully analyzed. The narrative on pages 4-19 and 4-41 of the DEIS indicates that water levels in GW-16 and GW-29 are actually 5 to 10 feet below the proposed bottom of the Proposed Action and Alternative 1 pits but seasonal fluctuations in water levels could result in seasonal groundwater flows to the bottom of the pit. It is unlikely that the pit bottom would be perennially submerged in groundwater. Thus, the relative percentage of pit backfill that would be exposed to direct contact with groundwater is also very small compared to the entire volume of pit backfill such that the effect on predicted flushing of COPCs from the backfill material would be negligible. Language to this effect has been added to the FEIS in Section 2.6.3.7. Further, note that both the IDEQ Point(s) of Compliance process and the additional monitoring and follow-up conducted as part of the Adaptive Management Plan would both address any unforeseen water quality or dewatering issues.
4	4.6	GYC/ICL	The DEIS presents a "Not Mining below the Water Table Alternative (2.6.3.7) as being inconsistent with the purpose and need because the proponent would be prohibited from recover ore. However, the DEIS still needs to disclose what the additional costs are for the proponent and for the public regarding mining this ore as opposed to not mining this ore. The DEIS notes that not mining below the water table is technically practical and feasible for other operations at Smoky Canyon. The mine plan may still be economical without this additional mining and may actually be more economical if the costs of extracting this ore and managing water quality exceed the value of the ore removed. Cost savings include decreased pit size, waste rock removal and handling, no anticipated water-piping infrastructure from the pit to the tailings pond and costs of pumping water. Furthermore, the value of ore beneath the water table is relatively low. There may also be added costs if mining below the water table complicates ground water protection and management. In addition, the SDEIS needs to disclose whether mining this additional ore could result in unnecessary and undue degradation.	Please see Comment Response 4.5. Further, regarding economics, BLM must, by regulation, ensure that mining plans result in maximum economic recovery of leased federal ore. If it turns out to be more economic to not mine the below water ore, Simplot would request a mine modification. If that occurred, at that time BLM would consider whether ultimate maximum recovery would still be met.
4	4.7	GYC/ICL	Another factor to consider is that mining operations sometimes suspend operations and go into care and maintenance. These temporary shutdowns can occur for a variety of reasons and can be difficult to predict in advance. The analysis and bonding estimates need to examine what the impacts would be if operations were to be suspended when this lower area was exposed and unreclaimed for longer periods than anticipated.	Per Section 2.4.11 of the DEIS (Section 2.4.13 of the FEIS), the reclamation performance bond for this Project will be calculated according to BLM policy regarding bond requirement and calculation guidance for phosphate mining operations, as given in the cited reference. Further, per that section, "*The bond for the mine is managed adaptively and can be increased or decreased if or as unforeseen issues arise when it is determined that a change in coverage is appropriate.*"
4	4.8	GYC/ICL	The analysis should examine the use of other cover types that are economically practical and reasonable. We note that the operator is using a variety of other cover types on other projects and that additional consideration of these in protecting water quality is warranted. We note that the design for Smoky Canyon Panel B originally included an 8' cap that was subsequently changed to	The percolation rates used in the impact analysis result from site-specific unsaturated flow modeling conducted on the East Smoky Panel Proposed Action cover design using measured properties of the available construction materials. Laboratory testing of the Salt Lake Formation materials proposed for construction of the cover focused on the properties of the clayey, silty, and sandy materials. The clayey material showed modeled cover percolation rates of 2 to 3 inches per year and 6 to 7

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			a 4' cap. We also note that modeling for this DEIS examined 2" and 7" infiltration rates but that a possible 15" infiltration rate was not addressed in all alternatives. The SDEIS needs to run these additional analyses and assess if there are substantive differences, which can better inform a selected alternative.	inches per year resulted from use of only silty materials. The modeled annual cover percolation rate using just sandy materials below the topsoil layer was 13 to 14 inches per year. Drilling data suggests there should be sufficient clayey and silty material present to build the Proposed Action cover with these materials, so the impact modeling was done with the 7-inch annual percolation rate, which is the upper end of the cover modeling results. This is considered to be a reasonably conservative performance value for the cover, so this rate was used in the impact analysis of the EIS. If the cover below the topsoil layer was constructed of highly permeable materials, such as sand, the cover modeling indicated annual percolation rates of 13 to 14 inches per year. As the Alternative 1 cover is proposed to be a topsoil layer over waste rock backfill, a higher annual percolation rate of 15-inches per year was considered to be a reasonable value for this type of cover (soil-only). This higher 15-inch percolation rate was not used in the EIS for the Proposed Action cover because it would represent a worst-case analysis of complete failure of the ET cover, which is not required under CEQ rules.
4	4.9	GYC/ICL	The SDEIS and bonding calculations should also factor in the ability for the water treatment plant at Hoopes Springs to successfully treat additional selenium mobilized by project activities as well as the operating and equipment replacement costs for managing this plant into the future.	Reclamation bonding is part of BLM's inspection and enforcement program, but it is not an environmental impact or mitigation to be addressed under NEPA. Section 2.4.11 of the DEIS (Section 2.4.13 of the FEIS) describes the timing of the reclamation performance bond determination and posting, and notes that the calculation methodology would be described in the Record of Decision. Whether or not the bond calculations will include water treatment costs will be determined as part of that process.
4	4.10	GYC/ICL	The analysis area should encompass the pipeline and tailings ponds, as these are integral components for the mining project. While the footprint of the tailings ponds will not be affected, the implementation of this project will utilize some of the ponds' capacity, extend the operational life of these ponds, prolong the need to maintain the piping infrastructure and delay the restoration of these ponds by three or more years. These ponds are located in General Sage-grouse Habitat Management Zone with known sage-grouse leks occurring nearby. Because use of these tailings facilities has already been occurring, there are not likely to be additional impacts to Sage-grouse from direct mine operations. While reclamation of the tailings facility would be delayed, reclamation could be done in a manner that benefits Sage-grouse and other species.	First, note that closure and reclamation planning details for the tailings ponds are separate from the NEPA process. IDL and Simplot manage the process to ensure that all required regulations are met and reclamation is complete prior to bond release. The current plan includes considerations for wildlife and post-mining land uses while also ensuring that vegetative uptake of selenium is controlled. As the comment points out, continued use of the tailings ponds will not affect sage-grouse, there is no need for further analysis or identification of mitigation in this EIS.
4	4.11	GYC/ICL	The state, federal agencies, and proponents should reexamine the reclamation plan for this facility and see if there are ways to improve this area for sage-grouse and other species. The state and federal agencies and stakeholders involved in Idaho's Sage-Steppe Mitigation Framework may be able to provide some guidance on mitigation or habitat improvement measures related to future productive uses for this area.	Reexamining tailings pond closure and reclamation is not needed or applicable in this EIS. Please see also Comment Response 4.10.
4	4.12	GYC/ICL	The Proposed Action (PA) will negatively impact vegetation. The PA will remove up to 728 acres of vegetation, reclaim 719 acres, and leave a net debit of 12 unreclaimed acres. Species composition and community structure will be permanently altered in disturbed areas. If non-native plants establish themselves in disturbed areas, then the diversity of native vegetation will be further reduced. However, the PA lacks detailed plans for temporary and permanent revegetation. The PA additionally fails to present a comprehensive plan for noxious weed control. **Recommendation:** The proponent must develop and implement a comprehensive plan for temporary revegetation. To the extent practicable, earthwork and temporary revegetation should be timed to protect reclaimed areas and minimize the loss of seed, treatments, erosion, and surface failure. The plan for temporary revegetation must include a detailed schedule for temporary revegetation, standards by which to measure the success or failure of the plan, increases in the selenium content of the growth medium, and bioaccumulation of selenium by vegetation on the newly reclaimed areas. It is imperative that the proponent obtains final USFS approval for the proposed seed mix associated with temporary revegetation described in the Mining & Reclamation Plan (M&RP). The proponent must also develop and implement a comprehensive plan for permanent revegetation. The plan for permanent revegetation should identify specific goals for reestablishing essential vegetation features and long-term vegetation cover. These goals should provide for both alpha and beta diversity similar to the project area's original cover condition, as	Section 2.4.11.4 details the process of temporary and permanent revegetation, including the seed mix proposed. Additionally, the HEA documentation discusses how revegetation would occur both temporarily and over the long term. The plan for noxious weed control is well described in Chapter 2 of the EIS.

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			well as identify criteria for success and failure for alpha and beta diversity. In addition, these goals should ensure the reestablishment of richness, evenness, and diversity. The plan for permanent revegetation must also include standards by which to measure the success or failure of the plan, increases in the selenium content of the growth medium, and bioaccumulation of selenium by vegetation on the permanently reclaimed areas. It is equally important that the proponent obtain final USFS approval for the seed mixes associated with permanent revegetation. The PA notes that the proponent will comply with its existing noxious weed program as well as BLM's applicable guidelines, techniques, and practices, listed in Appendix C. The M&RP fails to provide details on the noxious weed program. The M&RP states only that a noxious weed control program will be employed throughout the life of the mine. The proponent must create and implement a schedule for noxious weed control that includes certification for weed-free seed and hay, criteria identifying triggers for weed treatment, standards by which to measure the success or failure of the noxious weed control plan, and treatment measures to address plan failures.	
4	4.13	GYC/ICL	As stated in the DEIS, analysis of Chemicals of Potential Concern (COPC) loading is based on 15 inches of infiltration. It is presumed the topsoil-only cover design planed for the East Smoky Panel reclamation under the Agency Preferred Alternative has been given significant analysis and can reasonably achieve the modeled infiltration rate. **Recommendation:** Please provide a section in the SDEIS describing the final topsoil-only cover design for the Agency Preferred Alternative. This section should state how the cover will achieve the modeled 15 inches of infiltration. Please provide a description of the analysis that was conducted to assess the infiltration rate. It is expected that either existing topsoil-only installations or field scale testing has proven the proposed cover design's efficacy. Should the proposed cover design not be documented to limit infiltration to 15 inches per year, the empirical or analyzed rate of infiltration should be applied to ground water modeling for COPC's. For this and other similar recommendations it is presumed that the plume modeling would not show significantly higher COPC levels over the 100 and 300-year periods, however this presumption should be adequately tested.	See Comment Response 4.8. The 15-inch annual percolation rate was based on site-specific cover modeling results using permeable sand in the cover beneath the topsoil layer instead of fine-grained and less permeable clay and silt.
4	4.14	GYC/ICL	As stated in the DEIS, it is presumed there will be no additional load of COPC's due to additional back fill material being transfer to the B Panel pit. It is unclear for this review what the current design and infiltration rates are for the B Panel cover system. **Recommendation:** While it is not expected to trigger additional leaching and ground water plume analysis, please provide a SDEIS section documenting the B Panel cover design and predicted performance. This section should discuss improvements in cover design from the initial B & C panel evaluation and ground water analysis. Please include field scale investigations of the cover design's ability to meet projected infiltration rates.	The Panel B impact from backfill seepage has already been evaluated and approved by BLM in the past, thus it was not re-evaluated in the East Smoky Panel EIS. Another reason why it was not re-evaluated is that the seepage chemistry of the East Smoky Panel overburden that will be added to the Panel B backfill is actually less concentrated in selenium than the material already approved by BLM for backfilling in Panel B (Table 4.5-3 and pages 4-22 and 4-23 of the DEIS). Soluble manganese in the East Smoky Panel materials would be greater than the backfill material already approved for Panel B. The DEIS describes the resulting manganese impact to groundwater quality as follows (page 4-26): *Because manganese is prevalent in the waste rock leachates of all the pit backfills at Smoky Canyon, and the secondary standard for manganese is relatively low, it is likely that a wide area of Wells Formation aquifer would be impacted above the groundwater secondary standard in the Smoky Canyon Mine area. The addition of the East Smoky Panel overburden to the Panel B backfill volume does not change this impact.* *It should also be noted that the groundwater standard for manganese is a secondary standard, not based on protection of human health like a primary standard, but instead based on aesthetics, specifically water color, staining household fixtures, and taste.*

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4	4.15	GYC/ICL	Proposed Action Cover and Infiltration Rates - As stated in the DEIS, analysis of COPC loading is based on 7 inches of infiltration. It is presumed the cover design planed for the East Smoky Panel reclamation will be revised from the East Smoky Panel Mine and Reclamation Plan – Updated August 2015. That plan specifies, and store and release cover constructed of 0.5-1 foot of topsoil over 3 feet of Dinwoody or similar material over 2 feet of Chert. **Recommendation:** Please provide a section in the SDEIS describing the final store and release cover design for the PA. As for the B Panel cover, this should state how the cover will achieve the modeled 7 inches of infiltration. Please provide a description of the analysis that was conducted to assess the infiltration rate. It is expected that ongoing field scale and or lysimeter testing has proven the proposed cover design's efficacy. Should the proposed cover design not be documented to limit infiltration to 7 inches per year, the empirical or analyzed rate of infiltration should be applied to ground water modeling for COPC's.	The Agency Preferred Alternative is Alternative 1 which does not include an ET cover. The Proposed Action ET cover is described in Section 2.4.9.2 of the DEIS as two feet of chert, overlain by three feet of Dinwoody or Salt Lake Formation material, and finally a 6 to 12-inch topsoil layer. This is the cover design that was evaluated with unsaturated cover modeling as described in Section 4.5.2.1, Percolation through Reclaimed Mine Panels, of the DEIS, which indicated an upper annual percolation rate through the cover of 7-inches per year. The Proposed Action cover is proposed for the portion of Panel B receiving East Smoky Panel backfill materials (DEIS Section 2.4.9.2) and has already been evaluated as described in Section 4.5.2.1.
4	4.16	GYC/ICL	As stated frequently in the DEIS, many aspects of the modeling that is essential in the analysis of the proponent's project is uncertain and complex at best. It is unclear however how the agencies have accounted for probable and reasonable changes to the project analysis based in Hydrologic, Climatological and Meteorological factors. In great measure because the Smoky Canyon Mine has been operating for so many years it seems likely that trend data is available to for those factors. Shifts in ground water levels or peak storm events (both duration and frequency) for instance could significantly affect the cover performance and or COPC loading. **Recommendation:** Please provide an agency analysis of SCM ground water monitoring to discuss potential affects that could arise from ground water hydrology trends. Please demonstrate how these trends are or are not likely to affect flushing and residency time/concentration of COPC in ground water resources. Additionally, the potential resultant impact on surface waters i.e. Hoopes Springs. Please document how changes to hydrology may affect the agencies' model calibrations.	Trends in monitored groundwater elevations of the alluvium, Dinwoody, and Wells Formation are described in Section 3.5.1.1 of the DEIS. Of most significance for the groundwater impact analysis are the trends in the Wells Formation aquifer water levels. Figure 3.5-9 shows the seasonal variation of about four feet in the monitored Wells Formation groundwater elevations. These seasonal variations are within the calibration goal of 5 feet within the groundwater impact modeling effort. Changes in climate may affect the performance of the proposed covers in the future. Over the next century, precipitation in southeastern Idaho is expected to increase during the winter and spring months with potential decreases in the summer months (Runkle et al. 2017). The frequency and intensity of extreme precipitation events are projected to increase (Runkle et al. 2017; USGCRP 2017). It is anticipated that annual precipitation will increasingly fall as rain instead of snow given the projected warmer temperatures. These seasonal changes also may result in increased flood risks including during the cold season (Runkle et al. 2017; USGCRP 2017). The earlier melting of mountain snowpack may lead to a reduction in soil moisture during the summer months. As a result, naturally-occurring droughts are projected to be more prevalent. The future impact of climate change to the hydrology of the Smoky Canyon Mine area is predicted to trend long term to warmer temperatures, increased annual precipitation, and less snowpack. There is uncertainty how this would affect the performance of the covers at the mine, but it is conservative to assume that net annual percolation through the covers would increase slightly. See revisions to FEIS Section 3.3.4. References Runkle, J., K. Kunkel, R. Frankson, S. Champion, and L. Stevens. 2017. Idaho State Climate Summary. NOAA Technical Report NESDIS 149-ID, 4 pp. United States Global Change Research Program (USGCRP). 2017. Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. United States Global Change Research Program, Washington, DC, USA, 470 pp. http://dx.doi.org/10.7930/J0J964J6. Accessed February 12, 2019.

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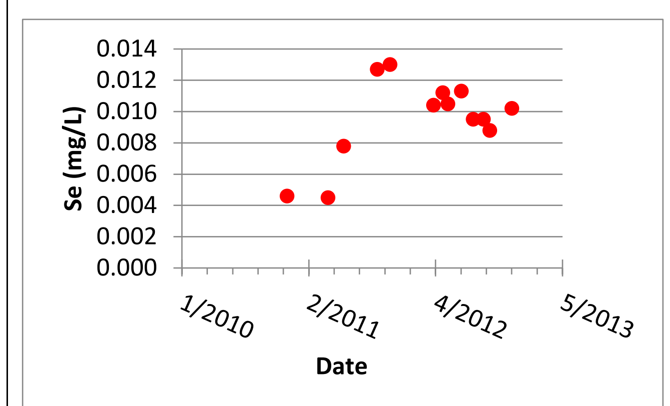
4	4.17	GYC/ICL	Similarly, how will emerging trends in snowpack and peak storm events impact cover performance? For example: how will changes in the timing of spring precipitation and/or average March temperatures change and saturation of a topsoil-only cover? Will a topsoil-only cover accomplish sufficient evapotranspiration to reasonably limit infiltration to 15 inches per year?	The effect of climate change on the performance of the Proposed Action cover was analyzed in the 2015 vadose modeling efforts. Please see Section 6.1.9, Climate Change Considerations in Stantec 2017(f). These model runs, assumed that climate change would cause warmer temperatures and increased annual precipitation. The 2015 vadose modeling results assuming warmer temperatures and increased precipitation resulted in net increased percolation through the Proposed Action cover of just over one inch. Because the most reasonably foreseeable percolation rate for the Proposed Action cover was 7 inches per year, only those results were discussed in the EIS. However, the 15-inch results for the Proposed Action are also discussed in the groundwater modeling report (HGG 2018). For selenium they show that the peak concentration at Hoopes Springs would be 0.002 mg/l vs. 0.001 mg/l for the 7-inch percolation rate and a final Hoopes Springs selenium concentration at the end of the simulation of 0.001 mg/l vs. 0.0008 mg/l for the 7-inch percolation rate. The relative differences between these runs are small because the prime control on the impacts to water quality is the source of contamination in the pit backfill; and the East Smoky Panel backfill material is relatively low in soluble selenium. The performance of the covers on selenium impacts to groundwater quality are relatively immune to changes in the annual percolation rates through the covers and this is expected to be the case in the event that climate change affects the cover performance. References: HGG. 2018. Technical Memorandum: East Smoky Panel of the Smoky Canyon Mine, Numerical Modeling Report. Final. January. Stantec. 2019. Impacts of Climate Change in Southeastern Idaho Technical Memorandum for East Smoky Panel Project. Prepared for: Bureau of Land Management Pocatello Field Office. March 5.
4	4.18	GYC/ICL	The DEIS states that pit excavations in phases 6 & 7 would seasonally intersect ground water flows. What is the implication for post mining saturation and flushing in pit back fill? **Recommendation:** Please provide an analysis of the need for or advantage of seleniferous material segregation expected with regard to backfill placement that may reasonably be inundated or flushed by ground water specifically from long-term ground water level fluctuation.	The narrative on pages 4-19 and 4-41 of the DEIS indicates that water levels in GW-16 and GW-29 are actually 5 to 10 feet below the proposed bottom of the Proposed Action and Alternative 1 pits but seasonal fluctuations in water levels could result in seasonal groundwater flows to the bottom of the pit. It is unlikely that the pit bottom would be perennially submerged in groundwater. Thus, the relative percentage of pit backfill that would be exposed to direct contact with groundwater is also very small compared to the entire volume of pit backfill such that the effect on predicted flushing of COPCs from the backfill material would be negligible.
4	4.19	GYC/ICL	It is difficult to see how single samples from GW-27 can give any reasonable indication of conditions. It is known that COPC contractions have continued to rise despite modeling and assessments that predicted a peak in 2015. **Recommendation:** Please provide additional sampling for existing COPC concentration in ground water in order to examine model calibration and confidence.	It is agreed that additional samples from GW-27 would provide a more reliable description of water quality in this location. While additional data has been gathered from this monitoring well, it was only sampled a single time for the baseline study. Having a more robust dataset of baseline information on groundwater water quality in this location was determined to not be needed to conduct an appropriate impact analysis. However, for reference, note the following set of GW-27 selenium concentration data (in mg/L) from the Remedial Investigation (10-plus samples over 2011-2012). As reported in the DEIS, the single sample from the baseline had a selenium concentration of 0.0104 mg/L, which is encompassed within the selenium range shown below. 

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4	4.20	GYC/ICL	While new analysis of B Panel COPC plumes (and other COPC plumes) may not be warranted, it seems reasonable to examine and analyze how plumes from B Panel and East Panel along with other sources will cumulatively affect ground water resource at SCM. **Recommendation:** Please provide COPC plume concentration analysis of comingled COPC sources. In addition, provide discussion of cumulative effects to groundwater and surface water resources in the project area.	The impact analysis in the DEIS is already a cumulative impact analysis because the predicted COPC concentrations at the only place in the East Smoky Panel groundwater model domain where groundwater discharges to the surface, i.e. Hoopes Springs, have been added to those concentrations predicted by the past CERCLA groundwater modeling, which includes all the current sources of contamination at the Smoky Canyon Mine.
4	4.21	GYC/ICL	The PA will negatively impact wildlife by reducing suitable habitat and reducing biodiversity. The PA will remove up to 728 acres of vegetation and impact at least 130 acres of winter range for wildlife. These impacts will result in a net debit of 33,551 Discounted Service Acre Years (DSAYs) of wildlife habitat services. Native wildlife species may decline in abundance, while the populations of new, non-native species may increase on the local scale. Other impacts to wildlife may include exposure to contaminants of potential concern (COPCs) and reduced or eliminated water sources. Despite these impacts, the PA fails to set forth plans for a detailed wildlife and wildlife habitat monitoring program or mitigation measures. **Recommendation:** Develop and implement detailed plans for monitoring wildlife and wildlife habitat as well as mitigation measures that include a range of projects in conjunction with an in-lieu fee based on the HEA analysis.	Wildlife monitoring is a requirement set forth in the M&RP and is conducted annually. Results of that monitoring includes results of any surveys conducted and status of any reclamation efforts. Large-scale monitoring of ecosystem health is not within the scope of this EIS.
4	4.22	GYC/ICL	Monitoring and evaluating the effects of the PA on wildlife and their habitat must be completed prior to implementing the project, during project implementation, and after project completion. The DEIS and the M&RP both state that the proponent will monitor and evaluate the potential effect of the mining operation on wildlife and their habitat. Neither document indicates how the proponent will accomplish this goal. **Recommendation:** Monitoring and evaluation must include assessments of individuals, populations, communities, and ecosystems. In order for monitoring and evaluation to be effective measures of wildlife health and wildlife habitat health, the proponent must create and implement a monitoring and evaluation program that accurately assesses the mining operation's impact wildlife and their habitat.	See Comment Response 4.21.
4	4.23	GYC/ICL	The mitigation measures described in Section 2.5 cover actions designed to reduce or minimize impacts but not actually mitigate for these impacts. We understand that the BLM views mitigation as no longer being a requirement, but we disagree with that interpretation.	Comment noted. See Section 1.5.3 of the EIS.
4	4.24	GYC/ICL	In addition, vegetation, wildlife habitat and recreation opportunities and the ability to achieve Desired Future Conditions will be dramatically impacted by the proposed action, and the Forest Service has an obligation under the Forest Plan to mitigate for impacts to surface resources: according to the HEA, the Proposed Action would result in a total debit of 62,043 DSAYs during mining and before reclamation. Reclamation would result in the long-term return of 28,491 DSAYs at the mine site, which equates to 46% of the wildlife habitat services total debit under the Proposed Action. Therefore, under the Proposed Action, there would be a net debit of 33,551 residual DSAYS of wildlife habitat services (Stantec 2017h). DSAYs are used to quantify the value of all ecosystem services provided by one acre of land over the course of one year. **Without additional mitigation, this residual debit in wildlife habitat services would represent a long-term adverse impact of the Proposed Action on wildlife, and also on vegetation as measured by plant species metric**s (emphasis added.). DEIS p. 4-59. We maintain that the BLM, USFS, and the proponent all have a statutory or ethical obligation to avoid unnecessary and undue degradation and to ensure that public resources are kept whole and that mitigation is an important tool to accomplish this. Under FLPMA authorities for multiple use	The DEIS accurately assesses these impacts. Note that the Agencies are no longer allowed to require compensatory mitigation (see Section 1.5.3 of the EIS), via the HEA process or otherwise.

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			and sustained yield, the BLM can seek mitigation from or accept mitigation offered by project proponents.	
4	4.25	GYC/ICL	We understand that there are a number of critiques of the use of Habitat Equivalency Analysis (HEA) for estimating impacts and calculating mitigation offsets. There are a number of approaches to mitigation and we are open to further discussions with the agencies and proponent on a mitigation program on the proper scale that emphasizes durable improvements on the ground.	Comment noted.
4	4.26	GYC/ICL	The proponent must address and mitigate the impacts to potential loss of habitat for terrestrial species in the project area. Although the DEIS identifies impacts to and potential loss of habitat for terrestrial species, these impacts are neither addressed nor mitigated. The DEIS notes that the proponent has discussed “a 440-acres voluntary land-donation to BLM as part of its Dairy Syncline Mine (approximately 2,800 acres in size) application” in the Stump Creek area east of Star Valley, Wyoming, and adjacent to a BLM Area of Critical Environmental Concern. Despite the fact that the voluntary land-donation to BLM contains big game winter habitat and sage grouse habitat, the donation will be part of the Dairy Syncline Mine application. The donation has no bearing on the PA at hand. Furthermore, the donation would reduce cumulative impacts to wildlife habitat by an unknown amount, making analysis or comparison impossible.	As the comment notes the donation identified has no bearing on the East Smoky Panel Project. The statement about the donation was just a factual statement about cumulative impacts to wildlife within the CEA. In no way is the land donation considered a form of mitigation for East Smoky Panel impacts. No impacts to terrestrial species identified in the East Smoky Panel EIS require additional mitigation (See Section 1.5.3 of the EIS).
4	4.27	GYC/ICL	The proponent must comprehensively address the net debit of 33,551 DSAYs of wildlife habitat services with a voluntary contribution that includes range of mitigation projects in conjunction with an in-lieu fee based on the HEA analysis. Projects may include restoration, establishment, enhancement, or preservation of on or off-site areas comparable to the project area. The proponent may also request that BLM identify opportunities for voluntary contributions. BLM should incorporate voluntary mitigation into the NEPA analysis for the PA, evaluating not only the effectiveness of any proposed mitigation measures, but also comparing the PA’s impact with and without such measures.	The Agencies accurately assessed the DSAYs debit due to the Project and cannot compel the proponent to make a “voluntary” contribution. No voluntary mitigation has been offered.
4	4.28	GYC/ICL	With regard to surface water, we appreciate the list of replacement options for affected springs provided on p. 5-52 and ask for additional opportunities to discuss these measures with the agencies and proponent.	Comment noted.
5	5.1	Earthworks/ CCA	Although the DEIS predicts that the agency’s preferred alternative (Alternative 1) will result in less severe impacts, the DEIS states that Alternative 1 may result in an unstable highwall that may necessitate the mining of the Cherty Shale and negate the reduced impacts. As a result of this uncertainty, the DEIS offers no real alternative to the proposed action.	The agencies disagree that Alternative 1 does not offer a real alternative to the Proposed Action. Several phosphate mines in SE Idaho have experienced unstable mine pit highwalls. Historically, the unstable highwall area in these mines has been limited to a small fraction of the total area of mine highwall. The intent of the statement in the EIS (4.5.2.2) acknowledging the potential for an unstable highwall was to disclose the unexpected possibility that a small portion of the total cherty shale unit could end up being mined. The full statement also states that the studies by CNI indicate that the steeper slopes should be stable (see quotation below). Mostly likely, the slopes will be stable and mining of cherty shale will be eliminated. If a small portion of cherty shale needed to be mined it would still be an advantage over the Proposed Action. *“Alternative 1 includes steeper pit slopes than the Proposed Action which would allow mining activities to avoid including Cherty Shale overburden in the pit backfill. Geotechnical evaluation (CNI 2017) has indicated that these steeper slopes should be stable. However, in the unexpected case where some slope instability was experienced on the east side of the pit, it may be necessary to layback the unstable part of the slope which could, in turn, require mining the Cherty Shale in the affected area.”* The Cherty Shale comprises about 2.7% of the rock to be mined in the Proposed Action pit and 0% in the Alternative 1 pit. If some Cherty Shale needed to be mined in the Alternative 1 pit due to some highwall instability it is unlikely that the amount to be mined would be greater than that proposed to be mined in the Proposed Action pit. Any amount of Cherty Shale that would be mined would be moved to the Panel B backfill along with the other overburden lithologies mined during initial operation of the Alternative 1 pit. This would basically be a mixture of overburden very similar to that for placement in Panel B as part of the Proposed Action. The comparison of this overburden mixture to that already approved for Panel B is discussed on pages 4-22 and 4-23 the DEIS. An additional alternative to cover this unlikely condition is therefore not required.

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				In addition to limiting the cherty shale material, Alternative 1 also reduces the mine disturbance footprint by 78 acres and reclaiming the topography of Panel B closer to original contours. Reference: Call & Nicolas, Inc. (CNI). 2017. East Smoky Canyon Mine Feasibility-Level Pit Slope Angle Geotechnical Study. Prepared for J.R. Simplot. February
5	5.2	Earthworks/ CCA	Our organizations are deeply concerned with the ongoing selenium pollution from Smoky Canyon and the lengthy delays in addressing this pollution. Despite a decade of effort, Simplot has yet to demonstrate that it can effectively treat its releases into Sage Creek and Crow Creek and return these water resources to their beneficial uses. Members of the Crow Creek Conservation Alliance continue to be directly affected by the selenium pollution running through their private property.	Comment noted. Ongoing CERCLA remedial actions are being implemented at the Smoky Canyon Mine. The purpose of this EIS is to evaluate the potential effects of the Proposed Action and alternatives. This EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies.
5	5.3	Earthworks/ CCA	Based on the predicted water quality exceedances and other significant adverse impacts, the proposed plan and alternative conflicts with FLPMA, the CWA, the Forest Service Organic Act, the Mineral Leasing Act and the implementing regulations of these laws. As a result, the East Smoky Operations should not be approved as proposed.	Regarding water quality, the comment indicates an incorrect understanding of the results of the impact assessment. For groundwater quality, the Idaho Ground Water Quality Rule requires IDEQ to determine and track compliance at locations outside of the pit footprint through compliance; Simplot will be required to comply with the requirements determined by IDEQ. IDEQ has finalized the Point of Compliance determination (IDEQ 2020), and baseline characterization at the compliance and indicator wells is underway. For surface water quality, there are no predicted exceedances of standards due to the Proposed Action or Alternative 1. Regarding the assertion of “other significant adverse impacts” from the comment, no examples were provided. The potential effects were adequately examined and any “conflicts” with the cited Acts are properly addressed. Reference: IDEQ. 2020. Final Determination Letter from Bruce Olenick, IDEQ, to Lori Lusty, J.R. Simplot Company with enclosed determination. January 7, 2020.
5	5.4	Earthworks/ CCA	The 2-inch and 7-inch percolation rates used as minimum and reasonably foreseeable long-term average percolation rates for the store and release cover system in the Proposed Action are not sufficient. The 15-inch percolation rates should be included in the DEIS for the proposed action as reasonably foreseeable.	Groundwater modeling was prepared for the Proposed Action for all three seepage rates but use of the 15-inch percolation rate for the Proposed Action cover would be a worst-case analysis which is not required by CEQ. Even though a 15-inch percolation rate would be a worst-case analysis, the DEIS (and the FEIS) analyzes this scenario and provides the results in Section 4.5.2.2 and Table 4.5-9 (4.5-10 for the FEIS). The estimated impacts from the Proposed Action at the 15-inch percolation rate are very similar to the results at a 7-inch percolation rate because the impacts are more driven by the source and not the percolation rate (see Comment Response 4.17).
5	5.5	Earthworks/ CCA	The DEIS states that the 7-inch percolation rate is the only model result considered relevant for the presentation of the potential impacts from the Proposed Action for the EIS, and it also restricts the fate and transport model results to those that are based on 7-inch percolation rate. (DEIS, pp. 4-24 and 4-25) This is insufficient, as demonstrated by Stantec (2017(f), which ran a simulation that involved more recent climate data with higher precipitation rates.	The 7-inch percolation rate for the Proposed Action is the conservative upper end of the range of annual net percolation rates that was predicted by modeling with robust software using an annual precipitation rate of 31.4" which is consistent with other vadose modeling efforts in Southeast Idaho (Stantec 2017). The Agency Preferred Alternative used a more conservative net percolation rate of 15 inches per year. Also see Comment Response 5.4. Reference: Stantec. 2017f. Unsaturated Flow Modeling for the East Smoky Panel Mine Proposed Action Cover. Smoky Canyon Mine, East Smoky Panel Mine EIS. March.

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5	5.6	Earthworks/ CCA	According to Stantec (2017f, p. 29), group 4 simulations used a significantly abbreviated range of climate data, which included recent years that had more precipitation on average. It predicted percolation rates from 12.4 to 13.6 inches per year, rather than 7 inches. This provides a more realistic view of current climate conditions. As such, the 15-inch percolation rate should be incorporated into the DEIS as a more reasonable upper limit.	Please note that the Stantec narrative referenced in the comment relates to the discussion of all the model runs completed. The specific group of model runs cited in the comment were referred to as "Group 4" and the report authors describe the group as follows: "*The Group 4 simulations were performed to observe the differences in estimated cumulative percolation rates, considering the range in texture of the Salt Lake Formation soils sampled, and a range of density values expected from construction. These simulations were used to observe the relative difference in cumulative percolation by changing soil parameters, not to predict the cumulative percolation values*." (emphasis added) The report authors describe the Group 3 results as follows: *"The Group 3 simulations are considered the best representations of field conditions, using the most accurate and comprehensive data sets."* It is the Group 3 range of 6 to 7 inches per year for the Proposed Action cover that was used in the EIS impact analysis. It should also be noted that the annual net percolation rate used for the Alternative 1 cover, the Agency Preferred Alternative, was 15 inches per year. Although this percolation rate was attributed to vadose modeling of a soil only cover and not the Proposed Action ET cover, the groundwater impacts do represent leaching of the pit backfill at the 15 inches per year requested in the comment.
5	5.7	Earthworks/ CCA	The DEIS must include a higher percolation rate that incorporates current climatic conditions and predicted climate change conditions throughout the mine's operating life, reclamation and closure, and incorporates that into associated fate and transport model results. The data behind these model results should be incorporated into an appendix in the DEIS/FEIS.	Please see Comment Response 4.17.
5	5.8	Earthworks/ CCA	Simplot's proposed action fails to protect surface and ground water resources and beneficial uses. It would release contaminants into surface waters that already exceed aquatic life standards and are 303(d) listed as impaired for selenium. It inappropriately relies on CERCLA as mitigation, and it fails to comply with the 2003 Revised Forest Plan goals and standards.	The Proposed Action and Alternative 1 impact assessments do not rely on any CERCLA remedy; water quality impacts are assessed based only upon the Project, and not the impacts from past or current mining or future treatment options. Additional narrative has been added to Section 3.5.2.3 (Surface Water Quality) and the subsection on selenium impacts to stream flow under Section 4.5.2.1 in the Final EIS related to the compliance with IDEQ requirements, including 303(d) listed stream segments. The 2003 RFP goals and standards are addressed in Appendix 4A of the EIS.
5	5.9	Earthworks/ CCA	The proposed action would allow mine seepage, containing selenium and additional pollutants, to be released into Hoopes Spring and the Sage Creek watershed – surface waters that already exceed water quality standards and are listed as impaired for selenium under 303(d), contrary to the Clean Water Act.	Additional narrative has been added to Section 3.5.2.3 (Surface Water Quality) and the subsection on selenium impacts to stream flow under Section 4.5.2.1 in the FEIS related to the compliance with IDEQ requirements, including 303(d) listed stream segments.
5	5.10	Earthworks/ CCA	Although the DEIS predicts that the selenium plume will not reach Hoopes Spring for many years, the DEIS predicts that selenium concentrations in Hoopes Springs at that point would exceed chronic aquatic life standards. Thus, the addition of selenium from the East Panel under the proposed action will contribute to the exceedance of water quality standards and beneficial use impairment.	Comment noted. These cumulative impacts are addressed in Chapter 5.
5	5.11	Earthworks/ CCA	If the 15-inch percolation rate is used, the selenium will reach Hoopes Spring and enter the Sage Creek and Crow Creek watersheds much more rapidly. Either way, the proposed action will contribute selenium to streams that already exceed water quality standards, do not meet their beneficial uses and are listed as impaired under 303(d). It would appear that this conflicts with the Clean Water Act. The agencies should explain the regulatory rationale surrounding these issues.	Please see Comment Response 4.17. According to the groundwater modeling report (HGG 2018), the selenium concentration at Hoopes Springs would reach 0.001 mg/l at about 90 years for the 7-inch percolation rate through the Proposed Action cover and at about 50 years for the 15-inch percolation rate through the Proposed Action cover. The peak selenium concentration at Hoopes Springs would be 0.001 mg/l for the 7-inch percolation rate and 0.002 mg/l for the 15-inch percolation rate. Both concentrations are less than the current chronic cold-water criterion for selenium. Reference: HGG. 2018. Technical Memorandum: East Smoky Panel of the Smoky Canyon Mine, Numerical Modeling Report. Final. January.
5	5.12	Earthworks/ CCA	The DEIS states that "based upon the model-predicted selenium concentrations and with implementation of the Adaptive Management Plan (AMP) described in Section 4.5.3 and provided in Appendix 4B, the Project should be in compliance with the Clean Water Act." (DEIS, p. 4-37) Yet, the DEIS cannot approve a proposed action that should comply with the Clean Water Act. It must demonstrate that the proposed action will comply with the Clean Water Act.	The word "should" in the DEIS has been changed to "would" in the FEIS.

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5	5.13	Earthworks/ CCA	Moreover, the DEIS (Adaptive Management Plan) relies on the water treatment plant, associated with the CERCLA action, to mitigate the combined selenium load of the baseline (existing operations) and East Smoky Panel contribution. (DEIS, p. 7 of Appendix 4B Adaptive Management Plan). Yet, the DEIS provides no analysis of the water treatment plant and its effluent concentrations and no data has been provided to demonstrate that it can meet water quality standards or reduce selenium concentrations downstream sufficient to protect beneficial uses or reduce selenium concentrations in fish tissue to meet the EPA criteria. There is significant uncertainty associated with the timing of the water treatment plant under consideration as part of CERCLA and the arrival of the contaminant plume from the East Smoky operations.	The Proposed Action and Alternative 1 impact assessments do not rely on any CERCLA remedy; those water quality impacts are assessed based only upon the Project, and not the impacts from past or current mining or future treatment options. Selenium loading and implications to groundwater were discussed in the subsection titled "Potential Mobilization of COPCs/Impact to Wells Formation" under Section 4.5.2.1. Selenium loading and implications to surface waters were discussed in the same section under the subsection titled "Selenium and other COPCs in stream flow". It is clearly acknowledged that the Proposed Action would incrementally add to existing degraded water quality but would not in and of itself exceed water quality standards in surface waters. It also clearly acknowledges that the existing and future instream selenium concentrations, irrespective of the East Smoky Panel Mine Project, have and will continue to exceed water quality standards. Appendix 4B of the DEIS discusses aspects of groundwater and surface water quality in relation to mining activities and CERCLA work. The pilot water treatment plant was built and authorized through CERCLA as a treatability study to develop information for completion of the CERCLA Feasibility Study (FS). Work on the FS continues. At the conclusion of the FS, the USFS will issue a Record of Decision as to appropriate actions needed to address releases to the environment, including selenium to Hoopes Springs and downstream waters (such as Sage Creek). Simplot will then implement those decisions to address these releases. The Remedial Investigation (RI) groundwater modeling considers contribution from all historical source areas along with reductions associated with existing reclamation and existing removal actions at Pole Canyon. Although the RI model predicts that selenium concentrations related to historical mining activity will be elevated at Hoopes Spring and South Fork Sage Creek springs by the time any additional selenium transport from the East Smoky Panel arrives at Hoopes Springs, the additional impact on surface water would have a negligible to minor effect. Also, see Comment Response 3.14.
5	5.14	Earthworks/ CCA	More importantly, the DEIS cannot simply rely on a CERCLA action for hazardous releases from the mine's other operations to mitigate the impacts from new operations at East Smoky.	The Proposed Action and Alternative 1 impact assessments do not rely on any CERCLA remedy; those water quality impacts are assessed based only upon the Project, and not the impacts from past or current mining or future treatment options.
5	5.15	Earthworks/ CCA	The East Smoky operations must not be authorized to contribute contaminants to groundwaters that already exceed water quality standards and create groundwater plumes that would preclude other beneficial uses in the area for centuries. Furthermore, these groundwater plumes will contribute contaminants to surface waters that already exceed aquatic life standards, resulting in additional harm to fish and fish habitat.	Additional narrative has been added to Section 3.5.2.3 (Surface Water Quality) and the subsection on selenium impacts to stream flow under Section 4.5.2.1 in the Final EIS related to the compliance with IDEQ requirements, including 303(d) listed stream segments.
5	5.16	Earthworks/ CCA	The Proposed Action also fails to meet the Revised Forest Plan standards, goals and objectives.	The 2003 RFP goals and standards are addressed in Appendix 4A of the EIS.
5	5.17	Earthworks/ CCA	The Deep Dinwoody Cover in the proposed action does not represent a state-of-the-art cover system or best management practices, and it would allow hazardous substances into groundwater at levels exceeding state and federal standards (as described above). It would allow these contaminants far outside the permit boundary.	The comment includes assumptions on the Project's compliance with groundwater and surface water quality standards. The IDEQ will make the final determination on the compliance status of the Project and that determination is pending. However, the IDEQ has been intimately involved with all aspects of the EIS preparation as a cooperating agency and they have not opined that the Project is not in compliance with said standards.
5	5.18	Earthworks/ CCA	In addition, the Smoky Canyon Mine is already the subject of CERCLA remediation, yet Simplot is proposing to expand those operations, and release more hazardous substances into important water resources that are already the subject of CERCLA remediation. This is entirely inappropriate since Simplot has yet to demonstrate that it can effectively treat its existing releases.	The purpose of this EIS is to evaluate the potential effects of the East Smoky Panel Project Proposed Action and alternatives. This EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project.
5	5.19	Earthworks/ CCA	Alternative 1 does not protect water resources and beneficial uses. The DEIS fails to provide a reasonable range of alternatives that adequately protect water resources and beneficial uses and complies with the Revised Forest Plan.	The BLM, USFS and IDEQ believe the Project would comply with applicable BLM, USFS and IDEQ regulatory requirements. Please see Comment Response 5.1.

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			The DEIS also includes Alternative 1 (the Reduced Pit Shell (RPS)), the agency proposal for a deeper pit that avoids mining the Cherty Shale. Although the DEIS predicts that Alternative 1 would result in less severe impacts to water resources than the Proposed Action, the DEIS does not guarantee that those reduced impacts will be realized because it acknowledges that the highwall could be unstable – thus requiring the Cherty Shale to be mined (DEIS, p. 4-40).	
5	5.20	Earthworks/ CCA	Once again, the agencies should not authorize any release that would contribute selenium to waters that are already exceeding standards for selenium and are 303d listed for selenium, as required by the Clean Water Act. The DEIS provides no data to demonstrate that these streams would be delisted prior to the arrival of the selenium plume, nor that selenium concentrations in fish tissue or fish habitat would return to safe levels.	The DEIS comprehensively analyzed in Chapter 4 the direct and indirect effects of the Project on groundwater and surface water resources, especially the potential for selenium releases into Section 303(d) listed streams. Based on the modeling, impacts to listed streams would be negligible and well below the current State regulatory threshold (DEIS pages 4-26 and 4-37). The EIS also details that there are unique features to the Project, including significantly lower selenium and cadmium leach column concentrations in the overburden as compared to other measured overburden that has been tested according to Agency protocols. These very low column leach concentrations explain the negligible direct effects. (DEIS page 4-23). Additional narrative has been added to Section 3.5.2.3 (Surface Water Quality) and the subsection on selenium impacts to stream flow under Section 4.5.2.1 in the FEIS related to compliance with IDEQ requirements, including 303(d) listed stream segments. However, while there is no guarantee that the streams will be delisted by the time the plume is predicted to reach Hoopes Springs, it is reasonable to assume that, given time, selenium removal will occur via treatment or other means.
5	5.21	Earthworks/ CCA	Other contaminants are also an issue with this alternative. The animated video for the Reduced Pit Shell at 7-inch and 15-inch percolation rates predict that manganese will exceed secondary standards far outside of the permit boundary. Furthermore, the cumulative effects analysis concludes that under Alternative 1, the peak concentration of manganese would be 0.042 mg/l, very close to the regulatory standard (0.05 mg/l). (DEIS, p. 5-23) According to the DEIS, the current manganese concentration in GW-27, based on only one sample, is 0.004 mg/l. The addition of 0.042 mg/l would be a major cumulative impact at this groundwater well.	IDEQ has finalized the Point of Compliance determination (IDEQ 2020), and baseline characterization at the compliance and indicator wells is underway. The impact analysis shows the limits of expected water quality impacts from manganese. It is again emphasized that the secondary standard for manganese is related to aesthetic characteristics where the water is used for domestic water supply. The current beneficial use of the affected groundwater is not for domestic water supplies, nor is it likely to be so used in the future. Reference: IDEQ. 2020. Final Determination Letter from Bruce Olenick, IDEQ, to Lori Lusty, J.R. Simplot Company with enclosed determination. January 7, 2020.
5	5.22	Earthworks/ CCA	More importantly, the model predictions data (available at Table 4.5-9) fail to take a hard look at groundwater impacts because it fails to include predictions for groundwater concentrations at points that are closer to the East Smoky panel, and instead, predicts groundwater quality concentrations for GW-IW and GW-27 that are much farther to the west and south, respectively.	DEIS Table 4.5-9 also includes modeled concentrations at observation points 1 and 2 which are much closer to the East Smoky Panel than GW-IW of GW-27. These observation points show higher concentrations of manganese than at GW-IW and GW-27. The same is true for the model results in Table 4.5-6 for the Proposed Action. Also, the narrative for the manganese water quality impacts describes the modelled concentrations in the groundwater directly under the East Smoky Panel backfill.
5	5.23	Earthworks/ CCA	Selenium concentrations in GW-16, located in the Wells Formation closest to the proposed pit, already exceed standards for selenium as a result of previous operations. Adding more selenium from the East Smoky Canyon panel would inappropriately add to these exceedances.	GW-16 is located within the active mining area of the Smoky Canyon Mine close to the existing sources of groundwater contamination that are subject to the CERCLA remediation actions already established. As the comment states, the selenium concentrations at GW-16 have routinely been over 0.05 mg/L. The groundwater impact modeling for the Project indicate that the added selenium concentrations at GW-16 should be less than 0.002 mg/L. This increase in selenium concentrations at GW-16 would be very slight and possibly difficult to detect.
5	5.24	Earthworks/ CCA	As a result, neither the Proposed Action nor Alternative 1 provide a cover system that protects surface and groundwater resources and associated beneficial uses. This is particularly inappropriate since there are more robust cover systems that could reduce or potentially prevent selenium from reaching Hoopes Spring. More robust cover systems have already been deemed feasible in other portions of the mine, and yet they've been excluded from consideration in this expansion.	The EIS describes the differences in chemistry between the East Smoky Panel backfill material and prior mine backfills at the Smoky Canyon Mine. The geochemistry of the East Smoky Panel overburden is rather unique and much less concentrated in selenium than the other pit backfills (DEIS Table 4.5-3). The selenium concentration of the PV1 leachate for the East Smoky Panel is about 42 percent of that for Panels B and C. The selenium concentration for East Smoky Panel PV2 leachate is only 9 percent of that for Panels B and C. The groundwater modeling has shown that selenium concentrations under the East Smoky Panel backfill would be such that increases in selenium concentration at the single discharge point for groundwater impacted by the Project, Hoopes Springs, would be approximately 0.001 mg/L. This value is well below any surface water standard and would be part of the spring flow that is already destined for capture and treatment. For these reasons, the Agencies do not think it would be necessary to apply more robust cover systems to the East Smoky Panel backfill. The environmental protection measures incorporated into the Proposed Action and Alternative 1 are considered appropriate for the lower level of groundwater impacts predicted for the East Smoky Panel backfill. Section 2.6.3.9 of the EIS also explains why more robust cover systems were eliminated from detailed analysis.

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5	5.25	Earthworks/ CCA	Alternative 1 also fails to comply with the goals and standards in the Revised Forest Plan (2003). It does not provide a state-of-the-art cover system or best management practices. It includes only a soil cover, when other more protective covers are already in use in other areas of the mine, and it will contribute selenium to surface water that already exceeds standards.	Please see Comment Response 5.24.
5	5.26	Earthworks/ CCA	The DEIS must include other reasonable alternatives in its analysis, such as combining the RPS with a more robust cover and foregoing mining into the groundwater table. The DEIS rejects this alternative for economic reasons (DEIS, p. 2-42), but the DEIS provides no data to demonstrate that the alternative is uneconomic and acknowledges that the amount of ore estimated to be below the water table is low.	Please see Comment Response 5.24 with regards to applying a more robust cover system than has been shown to be necessary by the impact analysis. Please see Comment Response 4.18 with regards to mining below the water table.
5	5.27	Earthworks/ CCA	The EIS states that it would be technically and practically feasible, and that there would be no difference environmentally. "Not mining below the existing water table would be technically practical and feasible as dewatering has never occurred or been needed at the Smoky Canyon Mine in the past. Besides not requiring a pipeline to take the pit water to the tailings pond, in which there would be sufficient capacity, there would be no difference environmentally under this alternative compared to the Proposed Action." (DEIS, p. 2-43). In fact, it would be environmentally preferable because it would prevent a new waste stream that must be managed, eliminate the need for a pipeline, and avoid the risk of pipeline spills. The alternative cannot be discarded based on unsupported assertions, and the agency is under no legal obligation to ensure that Simplot maximizes profit.	As described in Section 2.6.3.7, mining below the water table would be a short duration operation and the amount of water to be removed would be minimal so the environmental impacts on the groundwater removed from the pit would be minimal. The section further states that not mining the East Smoky Panel would be inconsistent with the Project's Purpose and Need of ultimate maximum recovery of phosphate ore from the federal leases involved.
5	5.28	Earthworks/ CCA	The DEIS eliminates analysis of alternate cover systems as well, stating that the need for alternative cover systems was eliminated from further consideration because it was determined that a relatively simple cover system is expected to sufficiently protect groundwater and surface water resources. (DEIS, p. 2-44). We disagree with this assertion since the modeling in the DEIS demonstrates that the proposed action and Alternative 1 will release selenium to waters that already exceed standards and contribute selenium to fish that already surpass the EPA's criteria, as stated elsewhere in our comments. As a result, the DEIS must consider more robust cover systems to improve source controls and demonstrate that water resources will be protected. The EIS must include a reasonable range of alternatives, and take a hard look at those alternatives.	Please see Comment Response 5.24.
5	5.29	Earthworks/ CCA	Alternative 1 would allow additional materials to be placed in Panel B, which is already the subject of a CERCLA Administrative Order on Consent. The DEIS fails to demonstrate that the Panel B cover system is adequate to protect groundwater resources from the cumulative effects of existing and proposed operations, and it fails to take a hard look at the potential impacts of Alternative 1.	The currently approved Panel B cover system was considered by the Agencies to be appropriately protective of groundwater quality considering the chemistry of the Panels B & C backfill materials and the groundwater modeling that was done to evaluate those impacts. The narrative starting on page 4-22 of the DEIS shows that the leachate chemistry of the East Smoky Panel backfill material to be added to the Panel B backfill, for both the Proposed Action and Alternative 1, would actually be less concentrated in selenium and cadmium than the already approved Panel B backfill. Thus, the groundwater impact analysis already completed for Panel B & C is sufficient to predict the peak groundwater quality impacts of the combined overburden materials for both of the East Smoky Panel Action Alternatives for these two COPCs. This is not the case for manganese which is shown to be more concentrated in the backfill materials for both of the East Smoky Panel Action Alternatives than Panels B & C. The impacts from the added manganese are discussed on page 4-26 of the DEIS: *Because manganese is prevalent in the waste rock leachates of all the pit backfills at Smoky Canyon, and the secondary standard for manganese is relatively low, it is likely that a wide area of Wells Formation aquifer would be impacted above the groundwater secondary standard in the Smoky Canyon Mine area. The addition of the East Smoky Panel overburden to the Panel B backfill volume does not change this impact.* *It should also be noted that the groundwater standard for manganese is a secondary standard, not based on protection of human health like a primary standard, but instead based on aesthetics, specifically water color, staining household fixtures, and taste.*

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5	5.30	Earthworks/ CCA	It's difficult to determine what cover system will be required for Panel B under Alternative 1. On page 2-33, the DEIS states that a currently approved cap will be required for Panel B, and references Section 2.4.11.2 for explanation. However, Section 2.4.11 is the financial assurance section, and I couldn't find a 2.4.11.2. I assume, it's referring to 2.4.9.2, which briefly discusses how the panel B cover system will be based on a previous ROD, but that section then refers to another section (Section 2.2.2) for an explanation. In Section 2.2.2, the DEIS references a previous 2002 FEIS and ROD that approved the cover system, and multiple other changes that have been made to Panel B and its cover since then. The DEIS should provide a detailed explanation of the cover system for Alternative 1, and the reasoning behind this section in one place in the DEIS.	Due to an inadvertent deletion of one page of Chapter 2 text, certain page numbers and section headings for Chapter 2 were incorrect in the DEIS. This has been corrected in the FEIS. In addition, additional text has been added to Section 2.4.11.2 and to Section 2.6.1.4 to describe the Panel B cover under Alternative 1.
5	5.31	Earthworks/ CCA	Ultimately, it appears that the cap for Panel B is a 4-foot chert cap, reduced from the original 8-foot cap evaluated in the 2002 ROD. It appears that the reduction to 4-foot was based on adequate protection of vegetation, but did not consider any analysis of water quality protection. Please verify.	Incorrect: the implications of the thickness reduction on groundwater quality was considered at part of BLM's approval process. Section 2.4.11.2 has been modified to state this.
5	5.32	Earthworks/ CCA	The DEIS assumes that the previous analysis is adequate, but it doesn't describe the long-term water quality impacts predicted in the original 2002 FEIS nor apply those predictions to current conditions. More importantly, there have been substantial changes to panel B and its cover since the 2002 FEIS/ROD, including changes in the current proposal.	The Formation Environmental 2014 model (Formation Environmental 2014) is an empirical model and takes into account the current condition. The East Smoky Panel Project team determined that there would be too many complications involved in remodeling Panel B or other mined-out areas. That model considers the current condition in an acceptable fashion. In the narrative, the EIS does apply the long-term water quality impacts from the past – it does so by using the most current predictive model which is the Formation 2014 model. The current model uses all the empirical information to make a calibrated model to explain how things have actually behaved – the Formation 2014 model. The previous analysis, together with the current modeling (Formation 2014) as a more recent update, is adequate. Reference: Formation Environmental. 2014. Final Smoky Canyon Mine Remedial Investigation/Feasibility Study. Remedial Investigation Report. Prepared for J.R. Simplot Company. September 2014.
5	5.33	Earthworks/ CCA	If there is uncertainty about whether the 4-foot cover is sufficient for existing backfill, it does not follow that it would be sufficient for the cumulative effects of adding backfill from the proposed expansion. Since Panel B is already the subject of an Administrative Order on Consent under CERCLA, isn't an amendment necessary to authorize more backfill to be incorporated into Panel B? The CERCLA action is clearly a "connected action" under NEPA, thus a more thorough description is needed in the EIS to clarify the interaction of these two activities. What questions remain about the adequacy of the approved cover for B? What information is being collected and analyzed to make this determination? When will a decision be made about whether it's adequate, or whether a more robust cover is needed? How will that decision be made? A decision about whether the 4-foot cover is adequate under CERCLA should be resolved prior to any decision about adding backfill from the proposed expansion.	'Uncertainty' about the 4-foot cover sufficiency is not an accurate or fair characterization. The Agencies were comfortable enough with the degree of certainty to approve the 4-foot cap. Adding backfill as proposed under Alternative 1 is not predicted to increase the concentration of selenium or affect the performance of the currently approved Panel B cover design. The CERCLA action for Panel B has independent utility separate from the Proposed Action under the East Smoky Panel EIS (i.e., the CERCLA action would continue, even under the East Smoky No Action Alternative) so it is not a connected action under NEPA. There are no "CERCLA" actions being proposed, just the East Smoky Panel Project; the Proposed Action and Alternative 1. The portion of Panel B that would receive backfill from the East Smoky Panel is not part of the CERCLA north area. CERCLA does oversee areas at Panel B where a 4-foot chert is or will be analyzed. Any conclusions or actions resulting from the CERCLA analysis on areas that received a chert cap could be considered for application onto the portion of Panel B with East Smoky Panel backfill. At this time, there is no conclusion under CERCLA that the chert cap is insufficiently protective.
5	5.34	Earthworks/ CCA	More importantly, the DEIS must update the hydrologic model to evaluate the potential groundwater quality impacts for Panel B, with the addition of East Smoky Canyon backfill. There have been several substantive changes since the 2002 FEIS and ROD. As a result, Panel B is substantially different from what was analyzed sixteen years ago…	The addition of East Smoky Panel backfill is analyzed in the EIS and is considered in combination with the predicted impacts from the Formation Environmental 2014 model at the Hoopes Spring discharge location. The Agencies do not believe the changes to Panel B (i.e. the change in chert cap thickness) are substantive because the Formation Environmental 2014 model is based on empirical observation of the existing condition at Panel B. The potential impact of selenium in the East Smoky Panel backfill to be added to Panel B is discussed on page 4-22 of the DEIS. It is shown that the test column concentration of selenium in leachate from the East Smoky Panel material is significantly less than that from the backfill material already approved in the past for Panel B, and evaluated in the 2002 EIS for Panels B & C. Thus, adding the East Smoky Panel backfill would not increase the selenium concentration in leachate from the Panel B backfill. This is not the case for manganese which was shown on page 4-23 of the DEIS to be greater in the test column leachates for the East Smoky Panel than that for Panels B & C. The predicted pit backfill

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				leachate concentration for manganese is described in Table 4.5-5 of the DEIS and the impacts of this greater concentration on groundwater are described on page 4-26.
5	5.35	Earthworks/ CCA	The currently permitted Panel B backfill volume is 20.9 M loose cubic yards (LCY). Under Alternative 1, approximately 9.1M LCY will be added to Panel B from East Smoky Panel (DEIS, p. 4-23) will be added to Panel B. This is a substantial addition. The DEIS should provide analysis on how the additional backfilled material will increase the time in which selenium contributions are occurring to groundwater, and provide data on how long the infiltration through Panel B will contribute selenium to water resources as a result of the additional backfill from Alternative 1 and previous operations. It's not enough to evaluate the potential change in concentration in Alternative 1, the EIS should evaluate the longevity in which selenium will be added to groundwater. Increasing the longevity will increase the overall total mass of selenium to the aquifer.	Adding more overburden on top of the currently permitted backfill in Panel B would increase the duration of each pore volume at the field scale. Using the proposed average depth of additional overburden to be added to the top of the Panel B backfill (about 130 feet) and using the same approach to estimating pore volume timing for a 7-inch percolation rate as described on page 4-20 of the DEIS, the duration of each pore volume through the added overburden layer would be about 33 years. This would be added to the pore volume duration of the currently approved Panel B backfill of 91 years. This is not considered to be a significant increase in pore volume duration for the Panel B backfill. The comment is incorrect that increasing the longevity of selenium leaching in the Panel B backfill will increase the overall total mass of selenium to the aquifer. The total mass of selenium added to the aquifer is controlled by the total mass of selenium leached from the backfill material which is a physical characteristic of the backfill material that is independent of the duration of the leaching. Narrative has been added to the FEIS addressing the change to the duration of leaching the combined Panel B backfill.
5	5.36	Earthworks/ CCA	The 2002 SEIS/ROD predicted cumulative impacts to surface and groundwater based on water quality conditions at that time. That data is no longer accurate. The EIS must consider the cumulative effects of predicted water quality concentrations from Panel B in addition to the current ground and surface water quality data.	The environmental effects of Panels B & C have been monitored since the SEIS/ROD and have been the subject of evaluation in the CERCLA process that has occurred since that SEIS. A major focus of the CERCLA efforts has been to estimate the future COPC concentrations where contaminated groundwater discharges to the surface at seeps and springs. This has included the potential mitigation effects of the various remedial actions that are planned or have been taken to reduce the contamination of the surface streams. The East Smoky Panel groundwater and surface water impact analysis described in the DEIS has added the water quality impacts predicted to be due only to the East Smoky Panel at Hoopes Springs to those estimated by the CERCLA efforts. Thus, the stream impacts described in the DEIS do include the cumulative effects of the past mining and the East Smoky Panel.
5	5.37	Earthworks/ CCA	With the addition of 9.1 M LCY to the currently permitted Panel B backfill volume of 20.9 M LCY, the topography of Panel B will change considerably from the previous 2002 ROD. This topographic change is not analyzed in the DEIS with respect to changes in hydrology, runoff, erosion, sedimentation, etc.	The potential impacts to topography due to the Panel B backfill were discussed in the DEIS on pages 4-3 and 4-4. The potential groundwater impacts from the additional overburden added to Panel B is discussed in the DEIS beginning on page 4-22. Last, while it is correct that the Panel B backfill would be higher than is currently permitted, runoff and erosion/sediment characteristics would be similar to those currently expected because the same types of controls would be used. Language to this effect has been added to Section 4.5.2.1.
5	5.38	Earthworks/ CCA	The DEIS fails to account for climate change when evaluating long-term cover system performance, determining percolation rates, and analyzing the potential impacts of storm water management and mine reclamation and closure. The climate for the first five monitoring years of the cover system for Panels F&G (2012-2017) has been warmer than the 100-yr climate record (1904-2004), according to data collected by O'Kane Consulting. The increased air temperature has resulted in an increased percent of precipitation as rainfall, rain-on-snow events, and early but slow snowpack loss that optimizes net percolation (2017) winter snowpack was fully lost in late March.4 O'Kane describes the myriad ways in which these climatic changes adversely influenced the Deep Dinwoody cover system's performance, allowing significantly more infiltration than predicted.5 It does not appear that current or ongoing climatic change were accounted for with the design of the proposed cover systems or the hydrologic models that predict surface and groundwater quality impacts.	Climate change was included in the evaluation of the Proposed Action cover performance and is found in Section 6.1.9 of the cover modeling report (Stantec 2017). The narrative in that section describes that a 6 degree increase in local temperature, along with a 5% increase in annual precipitation would result in an increase in annual percolation rate through the cover. Discussion of this analysis has been added to the Final EIS narrative.

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5	5.39	Earthworks/ CCA	In addition to incorporating climate change into cover system design, these climatic changes have implications for other aspects of the mine as well, including storm water management. For example, the BLM's analysis of a major storm event at the Zortman Landusky Mine in Montana determined that designing for a 24-hour/100-year storm event was inadequate, given the increased rate and severity of storm events due to climate change. Yet, the DEIS for East Smoky Canyon relies on stormwater structures designed for a 24-hour/100-year storm event. The EIS should disclose the potential impacts of increased stormwater releases on surface water, vegetation and soils, given the documented climatic changes and the increase in severity and frequency of storm events. The DEIS should also evaluate the potential effects of increased rate and severity of extreme storm events to the tailings impoundment facilities. Previous analysis has not accounted for these climatic changes with respect to the cover system, tailings dam stability and seepage management. The DEIS should consider these climatic changes as it evaluates all aspects of mine design, reclamation and closure.	Additional information on the potential effect of climate change on the local environmental conditions in southeastern Idaho has been added to FEIS Section 3.3.4. The tailings storage facility (TSF) is already fully permitted and is not proposed to be changed from currently approved designs as part of the East Smoky Panel operations. The TSF is not a connected action to the proposed East Smoky Panel development and will not be discussed in this EIS. Separate from this EIS project, Simplot has engaged geotechnical engineering companies to evaluate the condition and stability of the Smoky Canyon Mine TSF.
5	5.40	Earthworks/ CCA	The DEIS draws conclusions about "minor" harm to watersheds that are not substantiated. The DEIS states that "the selenium contributions from the East Smoky Panel under the proposed Action and under Alternative 1 would have a minor impact to Sage and Crow Creeks, both of which are already impacted beyond the current chronic aquatic life criterion for selenium." (DEIS, p. ES-5). The assertion that contributions of selenium to Sage and Crow Creeks will have minor, rather than major impacts, is not supported by the data.	The baseline condition against which impacts from the Proposed Action and Alternative 1 are assessed is the current environment, not a theoretical reconstructed estimate of the historical condition before mining or other human influences took place. Per 40 CFR 1508.8, effects analyzed in NEPA are specifically those that "*are caused by the action*", not some other past set of actions. With that important context, and the intensity definition of "minor" in Table 4.1-1 of the DEIS, it is clear the intensity category was properly selected for a projected maximum selenium concentration of 0.001 mg/L from Hoopes Spring entering downstream surface waters.
5	5.41	Earthworks/ CCA	There is nothing in the toxicological profile of selenium that leads to the conclusion that increased selenium above aquatic life standards will have minor effects. The agencies cannot simply ignore that this is the same mine, operated by the same company, adding more pollution to a watershed that is already overwhelmed by selenium contamination that it generated.	The purpose of this EIS is to evaluate the potential effects of the East Smoky Panel Project. This EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project.
5	5.42	Earthworks/ CCA	According to the DEIS, "Regarding future selenium levels, predictions are that current selenium levels are expected to decrease prior to any increases associated with the Proposed Action (Section 4.5). This would likely mean that any increases from the Proposed Action would not increase selenium concentrations beyond current levels." (DEIS, p. 4-98) The DEIS cannot rely on predicted improvements in water quality and fisheries that haven't been realized and remain undocumented. This is particularly important because past predictions have repeatedly failed by orders of magnitude.	The Agencies rely on models because they are the best available tool to predict impacts. The decision to approve a mine plan is based on weighing multiple uses. The rationale of the decision will be discussed in the ROD. The models are based on much data and use the best available modeling techniques. The parameters input to the model have an appropriate level of conservatism such that the model prediction also reflects a reasonable if not somewhat conservative prediction. Order of magnitude failures of model predictions in groundwater models in the phosphate mining region have not been seen. However, the infiltration models have under predicted for cover designs. Because of this, the EIS analysis utilized infiltration inputs similar to actual lysimeter data into the groundwater model to ensure appropriate conservatism in the model predictions. Additionally, monitoring will allow the Agencies to detect unexpected differences. If the modeling estimates prove to be lower than the observed impacts to water quality, there are potential remedies such as water treatment that are reasonably foreseeable.
5	5.43	Earthworks/ CCA	The DEIS notes that additional analysis by a consultant of Simplot (Townsend 2017) indicates that selenium concentrations in Hoopes Spring have peaked and are now declining. (DEIS, p. 5-22) Yet, the graph that is cited is not accompanied by any data for verification, and there aren't enough data points to conclude that concentrations have peaked or declining. This assertion should not be included in the DEIS.	The DEIS assertion attributed to Townsend that concentrations are declining has been removed from the FEIS. His use of the word "*peak*" was misinterpreted by the Agencies; Townsend was using the word to be more synonymous with "plateau", which better reflects the graphed information in the DEIS. The misinterpretation has been corrected in the FEIS and the graph has been replaced with a similar graph that extends the record through 2018. A plateau remains the appropriate description of the recent trend. There is currently no definitive evidence of a peak or a decline at this monitoring site. Additional explanatory graphs with data collected subsequent to the baseline study are shown below for reference; only the first (HS – Hoopes Spring) is included in the FEIS. Note: 2018 observations in HS-3 and downstream reaches illustrate the effects from the pilot water treatment pilot, which is on-going.

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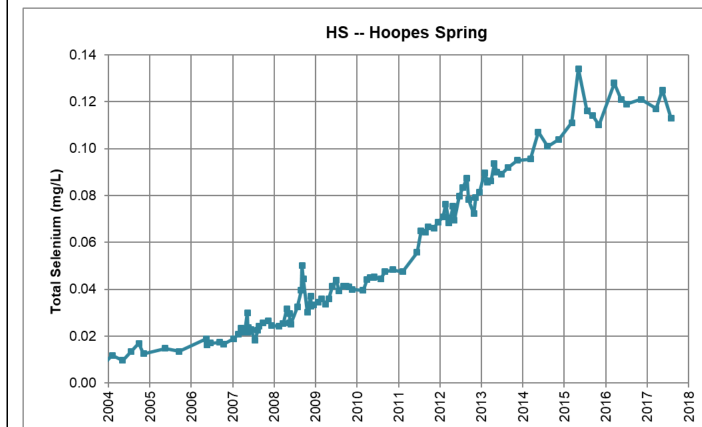
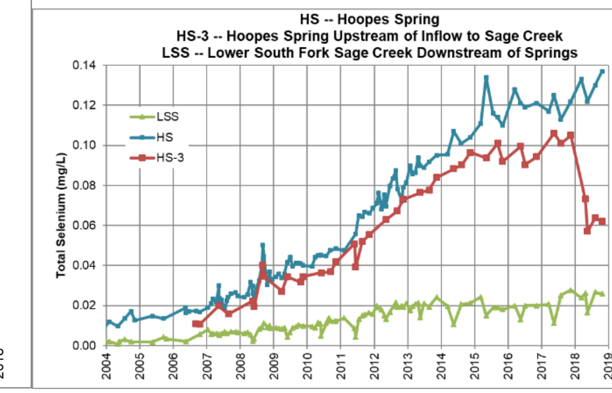
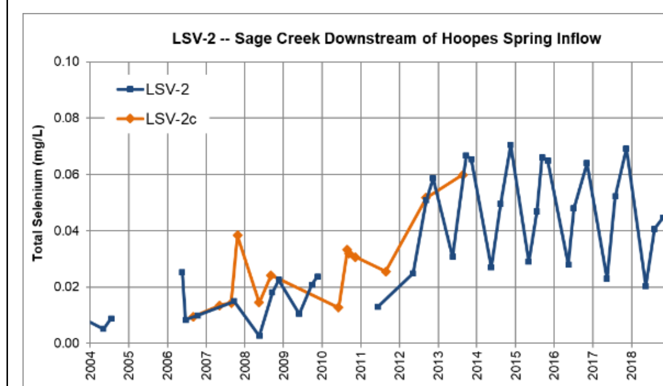
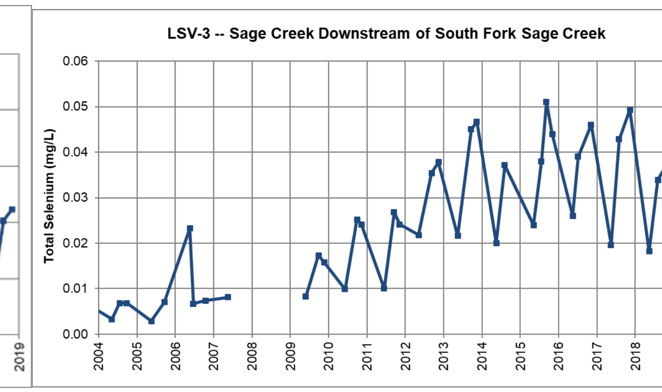
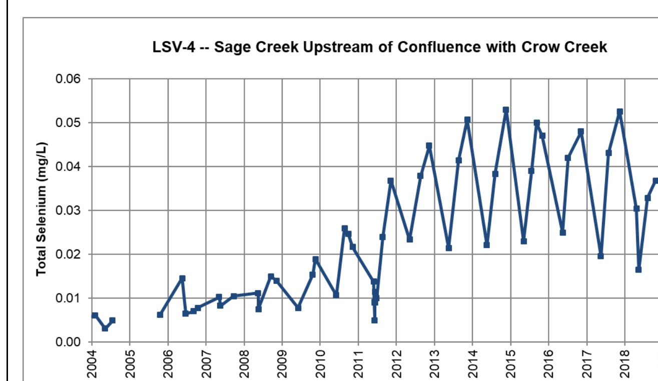
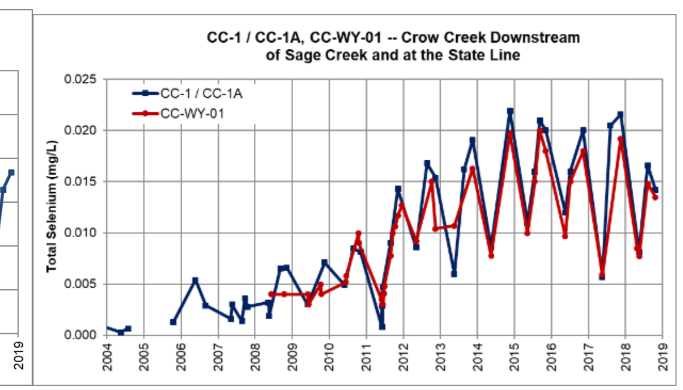


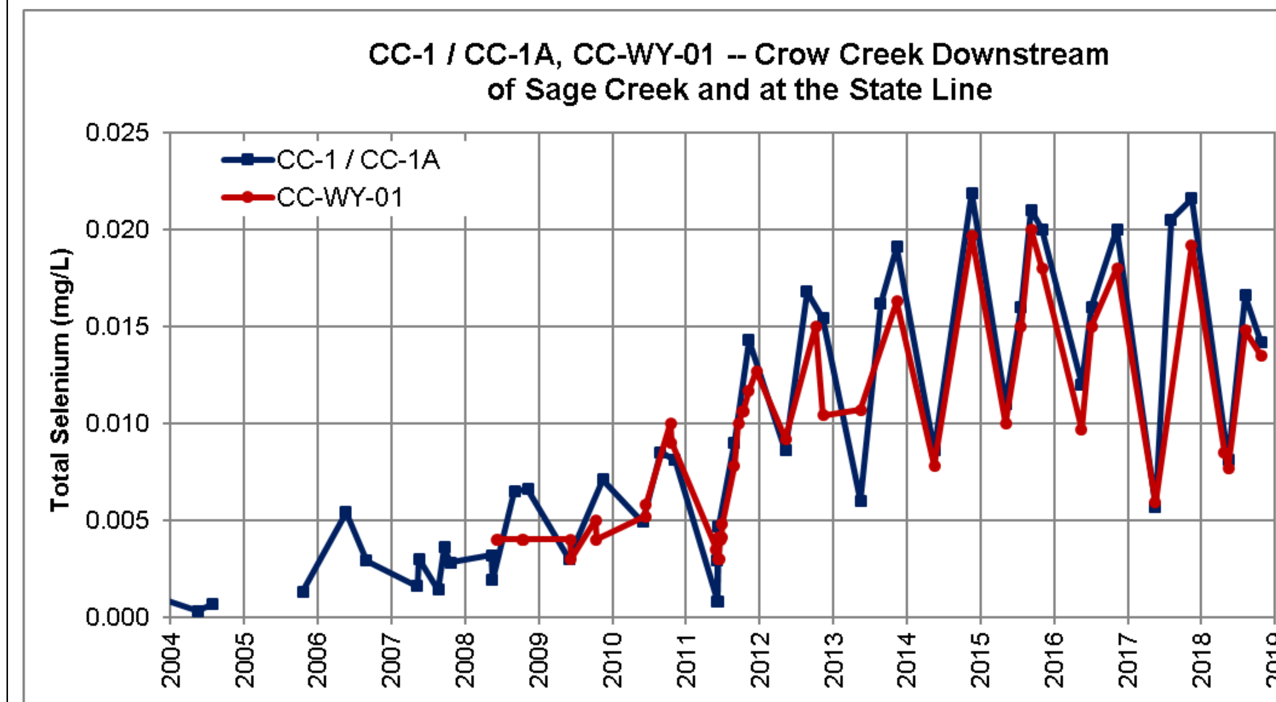










5	5.44	Earthworks/ CCA	But water quality monitoring to date does not demonstrate a decline in selenium concentrations at that monitoring point. Selenium concentrations continue to be measured at 0.02 mg/l in 2016 and 2017. As such, it is inappropriate to rely on any selenium reductions that haven't been measured or documented.	Estimated concentrations in surface water are based on groundwater transport modeling that is required as a part of the CERCLA RI/FS. Modeling is an accepted practice for assessing potential improvements that may be attained through a variety of remedial alternatives. Observed selenium concentration in surface water samples at CC-WY-01 have essentially plateaued beginning in 2015 at about 0.02 mg/L (see chart below for reference). Note decreasing concentrations measured in 2018 include the effects of the treatability study, which is ongoing. Consistent with observations at CC-WY-01, the concentration of selenium in surface water at CC-WY-01 was predicted to peak at about 0.02 mg/L, plateau starting in about year 2015, and decline after year 2020 (see Figure 7.4-8 from RI report below). These estimates of the Formation Environmental 2014 Model are not attributed to any future remedies that may be required by the CERCLA ROD, but rather a result of the existing removal actions at Pole Canyon, as well as existing reclamation and load depletion. 

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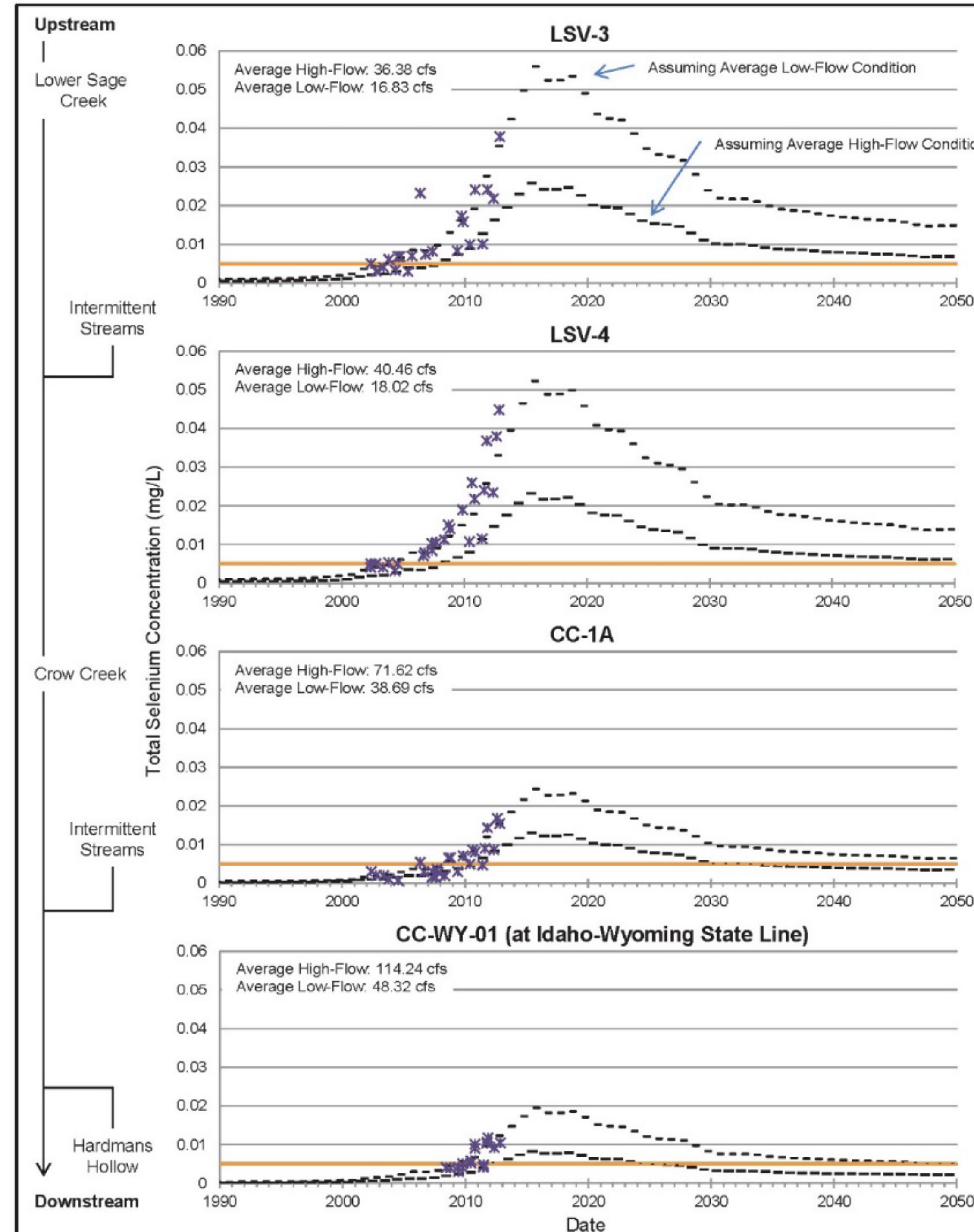

FIGURE 7.4-8
PREDICTED CONCENTRATIONS AT LOCATIONS DOWNSTREAM OF SPRINGS COMPLEX BASED ON MODELED LOADING

Idaho aquatic life selenium standard (0.005 mg/L) for Surface Water.
Observed Concentration

J.R. SIMPLOT COMPANY
SMOKY CANYON MINE RI/FS
REMEDIAL INVESTIGATION REPORT
DATE: MAY 29, 2014
BY: LLV FOR: PHT
FORMATION ENVIRONMENTAL

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5	5.45	Earthworks/ CCA	Even if improvements in selenium concentrations in fish tissue have been realized, which they have not, there is no data or analysis to indicate when conditions in those stream reaches will be able to meet beneficial uses. As stated in the DEIS, organisms in aquatic environments exposed to selenium accumulate it primarily through their diets and not directly through water. At present, sediment, periphyton and macroinvertebrates (Formation Environmental, 2018) contain very high concentrations of selenium, and there is no analysis to demonstrate how long it will take to see habitat conditions improve and fish tissue concentrations decline once selenium inputs to water have been reduced. The Forest Service and BLM have an obligation under the Organic Act and FLPMA, respectively, to protect water quality and fish populations, and cannot ignore these responsibilities by deferring to some future undocumented, unproven, actions by another agency.	The purpose of this EIS is to evaluate the potential effects of the East Smoky Panel Project. This EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project. Section 3.9.5 of the DEIS acknowledges bioaccumulation effects of selenium on aquatic life and describes the existing selenium condition in aquatic life, which reflects that bioaccumulation and serves as the baseline condition. Then Section 4.9.2.1 evaluates the incremental increase resulting from the Proposed Action, but also acknowledges the fact that these increases would occur in an already impacted system. The CERCLA process is underway to evaluate remedial alternative that would address the existing contamination. The NEPA process for the East Smoky Panel Mine Project cannot and does not circumvent or overstep CERCLA.
5	5.46	Earthworks/ CCA	The cumulative impact analysis in the DEIS documents unacceptable impacts to Sage Creek and Crow Creek. It fails to take a hard look at the cumulative impacts to groundwater from previous mine activities and East Smoky Panel, and it inappropriately relies on CERCLA to mitigate cumulative impacts.	See Comment Response 5.36 with regards to the cumulative impact approach used in the DEIS for describing the potential water quality impacts to Hoopes Springs which is the only discharge point for groundwater impacted by the East Smoky Panel Project and the surface environment.
5	5.47	Earthworks/ CCA	According to the DEIS, "the predictive model analyses did not consider the current mining impacted groundwater at the four modeled groundwater points." (DEIS, p. 5-23). The DEIS states that there is no means to assess current selenium concentrations at the theoretical OBS-1 and OBS-2 locations, but baseline data (Stantec 2017a) at GW-27 (one sample) showed a selenium concentration of 0.0109 mg/L; adding that to the predicted 0.003 mg/l peak impact at 100 years (under the proposed action, less under Alternative 1) results in a concentrations ranging from 0.026 to 0.047 mg/l, which a mean of 0.032 mg/l. Under this scenario, the DEIS fails to take a hard look at the cumulative effects to groundwater quality from the proposed action and Alternative 1. The predictive model includes data for only 4 locations. OBS-1 and OBS-2 are model derived observation points, not actual monitoring wells, so the DEIS provides absolutely no cumulative effects analysis for the groundwater plume to the north. Furthermore, the DEIS uses groundwater quality data from GW-27 and GWIW, which are far to the south and west of the proposed East Smoky Panel, rather than GW-16 and 24, which are monitoring wells that are in the Wells Formation and closer to the proposed East Smoky Panel.	The DEIS does provide a cumulative impact analysis for the predicted discharge of COPCs at Hoopes Springs, the only point where the groundwater affected by the East Smoky Panel would discharge to the surface environment. The cumulative impact analysis was obtained by arithmetically adding the predicted impacts from the East Smoky Panel to those already determined for the existing sources from the CERCLA groundwater modeling. Concentrations of the COPCs at all points within the affected groundwater are shown by the multiple maps showing the COPC concentrations in the plumes. These can be examined to see what the predicted concentrations would be at GW-16 and GW-24. In response to the comment, the groundwater model concentrations at GW-16 and GW-24 have been added to Tables 4.5-6 and 4.5-10 in the FEIS.
5	5.48	Earthworks/ CCA	The DEIS should provide a model of the existing groundwater pollution plume for all contaminants and how those plumes overlap with the predicted plume from the proposed action and Alternative 1.	The existing groundwater impacts have been modeled in the CERCLA process with an analytical model that predicts COPC concentrations at specific observation points. One of these points is Hoopes Springs which is the single location where groundwater impacted by the East Smoky Panel Action Alternatives is discharged to the surface environment. The Agencies decided not to redo the CERCLA groundwater modeling of the existing sources but to separately model the water quality impacts from the East Smoky Panel and then arithmetically add those impacts to the CERCLA model results.
5	5.49	Earthworks/ CCA	It should also consider the groundwater quality data from existing monitoring wells GW-16 and GW 24, which are both in the Wells Formation and closer to the proposed East Smoky Canyon panel. GW-16 already exceeds standards for selenium and other pollutants as a result of previous operations. Formation Environmental (2014) reports selenium concentrations at GW-16 ranging from 0.447 to 1.27 mg/l. Data from the East Smoky Panel baseline monitoring (Stantec 2017a) showed selenium concentrations ranging from 0.766 to 0.926 mg/l at GW-16. (DEIS, p. 5-16) Adding more selenium and other pollutants from the East Smoky Canyon panel would add to these exceedances.	See Comment Response 5.47.
5	5.50	Earthworks/ CCA	Furthermore, as mentioned above, the model should evaluate the 15-inch percolation rates as a component of the cumulative effects analysis for the proposed action.	The 15-inch percolation rate through the Proposed Action cover was included in the groundwater impact modeling (HGG 2018) but such a high percolation rate was not considered to be representative of the reasonably foreseeable percolation through the Proposed Action cover, which was determined to be the 7-inch percolation rate. That is what is described in the DEIS. The impacts of the 15-inch percolation rate through the Proposed Action cover can be reviewed in the groundwater modeling report.

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5	5.51	Earthworks/ CCA	According to the DEIS (p. 5-20), the predicted Panels F and G impacts to surface water (from the selected Alternative D), combined with the existing un-remediated Smoky Canyon Mine impacts, were assessed at South Fork Sage Creek downstream to Crow Creek at a timeframe of several hundred years post-mining. The DEIS states that based on that model, the timing of impacts to surface waters from Panels F and G is well beyond the 2050 end-date modeled in the RI/FS. However, the current selenium concentration in South Fork Sage Creek, Sage Creek and Crow Creek downstream of Sage Creek are already above the Alternative D predictions in the Panels F and G EIS (BLM and USFS 2007). As a result, the DEIS cannot rely on the model predictions for Panels F and G, and should rerun the model with current data.	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 action on the cumulative effects area. The DEIS evaluated whether Panels F and G would have a cumulative effect on the Project. Any potential effect on surface waters from the East Smoky Panel Project would be at Hoopes Springs. Modeling conducted for Panels F and G focused on potential effects on South Fork Sage Creek and Deer Creek. There is currently no information that indicates the groundwater modeling done for Panels F and G has technical deficiencies; thus, no additional work is needed to provide the cumulative effect for the East Smoky Panel Project in relation to past mining projects. As the commenters point out, selenium concentrations in South Fork Sage Creek, Sage Creek, and Crow Creek are higher today than predicted from earlier analysis. These are conditions from historical mining such as at Panel E and other historical mine features. As the CERCLA work progresses and additional early actions and remedies are implemented, selenium inputs to local surface waters will decrease over time. Reference: HGG. 2018. Technical Memorandum: East Smoky Panel of the Smoky Canyon Mine, Numerical Modeling Report. Final. January.
5	5.52	Earthworks/ CCA	The cumulative effects analysis improperly concludes that surface water quality impacts at Hoopes Spring and downstream into Sage Creek and Crow Creek would be negligible from the addition of selenium from the project (DEIS, p. 5-24). This conclusion is not substantiated. Selenium concentrations in Sage Creek already exceed aquatic life standards, and any addition to these concentrations would exacerbate those adverse effects.	See Comment Response 5.51. Also, per 40 CFR 1508.8, effects analyzed in NEPA are specifically those that "are caused by the action", not some other past set of actions. That said, the DEIS acknowledges in numerous places that there is already an ongoing selenium impact in Sage Creek, to which the action would incrementally add.
5	5.53	Earthworks/ CCA	Furthermore, the DEIS defers to the water treatment plant, which is the subject of a separate CERCLA action to mitigate these impacts. This is inappropriate because the DEIS provides no analysis of the water treatment plant and its effluent levels and no data has been provided to demonstrate that it can meet water quality standards or reduce selenium concentrations downstream sufficient to protect beneficial uses. Potential compliance with a future operation of a water treatment plant does not satisfy NEPA. There is significant uncertainty associated with the timing of the water treatment plant authorized under CERCLA, and the arrival of the contaminant plume from the East Smoky operations. At present, the water treatment plant is operating at capacity, but capturing only half or less of the contaminated water from the springs. There is no data to demonstrate that Simplot can reduce selenium concentrations in downstream flows to meet standards, let alone take on additional contamination.	The Proposed Action and Alternative 1 impact assessments do not rely on any CERCLA remedy; those water quality impacts are assessed based only upon the Project, and not the impacts from past or current mining or future treatment options. Also, see Comment Responses 3.10, 3.11, and 3.14. The RI groundwater modeling considers contribution from all historical source areas along with reductions associated with existing reclamation and existing removal actions at Pole Canyon. Although the RI model predicts that selenium concentrations related to historical mining activity will be elevated at Hoopes Spring and South Fork Sage Creek springs by the time any additional selenium transport from the proposed East Smoky Panel arrives at Hoopes Springs, the additional impact on surface water is expected to have a negligible to minor effect.
5	5.54	Earthworks/ CCA	More importantly, the DEIS cannot simply rely on a CERCLA action for hazardous releases from the mine's other operations to mitigate the impacts from new operations at East Smoky.	The Proposed Action and Alternative 1 impact assessments do not rely on any CERCLA remedy; those water quality impacts are assessed based only upon the Project, and not the impacts from past or current mining or future treatment options.
5	5.55	Earthworks/ CCA	The Adaptive Management Plan outlined in the DEIS is inadequate to evaluate the impacts of the proposed action, nor ensure that the mine complies with applicable laws and regulations. Furthermore, it contains insufficient detail for the public to evaluate impacts.	The Adaptive Management Plan (AMP) is included as Appendix 4B of the DEIS and the FEIS. It gives the overall objectives of the plan and describes that the AMP itself is by design flexible and evolving (i.e., adaptive) as needed to ensure that the objectives are met. One of those objectives is to conduct water monitoring with Agency oversight and as directed in Simplot's Comprehensive Environmental Monitoring Program Plan (CEMPP). Any needed changes to the CEMPP will not be made until a later date, and specifically in part will incorporate IDEQ's Point(s) of Compliance determination. The monitoring plans for both the groundwater and surface water will be modified where needed/as needed to meet the state regulatory compliance requirements and to provide adequate information on water quality trends that could affect compliance.
5	5.56	Earthworks/ CCA	Severe impacts to water, soils, vegetation, and wildlife have already occurred as a result of Smoky Canyon Mine operations, as documented in the Remedial Investigation/Feasibility Study. The Adaptive Management Plan fails to provide sufficient information concerning monitoring requirements and contingency measures for the proposed expansion to demonstrate that resources will not be further degraded and that there will be a timely response if monitoring shows that water quality is not meeting defined targets.	The purpose of this EIS is to evaluate the potential effects of the Proposed Action and alternatives. This EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project is predicted to make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project. The AMP gives the overall objectives of the plan and describes that the AMP itself is by design flexible and evolving (i.e., adaptive) as needed to ensure that the objectives are met. One of those objectives is to conduct water monitoring with agency oversight and as directed in Simplot's Comprehensive Environmental Monitoring Program Plan

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				(CEMPP). Any needed changes to the CEMPP will not be made until a later date, and specifically in part will incorporate IDEQ's Point(s) of Compliance determination. The monitoring plan for both the groundwater and surface water will be modified where needed/as needed to meet the state regulatory compliance requirements and to provide adequate information on water quality trends that could affect compliance.
5	5.57	Earthworks/ CCA	The DEIS provides only vague information about a monitoring plan that will be updated and reviewed at some point by the agencies (DEIS, AMP, p. 4), and may or may not require monitoring of some surface and groundwater sites. … The DEIS must provide details about where, when, how monitoring will occur at the expanded mine area, and specify contingency measures that will be implemented if monitoring demonstrates water quality impacts are occurring. Without this information it is impossible to determine whether impacts will be identified in a timely manner, whether resources will be adequately protected, and whether compliance will occur.	See Comment Response 5.55. Further, the AMP includes a discussion of efforts on the part of the federal agencies and Simplot under the CERCLA settlement agreement to develop effective collection and treatment of contaminated groundwater discharging to the surface environment at the mine.
5	5.58	Earthworks/ CCA	The DEIS should also provide information on the points of compliance that will be considered by IDEQ for groundwater compliance for the East Smoky Panel. Without this information, it is impossible to determine the potential impacts of the project, whether monitoring will provide timely notice of impacts, and whether groundwater resources will be protected. As noted in the DEIS, IDEQ will need this information to determine whether adequate protections are ensured to protect groundwater quality and public health effects. … Clearly, that information is also needed for the DEIS to provide information to the public about these potential impacts. The agencies can't simply rely on some future agency action.	The identification of Point(s) of Compliance (POC) with the Idaho Ground Water Quality Rule is under the authority of the IDEQ and the timing of that process is independent of the federal NEPA process. Idaho policy aims to both prevent contamination of ground water from all point and nonpoint sources of contamination to the maximum extent practical, while also allowing for the extraction of minerals above and within ground water. Idaho Code § 39-102(3), (4). The Ground Water Quality Rule is the State's regulatory mechanism for achieving this policy and ensuring that mining operations meet applicable regulatory standards. Mining operations are not permitted to conduct activities that would exceed Idaho's groundwater standards except as provided in the Ground Water Quality Rule. The Ground Water Quality Rule authorized IDEQ to allow exceedances of groundwater standards to occur if a site-specific POC determination is set for the operation and the operator implements best management practices and best practical methods ensure that the quality of ground water that discharges to surface water does not impair the identified beneficial uses of the surface water and that surface water infiltration does not impair beneficial uses of groundwater (IDAPA 58.0.11.150.03). The East Smoky Panel is an extension of an active mining area at Smoky Canyon Mine and the IDEQ has approved POC and indicator wells that make sense where potential sources of groundwater impacts at the mine are located so close to each other. Narrative is included in Section 4.5.2 in the Final EIS that describes this determination. While wells have been chosen, background and compliance water quality is underway for compliance conditions. The future monitoring plans for establishing compliance with the Ground Water Quality Rule are not necessary at this time to determine the potential impacts to groundwater. These impacts have been determined using current design information and robust modeling techniques. The impacts characterized by this analysis are described in the DEIS.
5	5.59	Earthworks/ CCA	"The treatment technology is expected to address existing impacts to Hoopes Spring water quality, and the possibility of future impacts from the East Smoky Panel. The USFS and the State of Idaho will require Simplot to achieve compliance with water quality standards and maintain compliance into the future." (DEIS, Adaptive Management Plan, p. 7) This is inappropriate. As noted before, the DEIS provides no data to demonstrate that the water treatment plan will meet standards, reduce selenium concentrations downstream sufficient to protect beneficial uses and reduce selenium in fish tissue, and it is inappropriate to rely on a CERCLA action as mitigation for a proposed expansion. Furthermore, the federal land management agencies must demonstrate that mine plan will comply with state and federal law, and it cannot defer to some future action by the State or EPA.	The cited AMP text that the comment includes is not referring specifically to the Project's Proposed Action or Alternative 1. The Proposed Action and Alternative 1 impact assessments in the DEIS Chapter 4 sections do not rely on any CERCLA remedy; those water quality impacts are assessed based only upon the Project, and not the impacts from past or current mining or future treatment options. The purpose of this EIS is to evaluate the potential effects of the East Smoky Panel Project; Proposed Action and Alternative 1. Further, this EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project. Both the EIS and the AMP discuss a treatment plant as a possible CERCLA remedy for ongoing selenium loading not associated with the East Smoky Panel Project. Clarifications have been added throughout the FEIS to note that a CERCLA remedy has not yet been selected. The AMP included as Appendix 4B of the DEIS discusses aspects of groundwater and water quality in relation to mining activities and CERCLA treatability study to develop information for completion of the CERCLA Feasibility Study (FS). Work on the FS continues. At the conclusion of the FS, the USFS will issue a Record of Decision as to appropriate actions needed to address releases to the environment, including selenium to Hoopes Springs and downstream waters (such as Sage Creek). Simplot will then implement those decisions to address these releases.

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				Finally, IDEQ has approved POC and indicator wells that make sense where potential sources of groundwater impacts at the mine are located so close to each other. Also, please see Comment Responses 3.10, 3.11, and 3.14.
5	5.60	Earthworks/ CCA	Given the experiences with the cover system for Panels F&G, the only way to determine that cover systems are operating as predicted is to actually measure infiltration. The mine should be required to install lysimeters in the cover systems to measure infiltration to ensure that cover systems are operating as planned. The monitoring plan should require active monitoring of infiltration rates, and include specific contingency measures if the panel does not perform as anticipated. Furthermore, the monitoring plan should include additional groundwater monitoring wells near the panel to actively measure seepage from the panel, and to differentiate it from other panels.	Order of magnitude failures of model predictions in groundwater models in the phosphate mining region have not been seen. However, the infiltration models have under predicted for cover designs. Because of this, the EIS analysis utilized infiltration inputs similar to actual lysimeter data into the groundwater model to ensure appropriate conservatism in the model predictions. The IDEQ has primacy for establishing the POC for the East Smoky Panel Project to ensure compliance with the Idaho Ground Water Quality Rule. The East Smoky Panel Project is an extension of an active mining area at the Smoky Canyon Mine and IDEQ has approved POC and indicator wells that make sense where potential sources of groundwater impacts at the mine are located so close to each other. Extensive ongoing monitoring and adaptive management will be implemented as part of this Project. The AMP gives the overall objectives of the plan and describes that the AMP itself is by design flexible and evolving (i.e., adaptive) as needed to ensure that the objectives are met. One of those objectives is to conduct water monitoring with agency oversight and as directed in Simplot's Comprehensive Environmental Monitoring Program Plan (CEMPP). Any needed changes to the CEMPP will not be made until a later date, and specifically in part will incorporate IDEQ's Point(s) of Compliance determination. The monitoring plan for both the groundwater and surface water will be modified where needed/as needed to meet the state regulatory compliance requirements and to provide adequate information on water quality trends that could affect compliance.
5	5.61	Earthworks/ CCA	Finally, for any monitoring program to be effective in the end, it should have a set of thresholds for habitat condition, population changes, and whole-tissue Se levels which would trigger immediate operational changes or shutdown, and require meaningful measures to reverse the adverse condition before operations could resume. The proposed monitoring program leaves entirely unclear what will happen in the event that any problems/impacts occur.	The East Smoky Panel Project operations would be enveloped within the ongoing environmental monitoring of various media including aquatic life that Simplot routinely compiles and reports to the appropriate regulatory agencies that have oversight through their CEMPP. Currently, long term aquatic habitat, species diversity, and contaminant monitoring data collected at numerous sites are used to track trends or unexpected conditions and as needed would trigger further agency conditions or requirements. Further, the AMP contained in Appendix 4B describes how water monitoring results could be used trigger management changes, and this would also be relevant to aquatic conditions.
5	5.62	Earthworks/ CCA	Furthermore, the DEIS must provide a detailed description of all BMPs that Simplot intends to employ to mitigate impacts, along with the effectiveness of those BMPs. The DEIS acknowledges that past mine activities have led to severe impacts, but fails to describe the new BMPS that will be used in the expansion to prevent similar impacts.	EPMs and BMPs were described in Section 2.5 of the EIS. Additional mitigation beyond those EPMs and BMPs were listed in Chapter 4 for each resource as needed. Over the years, there have been numerous changes to BMPs (e.g., cover designs, stormwater routing) as the need arose. This would continue.
5	5.63	Earthworks/ CCA	The DEIS fails to adequately analyze the impacts of contributing additional selenium to aquatic ecosystems that are already impaired by selenium. The DEIS predicts that the proposed action and Alternative 1 will contribute selenium over an extensive time period via Hoopes Spring into the Sage Creek watershed. The DEIS provides selenium concentrations in surface water, but it fails to calculate the selenium load to Hoopes Spring, Sage Creek and Crow Creek over time, and consider the potential impacts of loading on the aquatic ecosystem. The RIFS states that the selenium mass load transported to lower Sage Creek and farther downstream to Crow Creek originates predominantly from Hoopes and SFSC springs. RIFS p. 7-47. According to the RIFS (p. 8-11), "COPC concentrations in groundwater downgradient of the source areas and in surface waters that receive discharge from the Wells Formation aquifer (i.e., downstream of Hoopes Spring and SFSC springs) are above applicable screening-level benchmarks. Therefore, water quality conditions in these areas represent potential risks to human and/or ecological receptors." It is reasonable to assume that contributing selenium to this system will exacerbate those human and ecological risks.	The DEIS described and discloses that the very small selenium contributions from the Project would be in addition to those already resulting from historic mining operations. It also noted potential decreases in selenium contributions due to previously implemented corrective actions and/or due to the pilot water treatment plant. The RI/FS and the related CERCLA process are independent of the East Smoky Panel Project.

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5	5.64	Earthworks/ CCA	The DEIS fails to analyze the impacts of mining below the water table. According to the DEIS, the Proposed Action and Alternative 1 would mine lower branches during the final phases, and pit excavation could intersect the saturated portion of the Wells Formation. The DEIS gives differing information on when these impacts would occur. On page 2-32, it states that for Alternative 1, "groundwater would likely be intercepted during mining of the lower benches associated with Phases 6 and 7, rather than just during phase 7 mining as projected under the proposed action." (P. 2-32). However, in another section, it states that the proposed action would likely intercept groundwater during phases 6 and 7:	The potential mining of the bottom of the open pit below the water table is described on pages 4-19 and 4-41 for the Proposed Action and Alternative 1. It is described that groundwater inflow into the lowest portion of the Proposed Action open pit (Phase 6 and 7) "*could seasonally*" occur and would be a "*limited situation*" because the baseline groundwater elevations in nearby GW-16 and -29 are actually lower than the bottom of the proposed pit for the Proposed Action and Alternative 1 (Section 4.5.2.1). The description of the phases of mining in the Proposed Action that could encounter groundwater has been corrected as needed in Chapter 2 for the Proposed Action to be consistent with groundwater interception in Phases 6 and/or 7. Additional narrative on the potential impact to the water table from pit dewatering has been added to the Chapter 4.5.2.2 narrative for groundwater impacts due to the action alternatives.
5	5.65	Earthworks/ CCA	According to the DEIS (p. 2-9), no segregation of waste materials is planned for backfilling operations under the Proposed Action, including any backfill into saturated zones. When mining ceases, groundwater will seasonally be connected to backfilled material. What will be the effect of placing seleniferous waste in contact with groundwater, since GW-16 already shows selenium concentrations above standards? How much groundwater must be pumped seasonally and added to the tailings impoundment, and what is the anticipated water quality of that discharge? How will that waste water in the tailings facility be managed long term? What analysis has been conducted to evaluate long-term seepage from the tailings impoundment? Pipeline spills are a regular occurrence at many mines, with the potential for adverse impacts to surface and groundwater. The DEIS should analyze the potential for pipeline spills associated with pumping selenium contaminated water to the tailings facility.	The groundwater flow to the Proposed Action open pit is described beginning on page 4-18 of the DEIS and on page 4-41 for the Alternative 1. Narrative has been added to these sections of the FEIS to further describe the potential impacts from seasonal submergence of the pit backfill in these areas, the volume of dewatering water removed from the pits, and the expected water quality of this dewatering flow. Narrative has also been added describing that the water added to the TSF would be recycled to the mill along with the other tailings water and that the pipeline leading from the pit to the TSF would be of welded HDPE pipe with little potential for pipeline spills.
5	5.66	Earthworks/ CCA	The DEIS uses outdated information to predict surface and groundwater concentrations. According to the DEIS, the model to predict selenium concentrations in Hoopes Spring relies on the Year 2050 selenium concentrations that were predicted by another model in the RI/FS (Formation Environmental 2014). The RI/FS model predicted that by 2050 the selenium concentrations would have already peaked and essentially would have reached a steady-state condition. It predicted selenium concentrations of approximately 0.005 mg/l, and selected this concentration as the baseline conditions for Hoopes spring. However, the results of the RIFS model have not been realized, so additional modeling should be done to incorporate current data.	The CERCLA model information used in the DEIS is the best information available at the time. The predicted concentrations at Hoopes Spring are based on the arithmetic combination of the results from the CERCLA and DEIS groundwater modeling.

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5	5.67	Earthworks/ CCA	Furthermore, assumptions in the model do not reflect current climatic conditions. The RIFS says net percolation was estimated for each cover type, by year, during the historical period extending from 1984-2012 (p. 5-4 RIFS), and they used data from 1984-2012 to predict future conditions from 2013 through 2050 (RIFS, p. 5-6). Yet, climatic conditions have changed, as noted earlier, and it's no longer appropriate to use past weather conditions to predict future conditions. According to O'Kane (2015), full-scale monitoring of climatic conditions for the Deep Dinwoody cover system for Panels F&G began in 2012 and continued onward. They found that the climatic conditions from 2012 – 2017 were dramatically different than the previous 100-year record. The DEIS needs to update the model, and incorporate reasonably foreseeable future climatic conditions.	The cover modeling report that was used for the EIS (Stantec 2017f) did briefly evaluate the potential impact of climate change on the East Smoky Panel cover performance using 1D modeling. The results are discussed in Section 6.1.9 of that report and evaluated a potential increase in annual percolation through a cover made with Salt Lake Formation and having a topsoil layer of 6 to 12 inches thick. The increase in annual percolation through the Proposed Action cover using Salt Lake Formation material in its construction was 33 to 50 percent for the two topsoil layer thicknesses, respectively. The same report also showed that 2D modeling decreases the annual percolation compared to 1D so the increases in the 1D modeling described in Section 6.1.9 should be considered approximate. The groundwater modeling report that was used for the EIS (HGG 2018) did evaluate the effects of different percolation rates through the Proposed Action and the Alternative 1 covers. Each cover was evaluated at percolation rates of 2, 7, and 15 inches per year. For the Proposed Action cover, the differences in peak selenium concentrations at Hoopes Spring were very slight ranging from less than 0.001 mg/L for the 2-inch percolation rate, to 0.001 mg/L for the 7-inch rate, and 0.002 mg/L for the 15-inch rate. All selenium results at the end of the modeled period (300 years) were 0.001 mg/L or less. This suggests that the effects of increasing annual percolation rates, such as from climate change, to water quality at Hoopes Spring is relatively slight. For the Alternative 1 impact analysis all the three percolation rates resulted in selenium concentrations at Hoopes Spring of less than 0.001 mg/L This suggests that the impact to water quality at Hoopes Spring from the Alternative 1 is relatively immune to the effects of increasing annual percolation rates. See revisions to FEIS Section 3.3.4. Reference Stantec. 2017f. Unsaturated Flow Modeling for the East Smoky Panel Mine Proposed Action Cover. Smoky Canyon Mine, East Smoky Panel Mine EIS. March.
5	5.68	Earthworks/ CCA	The water resources section of the DEIS should provide more accessible information. This section is very difficult to understand because the full names of water quality monitoring sites are not included in the various figures and tables (e.g., Figure 3.5-17 and Table 3.5-2), only abbreviations. These figures and tables should be revised to include the full names, so the public can readily understand this information.	Groundwater monitoring sites do not have "full names". Section 3.5-1 text describes where the wells are located, and Figure 3.5-1 and other figures plot the monitoring well locations and generally code them by the formation monitored. This provides sufficient "accessibility" regarding groundwater monitoring sites. Regarding surface water monitoring sites, it is not necessary or practical to add the full names of monitoring sites everywhere they appear. Section 3.5.2.2 described surface water site locations in the text. Figure 3.5-13 plots the surface water monitoring locations on a map with both topographic and named locations visible. Those two places in the EIS can be referred to when reviewing other tables or figures if the reader has forgotten the surface water monitoring locations nomenclature. However, surface water site locations have been added as notes below Table 3.5-2 to provide another point of reference for this information.
5	5.69	Earthworks/ CCA	The information in Table 3.5-3 should be mapped to show where these beneficial use designations are located in relation to the existing and proposed mine activities.	A new figure (Figure 3.5-18) has been added to the FEIS.
5	5.70	Earthworks/ CCA	The DEIS includes a table of numeric model predictions of COPC concentrations for groundwater, but doesn't provide a similar table for surface water predictions. This should be included in the DEIS. This information should be provided for the 7-inch and 15-inch percolation rates.	Two new tables have been added to show the numeric model predictions for the two, surface water (i.e., spring) observation points. Table 4.5-8 gives those predictions for the Proposed Action with 7 inches per year percolation rate and Table 4.5-11 gives them for Alternative 1 with 15 inches per year percolation rate.

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5	5.71	Earthworks/ CCA	The DEIS fails to provide adequate data to characterize existing conditions. It appears that the most recent aquatic resources and fish population data has not been incorporated into the DEIS, as described in the 2017 Aquatic Resources and Fisheries Monitoring Report. This section should include the most current data on the full range (maximum, minimum and mean) concentrations in sediment, macroinvertebrates, fish tissue, periphyton, etc.	Although the data sets presented in Chapter 3 of the DEIS will not be updated, in response to the comment, sediment, periphyton, and macroinvertebrate chemistry data are shown below for 2006 to 2008 and 2009 to 2017. Blank cells occur when no data were collected for a site/time period. Fish tissue data are provided in Appendix 6B – Supplemental Information for Comment Responses.

Sediment Selenium Concentrations

Location	Units	2006 Fall	2007 Spring	2007 Fall	2008 Spring	2008 Fall	2009 Fall	2010 Fall	2011 Fall	2017 Fall
CC-75	mg/kg dw	0.61	0.6	0.34	0.54	0.48	0.6	0.6	0.4	0.53
CC-150	mg/kg dw	0.88	0.43	0.54	0.63	0.81	0.5	0.5	0.5	0.53
CC-350	mg/kg dw	1.3	0.52	0.55	0.7	0.81	1.0	0.6	1.0	1.13
CC-1A	mg/kg dw	1.8	1.1	0.67	1.2	1.7	2.8	1.5	1.7	5.36
CC-3A	mg/kg dw	1.3	0.73	0.93	0.66	1.3				
LS	mg/kg dw							0.7		
HS	mg/kg dw	2.3	5.9	1.1	1.8	4.4				
HS-3	mg/kg dw	7	6.2	7.5	2.1	8.1				
LSV-2C	mg/kg dw	4.6	4.5	5.4	1.1	5.7	11.9	7.0	5.5	10.3
LSV-4	mg/kg dw	3.3	3.9					4.7	2.0	9.71
LSS	mg/kg dw						1.6	1.2	1.9	3.66

Periphyton Selenium Concentrations

Location	Units	2006 Fall	2007 Spring	2007 Fall	2008 Spring	2008 Fall	2009 Fall	2010 Fall	2011 Fall	2017 Fall
CC-75	mg/kg dw	1.01	0.68	1.1	2.7	0.55	1.30	1.28	0.90	2.11
CC-150	mg/kg dw	1.2	1.37	0.77	2.4	0.65	2.76	1.58	0.79	2.91
CC-350	mg/kg dw	1.5	3.3	0.77	3.4	0.59	2.31	1.55	3.18	1.68
CC-1A	mg/kg dw	3.64	3.39	3.2	7.1	5.86	5.93	7.58	4.89	7.82
CC-3A	mg/kg dw	3.1	1.89	3.8	14.9	1.67				
LS	mg/kg dw									
HS	mg/kg dw	2.2	12	3.9	15	35.2				
HS-3	mg/kg dw	6.5	12	6.2	28.5	24.2				
LSV-2C	mg/kg dw	2.6	8.09	18.5	11.6	4.38	13.00	13.30	8.54	32.1
LSV-4	mg/kg dw	7.42	11.7					10.50	17.20	25.3
LSS	mg/kg dw						6.59	4.73	7.60	12.3

Benthic Macroinvertebrates Selenium Concentrations

Location	Units	2006 Fall	2007 Spring	2007 Fall	2008 Spring	2008 Fall	2009 Fall	2010 Fall	2011 Fall	2017 Fall
CC-75	mg/kg dw	3.11	**	**	4.45	3.49	2.10	3.38	3.61	3.04
CC-150	mg/kg dw	4.94	4.46	1.90	7.03	21.60	5.66	5.61	6.46	3.26
CC-350	mg/kg dw	2.11	4.20	**	10.60	12.30	4.39	2.93	4.24	6.51
CC-1A	mg/kg dw	3.53	12.90	12.24	15.50	11.60	32.10	8.87	16.70	23.5
CC-3A	mg/kg dw	5.48	5.41	**	17.80	11.20				
LS	mg/kg dw									
HS	mg/kg dw	1.00	15.70	**	21.70	33.90				
HS-3	mg/kg dw	12.47	11.40	15.41	28.40	24.70				
LSV-2C	mg/kg dw	22.62	8.26	31.74	30.00	23.90	25.50	53.40	12.70	15.6
LSV-4	mg/kg dw	10.00	9.08					24.10	17.60	14.7
LSS	mg/kg dw						10.90	9.65	12.60	15

** - Insufficient sample for re-analysis

5	5.72	Earthworks/ CCA	The water resources technical report (Stantec 2016(d)), which provides the DEIS baseline data, does not provide 2 full years of water quality data for most surface and groundwater monitoring wells. For example, Stantec (2016D) provides only 2 water quality samples for groundwater monitoring well GW-30 – both taken in fall 2015, so conditions that characterize spring snow melt are not included.	Per the second paragraph under DEIS Section 3.5, which is the introductory section of the water resources Affected Environment section, note the reference to Stantec 2017a right after the reference to Stantec 2016d. Stantec 2017a is a "Supplement to Water Resources Baseline Technical Report" per the reference list in Chapter 7. It contains a complete set of baseline water quality data for the two-year monitoring program.
5	5.73	Earthworks/ CCA	It also appears that the DEIS does not include vertical deviation corrections. It states that this will be completed in 2016, and a correction will be made to the hydrograph at that point. (Stantec 2016(d) p. 66). The DEIS must accurately characterize baseline conditions.	Incorrect. The DEIS was based upon all final groundwater elevation determinations, including any vertical deviation corrections made. As noted in Comment Response 5.72, DEIS information incorporated not only the 2016 Interim Technical Report but also the 2017 Supplemental Technical Report.

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5	5.74	Earthworks/ CCA	Habitat conditions for Smoky Creek and Tygee Creek (DEIS p. 3-137 to 139) are from 2001, far too outdated to be used for a 2018 DEIS. The DEIS should provide current information for these parameters. Without that data, it is impossible to have an accurate analysis of the potential impacts of new operations. Furthermore, habitat conditions for Sage Creek, South Fork Sage Creek and Crow Creek are from 2004, once again too dated for this DEIS.	The Agencies are not aware of additional habitat data for Smoky or Tygee creeks collected more recently than that already referenced in the DEIS. It should be noted, however, that although general habitat information is from 2001, more recent data (as recent as 2015) on embeddedness is presented. While the Agencies have chosen not to update the data sets presented in DEIS Chapter 3, all the pertinent habitat data for Hoopes Spring, Sage Creek, South Fork Sage Creek, and Crow Creek are provided in FEIS Appendix 6B.
5	5.75	Earthworks/ CCA	Macroinvertebrate data for Hoopes Spring, Roberts Creek, North Fork Sage Creek are also dated (DEIS, p. 3-149). Given the potential change in selenium concentrations in Hoopes Spring and the change in flows at Roberts Creek, the DEIS should include current and accurate data to characterize existing conditions.	Although the data sets presented in Chapter 3 of the DEIS will not be updated, summary data for macroinvertebrate communities are provided in FEIS Appendix 6B.
5	5.76	Earthworks/ CCA	The DEIS fails to provide an accurate analysis of the cumulative impacts of the proposed action in addition to other past, current, and future reasonably foreseeable activities in the region. The DEIS needs to take a hard look at the cumulative effects of the proposed action along with past, current and reasonably foreseeable future mining activities at Smoky Canyon, and other past, future and existing mining activities from other phosphate mines in the region. … The cumulative effects section fails to characterize these impacts, and fails to document the cumulative effects of these damages with those at East Smoky Canyon.	The CEAs were adequately defined and that the cumulative effects analyses are thorough as described in Chapter 5.
5	5.77	Earthworks/ CCA	At present, selenium concentrations in trout in lower Sage Creek are nearly 5 times the EPA criteria. The cumulative effects section should consider the possibility that the trout population may crash in the near future. At these concentrations, it is a reasonably foreseeable outcome.	The DEIS acknowledges elevated selenium in water and trout in lower Sage Creek. However, there is disagreement with the comments that the trout population may crash in the near future and that it is a reasonably foreseeable outcome. The following information is summarized from FEIS Appendix 6B to support this stance. First, from a cumulative standpoint, selenium is being reduced in groundwater and will continue to do so due to the Pole Canyon ODA removal actions. This reduction is predicted to show up at Hoopes Spring and begin reducing selenium loading there by 2026. Meanwhile, the treatment plant is functioning and is expected to continue to do so, also reducing selenium in lower Sage Creek and other downstream waters. See responses to Comments 3.13, 5.43, and 5.44 for updated information on the treatment plant. Reduction in selenium exposure will ultimately lead to reduced selenium in the food chain and less selenium bioaccumulation in fish. The time frame for those reductions is a function of multiple processes and like population level responses, recovery times are equally difficult to detect. Whole body (WB) issue and recruitment data collected in support of the Site-Specific Selenium Criteria (SSSC) were used to examine potential in situ population level effects. Excessive selenium bioaccumulation and resulting toxicity that affects development and survival of young trout should be reflected in lower recruitment. This is consistent with Janz et al. (2010) who suggests, that for selenium, detecting an effect requires monitoring for recruitment failure, which is the logical population-level consequence of reproductive impairment. Brown trout WB tissue data and respective recruitment data from mine influenced (e.g., Hoopes Spring, Sage Creek, South Fork Sage Creek) background (e.g., Crow Creek above Sage Creek) and reference (Spring Creek) sites, spanning 2006 to 2018 were analyzed. Results showed that at the reference and background sites, recruitment varies widely and appears to have no relationship to WB selenium concentrations (typically less than 10 mg/kg dw selenium). At the mine influenced sites, recruitment also varies widely and occurs over a much wider range of WB tissue selenium (about 10 to 60 mg/kg dw). At the mine influenced sites, peak recruitment occurs when WB concentrations are well above the proposed WB criterion. These data also appear to show that above a critical WB concentration, real effects on populations are observed. For these sites, the critical WB concentration appears to be greater than 30 mg/kg dw, as recruitment appears to decline above this WB concentration. The potential impacts on populations may also be observed in annual population monitoring data on age 1 fish abundance. Recruitment declines at about 2013 for mine influenced sites and coincides with an increase in WB selenium concentrations that occurred between about 2011 and 2013 to concentrations above 30 mg/kg dw. In 2018, Sage Creek recruitment improved while Hoopes Spring did not. This may reflect significantly reduced concentrations of selenium in surface water during the first full year of Simplot's selenium water treatment plant in 2017. Why a similar improvement was not observed in Hoopes Spring is unclear. The persistent recruitment failure from 2013 to 2017 coupled with measured WB tissue concentrations indicates that concentrations of selenium in WB tissues of brown

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				trout must be much higher than 13.6 mg/kg dw (the approved SSSC value for Hoopes Springs) for population level effects to occur. Reference" Janz, D.M., D.K. DeForest, M.L. Brooks, P.M. Chapman, G. Gilron, D.Hoff, W.A. Hopkins, D.O. McIntyre, C.A. Mebane, V.P. Palace, J.P. Skorupa, and M. Wayland. 2010. Selenium Toxicity to Aquatic Organisms. In P.M Chapman, W.J. Adams, M.L. Brooks, C.G. Delos, S.N. Luoma, W.A Maher, H.M. Ohlendorf, T.S. Presser and D.P. Shaw (eds). 2010. Ecological Assessment of Selenium in the Aquatic Environment. SETAC Press, Pensacola, FL, USA.
5	5.78	Earthworks/ CCA	The study area for evaluating impacts to wildlife resources is inadequate in size. The DEIS uses a 0.5-mile buffer surrounding the proposed action to determine the proposed study area for evaluating impacts to wildlife resources. (DEIS, p. 3-99) Based on the map in Figure 3.8-1, this study area appears to exclude mining activities in Panel G, the tailings ponds and an associated buffer zone. This is inadequate. The study area must encompass all mining activities, including Panels F&G and associated lands (e.g., Deer Creek, Manning Creek and Clear Creek watersheds) and continued use of tailings pond. … As stated, the expansion is inextricably linked with existing mining operations, including the tailings facilities and panels F&G. Therefore, the wildlife resources study area needs to incorporate the entire mine site, including a buffer zone, and not isolate one segment of the mine from the rest.	The 0.5-mile buffer was developed with input from the IDT experts and using professional judgement. In short, given the terrain, existing vegetation, and general wildlife movement distances, it is not anticipated that Project-related impacts would extend beyond this area. Certain areas were excluded from this study area based on current, existing conditions (i.e. active mining). It is anticipated that those areas would not provide general suitable habitat for wildlife or special status species and therefore were not included. While the existing mining operations and the Proposed Action/Alternative 1 for the Project are closely related, for the purposes of NEPA, they are considered separate actions and are analyzed as such. As the Proposed Action/Alternative 1 would not occur within currently mined areas, except where noted backfill was placed in Panel B, they were dropped from the direct and indirect impact analysis. However, the current mining operations are included in the cumulative impact analysis which looks at all past, present, and reasonably foreseeable future actions within the 15-mile buffer CEA area.
5	5.79	Earthworks/ CCA	Furthermore, it is not sufficient to rely on past analysis of wildlife impacts from mining on panels F&G. Wildlife populations can change abruptly, and it is important to consider current conditions and data.	Information used in this EIS is not only based on past data from adjacent mining actions which are very relevant and applicable, but information used is also from extensive onsite surveys and communication with USFS biologists. This information is detailed in various Wildlife Baseline Reports for Panels F and G, Panels B and C, and from the East Smoky Panel Project itself that are all part of the Project Record.
5	5.80	Earthworks/ CCA	The DEIS fails to analyze the direct, indirect and cumulative effects on Yellowstone cutthroat, and other fish species. … It's clear from the monitoring data that the mitigation measures associated with Smoky Canyon have not been sufficient to protect important aquatic resources.	Yellowstone cutthroat trout (YCT) and other fish species in the Study Area were discussed in Sections 3.9.4, 4.9.2.1, and 5.8 and a Biological Evaluation was prepared specifically addressing impacts to the YCT. Much of the selenium-related effects analysis focuses on brown trout because brown trout are more sensitive to selenium than YCT. Further, see FEIS Appendix 6B for additional long-term population data for brown trout, YCT, and sculpins. Numerous locations throughout the DEIS acknowledged past and on-going selenium-related impacts to water and aquatic resources from historic mining at the Smoky Canyon Mine and other nearby phosphate mines. Further, the DEIS described that mining companies and the regulatory oversight agencies have worked to understand release mechanisms and to develop best management practices to prevent releases. However, remediation of the historic impacts is not complete. See DEIS Section 2.2.3 in part for a discussion on the CERCLA process, which is driving remediation. The East Smoky Panel Project encompasses lessons learned from these studies and presents numerous EPMs and BMPs to minimize impacts.
5	5.81	Earthworks/ CCA	The DEIS must acknowledge that selenium concentrations in fish tissue in Sage Creek and Crow Creek are already at concentrations harmful to fish populations, and that selenium toxicity can result in dramatic declines in population.	DEIS Sections 3.9.5 and 4.9.2.1 discussed elevated selenium concentrations in fish tissue in Sage and Crow creeks. Please also see Comment Response 5.77 regarding population effects.
5	5.82	Earthworks/ CCA	The DEIS should provide information on what new mitigation measures or specific actions are being taken to address the current harm to water, sediment, fish and other habitat conditions within these watersheds.	The following locations in the DEIS were the primary locations where this subject was discussed: Section 2.2.3 for CERCLA actions; Sections 2.5 for EPMs and BMPs incorporated into the Project, the No Action Alternative surface water impacts sections on page 4-50 and 4-51 for water treatment plant operations; and Appendix 4B for other BMPs and measures related to water management.
5	5.83	Earthworks/ CCA	The DEIS should include the biological evaluation for the East Smoky Canyon operations as an appendix so the public can understand the potential impacts of proposed mining activities on sensitive species.	A BE is currently being prepared and will be finalized prior to the issuance of the Record of Decision, but will not be included in the FEIS, but will be part of the Project Record. The information used in the BE is the same information included in the FEIS.
5	5.84	Earthworks/ CCA	The DEIS should also specify the mitigation measures that will be used to mitigate and minimize the impacts, and the effectiveness of these measures.	Mitigation measures for water resources were discussed in DEIS Section 4.5.3. These were referred to in the mitigation measures section for fisheries and aquatics (DEIS Section 4.9.3) as also relevant for reducing potential impacts to fisheries and aquatic resources. Note that impacts to fisheries and aquatic resources are expected to be negligible to minor. Mitigation for wildlife is not proposed because impacts are already sufficiently reduced with the EPMs/BMPs already included as part of the Project.

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5	5.85	Earthworks/ CCA	The DEIS must provide better analysis on the direct and indirect impacts of past, current and proposed activities on sensitive species, even if that means waiting to gather additional data to understand those impacts.	There was sufficient data available to assess impacts on sensitive species and the level of analysis was also sufficient as described in Chapter 5.
5	5.86	Earthworks/ CCA	The DEIS should also provide graphs to illustrate age or size class trends over time, given selenium's reproductive impacts.	Although the data sets presented in Chapter 3 of the DEIS will not be updated, summary data for analysis of brown trout recruitment are provided in FEIS Appendix 6B which includes multiple figures for two age classes of brown trout and YCT. Brown trout age classes are based on reproductive maturity (i.e., < 230 mm and > 230 mm) where approximate age 1 and 2 fish (not reproductively mature) comprise the <230 mm class and age 3 and older fish (reproductively mature) comprise the > 230 mm class. For YCT, approximate age 1 and 2 fish (not reproductively mature) comprise the <200 mm class and >200 mm class comprise the approximate age 3 and older fish (reproductively mature).
5	5.87	Earthworks/ CCA	The DEIS needs to characterize the existing conditions, and take a hard look at the potential impacts of the proposed actions and alternatives. Yet, there is insufficient information in the DEIS to understand the impacts of increased selenium concentrations on the fish populations in Sage Creek and Crow Creek.	The existing conditions were adequately assessed, and a hard look was taken in the DEIS. However, additional information on selenium and fish populations has been added to the FEIS in Appendix 6B. This additional information does not change any of the conclusions in the DEIS regarding the implications of a small increase in selenium due to the Project.
5	5.88	Earthworks/ CCA	In its analysis of the data, Formation Environment dismisses the role of selenium contamination as a factor in reduced trout densities, stating that it is premature to make that determination. This is inappropriate. If there is insufficient data to conduct that analysis, more frequent population data must be collected. It is troubling that despite the fact that several measures in Sage Creek are quite high above the comparison period, that the next mandated fish population sampling event won't take place until 2020, and the next fish tissue selenium sampling isn't scheduled until 2023 (Table 5-1). Based on the data in these two tables, that is clearly too infrequent to identify the major changes that are occurring in these drainages. More importantly, age class and size class data needs to be analyzed to better understand impacts to fish populations.	This comment is not on the East Smoky Panel DEIS, but rather the Formation Environmental (2018) Panels F&G Report. The report does not dismiss selenium as a factor in reduced trout densities, rather it attributes a number of factors to the observations for changes in trout density. Section 4.1.2 of the Formation report states, "This widespread reduction in trout standing crop across most locations suggests related factors influencing trout production, such as flows and temperatures. In Sage Creek and Crow Creek downstream of Sage Creek, selenium concentrations may be a contributing factor as well, but given all the variables, determining how each specific stressor contributes to trout production is premature at this time given the available data." Trout populations were down across all locations, including reference sites and background sites indicating more than a single causal factor. The Panels F&G work is also considering the data collected from 2009 to 2017, and comparison of two data points to the pre-Panels F&G mining does not make much sense. The mitigation and monitoring plan spans for more than 50 years in order to effectively evaluate the long-term implications of mining in Panels F&G. The monitoring schedule cited is also for the Panels F&G mitigation monitoring and is based on a plan put forth in the Biological Opinion from the agencies. That schedule calls for trout population monitoring (and habitat) every third year and a full suite of monitoring every sixth year (i.e., abiotic and biotic chemistry, biological communities, habitats, populations). In the interim, Simplot has conducted voluntary monitoring annually at a smaller subset of locations. Simplot's investment in monitoring the abiotic and biotic conditions of the surrounding streams is extensive and provides a relatively thorough picture of conditions, past and present. Reference: Formation Environmental (2018) 2017 Aquatic Resources and Fisheries Monitoring Report Panels F and G. April.
5	5.89	Earthworks/ CCA	The DEIS must take a hard look at the past, present and future activities on fish populations and sensitive species, including Yellowstone cutthroat. The DEIS estimates increases in selenium concentrations in trout from the proposed activities (Table 4.9-3 and Table 4.9-4), and dismisses these impacts as minor by looking at them in a bubble. It fails to take a hard look at the cumulative effects of selenium contamination on fish from past, current and future activities. Instead it defers to improvements in selenium inputs under CERCLA that have not materialized, are not finalized, and have not been proven. (DEIS, P. 5-39) "Selenium contamination from the Smoky Canyon Mine is being addressed through the CERCLA process between Simplot and the USFS, EPA, and IDEQ. Selenium inputs in the foreseeable future are expected to reflect: continued recent improvements due to the Pole Canyon remedial action, dissipating loading from existing mine features, future loads from Panels F&G mining; improvements due to the Hoopes Spring WTPP, and slight increases at Hoopes Spring due to the Proposed Action or Alternative 1." This is inappropriate. The DEIS cannot simply dismiss the reams of data that show that selenium concentrations have continued to increase in fish tissue, and that selenium concentrations in water	A hard look has been taken in the EIS at the past, present and future activities on fish populations and sensitive species, including Yellowstone cutthroat. In addition, regarding YCT and other fish, see Comment Responses 5.80, 5.81, 5.86, 5.87, and 5.88. Further, the DEIS Proposed Action/Alternative 1 impact assessments do not rely on any CERCLA remedy; those water quality impacts are assessed based only upon the Project, and not the impacts from past or current mining or future treatment options. The purpose of this EIS is to evaluate the potential effects of the Proposed Action and alternatives. This EIS does not need to analyze to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project. However, additional information on the treatment plant is provided in Comment Response 3.14.

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			quality in Sage Creek and Crow Creek are expected to continue to exceed aquatic life standards through 2050.	
5	5.90	Earthworks/ CCA	Once again, the DEIS cannot rely on actions under CERCLA for which no data has been presented. There is no data or analysis for the water treatment plant, and there is no data to demonstrate that selenium inputs are decreasing. Given the history of predictive failures at Smoky Canyon and other phosphate mines, it is irresponsible to consider that a reasonably foreseeable outcome. The DEIS must take a hard look at the potential cumulative effects on fish based on actual data, not on speculative improvements that have not been realized and remain undocumented.	See Comment Responses 5.59 and 3.14.
5	5.91	Earthworks/ CCA	The DEIS should also evaluate the potential impacts to fish from selenium in areas of the streams, such as Lower Sage Creek, that are dominated by beaver ponds, and may more closely resemble “lentic” conditions rather than “lotic” conditions. What are the increased biological hazardous associated with these conditions.	Lower Sage Creek is not dominated by beaver ponds. On occasion, there has been beaver activity that has disrupted flow conditions at LSV-4 and caused pooling upstream as well as filling of one of the larger pools with sediment. However, those disruptions have been regularly cleared as they were built in front of the road culverts. An appropriate and adequate impact analysis to fish from selenium has been provided in the EIS.
5	5.92	Earthworks/ CCA	The DEIS states that while the fish tissue data from NGOs is similar to that presented in the report, it is uncertain whether the data is directly comparable in this report. It defers to a memo from a consulting firm, Covington (2017). Covington states that he was unable to ascertain whether the information was similar, when in fact, he made no effort to ascertain that information since no inquiry was made to the associated organizations. We include this data for the administrative record.	First, Covington (2017) is clearly cited in the DEIS as personal communications by phone and follow-up; it should not be construed as, nor was it cited as, a memo. Second, Formation neither suggested that the DEIS use or not use the NGO data (DEIS Section 3.9.5.2), but simply pointed out some of the issues that have been observed with some of the older data. Simplot and Formation are fully aware of these data as they both participate annually in the Idaho Fish Tissue Protocol Workgroup and have had access to all of these data. The issues pointed out are real and do not make them any more or less useful, just different and thus may not be as comparable to the Formation data set.
5	5.93	Earthworks/ CCA	The DEIS fails to analyze the impacts of dewatering on groundwater dependent ecosystems. GDEs are communities of plants, animals and other organisms whose extent and life processes are dependent on access to or discharge of groundwater, including springs, seeps and many wetlands, most perennial streams, many lakes and their associated riparian areas. According to the Forest Service, GDEs encompass regionally-and nationally-significant ecosystems on NFS lands and in many watersheds, they support a disproportionately large percentage of the total biodiversity relative to their size. The EIS predicts that baseflows will be reduced in some streams, and that groundwater drawdown will affect surface water. The DEIS fails to provide an inventory of groundwater dependent ecosystems for the area, and provide adequate baseline data on these resources. The EIS should analyze the potential impacts of dewatering to these systems, including changes to temperature, changes in gaining and losing reaches, loss of potential spawning habitat that relies on groundwater upwells, etc. For example, according to the DEIS, Roberts Creek appears to flow from alluvium, primarily via discharge from a spring designated as URS. However, the DEIS states that the source of water is not well understood, and that depending on the source of the water, the proposed action could have minimal or more serious impacts. The EIS should require data collection to determine the source of the water, such that impacts to Roberts Creek from the proposed action can be accurately determined.	The comment is correct that the DEIS does not directly include groundwater dependent ecosystems (GDEs) as a named resource subcategory. More importantly, the comment is incorrect where it states that the Agencies failed to include baseline data or assess impacts to the resources that comprise GDEs. For example, the affected environment for vegetation was assessed and included riparian and wetland areas, described in DEIS Sections 3.7.3.11, 3.7.4, and 3.75. Baseline wildlife information was presented in Section 3.8 and included amphibians and reptiles in Section 3.8.5. Last, Section 3.9 included baseline data for fish and aquatic life, including macroinvertebrates described in 3.9.3. Predicted effects of water loss, if any, to these resources were discussed in 4.7.2.1, 4.8.2.1, and 4.9.2.1. Further, given the location and type of water impacts predicted in Section 4.5.2.1, (e.g., potentially eliminating small springs) analysis of gain/loss, temperature changes, etc. is not needed.
5	5.94	Earthworks/ CCA	The DEIS does not adequately analyze the impacts to fish from reductions in stream flows, groundwater recharge and/or loss of runoff. The EIS makes very general statements about these issues, but fails to take a hard look as required by NEPA. The EIS makes general statements about Yellowstone Cutthroat Trout in Tygee Creek, but fails to substantiate it with any data. The EIS should provide baseline data that confirms whether there are resident YCT present in the upper reaches, whether redds are located in this reach, and analyze the potential impacts of dewatering on this population. The EIS should provide an analysis of how much habitat will be lost from dewatering, and whether there are mitigation measures to offset these impacts.	There are no predicted impacts to habitat from the short duration and small amount of pit dewatering that might be necessary in the last phases of mining the East Smoky Panel, however, potential streamflow reductions in Tygee Creek were discussed in DEIS Section 4.9.2.1. Regarding YCT in Tygee Creek, the DEIS provided all the data Simplot is aware of for Tygee Creek fisheries. Formation’s sampling of Tygee Creek did not encounter any redds, but sampling was conducted in the late summer/fall, thus no YCT redds would be expected during that time. The Blakney (2010) thesis, which focused on Northern leatherside chub, was examined to assess if any additional fishery data were reported. Three locations on Tygee Creek were sampled in 2010. The species encountered were reported, including redside shiner, longnose dace, sculpin, YCT, speckled dace, Utah sucker, and brown trout. The number of fish collected was not reported. YCT were encountered at each of the three sites that are approximately located just upstream of LT-5 near where Smoky Creek discharges to Tygee Creek, near the Draney Creek confluence, and upstream of Hatchery Road. Reference:

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				Blakney, J.R. Historical connectivity and contemporary isolation: population genetic structure of a rare high-desert minnow, the northern leatherside chub (Lepidomeda copei). Master's Thesis, Idaho State University.
5	5.95	Earthworks/ CCA	The EIS should include financial assurance calculations to demonstrate that adequate funds will be put in place to ensure that reclamation and closure costs are covered. The EIS should include the financial assurance calculation proposed for these activities to provide for public review and comment. In the event of bankruptcy or the company's refusal to complete reclamation, the agencies must have adequate financial assurance to complete reclamation activities. NEPA requires that mitigation measures be fully reviewed in the FEIS, not in the future.	Reclamation bonding is part of BLM's inspection and enforcement program, but it is not an environmental impact or mitigation to be addressed under NEPA. Section 2.4.11 of the DEIS (Section 2.4.13 of the FEIS) describes the timing of the reclamation performance bond determination and posting, and notes that the calculation methodology would be described in the Record of Decision.
5	5.96	Earthworks/ CCA	The DEIS also relies on CERCLA related activities (the water treatment plant) to address pollution from the cumulative impacts of Smoky Canyon mining operations. However, it is my understanding that no financial assurance is currently in place to address the long-term costs of water treatment at Smoky Canyon (please clarify), despite the ongoing liability and significant harm to public resources. Regardless of the East Smoky Canyon outcome, the Forest Service/BLM should take immediate action to collect financial assurance to cover the full cost of water treatment at Smoky Canyon. The Government Accountability Office has already identified this as a serious gap in regulatory oversight of phosphate mines.	Reclamation bonding is part of BLM's inspection and enforcement program, but it is not an environmental impact or mitigation to be addressed under NEPA. Section 2.4.11 of the DEIS (Section 2.4.13 of the FEIS) describes the timing of the reclamation performance bond determination and posting, and notes that the calculation methodology would be described in the Record of Decision. Whether or not the bond calculations will include water treatment costs will be determined as part of that process.
5	5.97	Earthworks/ CCA	The proposed action also fails to comply with the following Forest Plan directions. Furthermore, the DEIS states that the proposed action would not comply with management directions (Prescription 2.8.3 Minerals/Geology Guideline 1 and Guideline 4, Roads and Trails Guideline 1) that stipulate that new structures, support facilities and roads should be located outside AIZs. Where no alternative to siting facilities in AIZs exists, locate and construct the facilities in ways that avoid or reduce impacts to desired AIZ attributes. According to the DEIs, "There would be 20.9 acres of direct impacts to AIZs. The majority of this would be direct impacts to intermittent drainage for the placement of mine facilities. These intermittent drainages do not provide aquatic habitat themselves, but may contribute to flow in downstream (unconnected) areas. Measures would be implemented to reduce COPC transport throughout the Study Area."1 (DEIS, Appendix 4A -21). The DEIS does not demonstrate that alternative locations for these facilities are unavailable, or that impacts have been avoided or reduced to protect desired AIZ attributes.	The location of the phosphate ore dictates where new structures, support facilities, and roads can and should be sited and also needs to ensure that mining plans result in maximum economic recovery of leased federal ore. Facilities were sited to reduce impacts to AIZs, as feasible, and proposed road construction activities were also evaluated to keep roads to the minimum necessary for the Project. The majority of the Project Area is within the 8.2.1 Management Prescription. This management prescription area is shown on Map 11 of the RFP (USFS 2003). It is a 0.5-mile buffer around KPLA's and inactive leases that existed at the time the RFP was prepared, and it was intended to include phosphate mining operations and ancillary facilities needed for development of mines within the 8.2.1 management prescription area. This same area is also covered by other management prescriptions shown on Map 8 of the RFP. Those are the prescriptions that guide USFS management until a site-specific, phosphate mine development plan is submitted to the USFS. Then the area of the specific mine plan is intended to only be managed under prescription 8.2.2, phosphate mine areas. Thus, the management prescription that applies to this Project Area is 8.2.2, with the exception of components that occur outside the 0.5-mile buffer area.
5	5.98	Earthworks/ CCA	The DEIS also states that the proposed action would not be consistent with the Vegetation Goal 2 to manage aspen forests to reduce or halt the decline of aspen acres as a result of succession of aspen to conifer.	Comment noted. The Project Area is intended to be managed under Prescription 8.2.2, Phosphate Mine Areas, which applies to Federal Phosphate leases where mining is taking place and allows for the exploration or development of existing leases.
5	5.99	Earthworks/ CCA	Guidelines and standards for large game will not be met, including Big Game Guideline 2, Prescription 8.2.2 Wildlife Guideline 2, Prescription 2.7.1 (d) Elk and Deer Winter Range Critical and 2.7.2 (d) Elk and Deer winter range, Wildlife Standard 1 (DEIS, Appendix 4A 13-14). Although the DEIS states that that noncompliance would be short term, and come into compliance upon reclamation, there is no data to support this assumption.	Comment noted; this statement is based upon professional judgement. The Project Area is intended to be managed under Prescription 8.2.2, Phosphate Mine Areas, which applies to Federal Phosphate leases where mining is taking place and allows for the exploration or development of existing leases.
5	5.100	Earthworks/ CCA	According to Table 17 (DEIS, Appendix 4A), the proposed action will comply with Wildlife Goal 5, which states the management direction as "Maintain and where necessary and feasible, provide for habitat connectivity across forested and non-forested landscapes." The DEIS acknowledges that the haul road and other mine facilities would fragment some of the habitats in the Study Area, which is inconsistent with "maintaining" connectivity.	The discussion has been edited to say that over the short term, this goal would not be met but with the implementation of final reclamation, habitat connectivity would be accomplished over the long-term. Further, the Project Area is intended to be managed under Prescription 8.2.2, Phosphate Mine Areas, which applies to Federal Phosphate leases where mining is taking place and allows for the exploration or development of existing leases.

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5	5.101	Earthworks/ CCA	Regarding the duty of the USFS under the NFMA to ensure that all activities it authorizes (such as a ROD and PoO approval for a mining plan) comply with and be consistent with the Forest Plan, it is a legally incorrect position that compliance and consistency with the Forest Plan "must give way" if such compliance results in "the prohibitive cost of complying with that direction [in the Plan]" or other restrictions on mining. As held in Save Our Cabinets, all aspects of the ROD and PoO approval must comply with all standards, guidelines, desired conditions, and objectives of the Forest Plan. The Court specifically rejected the USFS's argument that all of these aspects of the Plan do not have to be fully met. 2017 WL2345667, * 11-13. The fact that compliance may be too expensive for the company does not eliminate the USFS's duty to comply with the NFMA.	The Project would need to comply with all requirements described and set forth in the RODs issued by the BLM and the USFS for this Project. The Project Area is within the 8.2.1 Management Prescription. This management prescription area is shown on Map 11 of the RFP (USFS 2003a). It is a 0.5-mile buffer around KPLA's and inactive leases that existed at the time the RFP was prepared, and it was intended to include phosphate mining operations and ancillary facilities needed for development of mines within the 8.2.1 management prescription area. This same area is also covered by other management prescriptions shown on Map 8 of the RFP. Those are the prescriptions that guide USFS management until a site-specific, phosphate mine development plan is submitted to the USFS. Then the area of the specific mine plan is intended to only be managed under prescription 8.2.2, phosphate mine areas. Thus, the management prescription that applies to this study area is 8.2.2, with the exception of components that occur outside the 0.5-mile buffer area. Reference: USFS. 2003a. Revised Forest Plan for the Caribou National Forest. U.S. Department of Agriculture. Idaho Falls, Idaho.
5	5.102	Earthworks/ CCA	The DEIS should evaluate the potential increases in sediment from clearing transmission lines, haul roads, and other activities associated with the new project. The proposed action will include rerouting transmission lines and utility corridors and new haul roads. The DEIS should evaluate the potential sediment increase from the clearing of vegetation, road construction and other associated activities, and provide an estimate of the amount.	Per Chapter 2 of the DEIS, erosion and sediment transport related to the mine disturbances (including miscellaneous disturbances such as mentioned in the comment) are currently addressed in a Stormwater Pollution Prevention Plan (SWPPP) that includes design and construction of ditches, settling ponds, culverts, sediment traps and other methods included in normal BMPs. As noted, the SWPPP would be updated to include the East Smoky Panel project, including the proposed miscellaneous mine components. Section 2.5.5 of the DEIS listed numerous BMPs and EPMs that would reduce or eliminate erosion and manage runoff such that sedimentation of downstream waters would be controlled. Further, as noted in Section 2.4.9.4, temporary re-vegetation of areas disturbed by construction would occur, also reducing or eliminating erosion. With these controls in place, erosion would be minimal at most, and stream sedimentation unlikely; quantification is not necessary to assess the impact. That said, a paragraph has been added to the *Sediment and TSS in Runoff* subsection of Section 4.5.2.1 of the FEIS to clarify that the miscellaneous mine disturbances are considered in the impact evaluation.
5	5.103	Earthworks/ CCA	How will the loss of springs and reductions in stream baseflows be replaced or mitigated by the mine operator? The DEIS documents the loss of a number of springs, and reduced stream flows due to mine operations. The RVP states that "Loss of available surface water sources for uses such as wildlife or grazing, as a consequence of mining operations shall be replaced or mitigated by the mine operator. This includes the loss of water quality sufficient to maintain post-mining uses. Forest Plan 2003, p. 3-13. The DEIS should provide detailed information on how the loss of these surface waters will be mitigated or replaced.	Section 4.5.3 of the DEIS describes water source replacement. Any further details beyond that given would be determined later when the replacement is deemed needed.
5	5.104	Earthworks/ CCA	The proposed action and Alternative 1 would result in unnecessary and undue degradation. As described above, the proposed action and alternative 1 would result in contributions of selenium to waters that are already exceeding standards for selenium. The proposed actions would also generate enormous groundwater plumes for manganese that extend far beyond the mine permit boundaries and are predicted to last for centuries. The degradation of these water resources by the proposed expansion are unnecessary because alternatives exist that could reduce or preclude these impacts. The mine has used more robust covers for source control in its other operations, but failed to consider these options for East Smoky.	The groundwater impacts from the East Smoky Panel are described in Section 4.5.2. of the DEIS. All selenium concentrations in the plumes outside of the mine backfill areas would be less than the applicable groundwater standard and concentrations at the single discharge to surface waters, Hoopes Springs, are less than or approximately 0.001 mg/L, which is well below any applicable surface water standard. There would be an appreciable plume of manganese caused by the East Smoky Panel and this would be added to the existing manganese contamination caused by existing mine backfills. However, there is no surface water standard for manganese and the groundwater standard is a secondary one based on aesthetic reasons of taste and staining in domestic water supplies. There is no current beneficial use of the affected groundwater or likely use of the impacted aquifer for domestic water supplies. The IDEQ regulates compliance with the Idaho Ground Water Quality Rule and is a cooperating agency on the EIS. Although decisions on the Project's compliance with the Idaho's rules have not yet been made by IDEQ, the agency has not opposed the Project for reasons of manganese impacts to groundwater.
5	5.105	Earthworks/ CCA	The DEIS should disclose the relative effectiveness of mitigation measures to reduce the impacts of selenium to water resources.	The relative effectiveness of the Proposed Action/Alternative 1 covers on protecting groundwater quality are described in detail in Section 4.5.2 of the DEIS where the resulting groundwater quality impacts are described. Please see Comment Response 5.104 for the resulting impacts from selenium and manganese. The impacts from the other two COPCs, sulfate

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			As required by NEPA, the DEIS should disclose the relative effectiveness of mitigation measures to reduce impacts from the proposed action and alternative 1. This should include an analysis of various cover systems, and their ability to protect water resources from mine seepage.	and total dissolved solids, are well below applicable groundwater standards outside of the backfill areas. The relative effectiveness (percolation rate) of the use of and ET cover (Proposed Action) and a soil-only cover (Alternative 1) are described in the EIS and these results can be compared with each other. Because the levels of groundwater quality impacts resulting from these covers are in acceptable ranges, the Agencies do not believe application of more protective covers is required.
5	5.106	Earthworks/ CCA	The DEIS should provide detailed information on all connected actions, including investigations, remediation and clean-up under CERCLA The DEIS should provide more detail on the CERCLA investigations, remediation and clean-up operations under CERCLA, including how the mine components interact with the proposed actions, the timing of these decisions, etc. This section should include selenium trends over time, and compare to predicted improvements.	CEQ regulations for implementing NEPA encourage the incorporation of information by reference where possible to cut down on bulk (1502.21 Incorporation by reference). That is what this EIS has attempted to do. The RI/FS is over 3000 pages and provides additional detail for readers wishing for more. The EIS provides numerous summarizing statements based upon the RI/FS and actually refers the reader to the RI/FS (Formation Environmental 2014) over 40 times. The EIS references and narratively discusses selenium trends. The data for these trends is tracked and collected under a combination of CERCLA and Mine Plan requirements. The narrative of Section 3.5 discusses the selenium concentrations observed in the past at various stations (see DEIS Table 3.5-4, Figures 3.5-10, 3.5-11, 3.5-12). Also, the trend is described narratively on page 4-37 of the DEIS. The actions of the East Smoky Panel Project and CERCLA are not connected – one does not depend on the other. That said they are most certainly interrelated. The EIS describes these interrelationships. DEIS references to foreseeable future CERCLA related activities and interactions with East Smoky Panel Project actions include: • Section 5.2.2.3 references dust and emissions that could result from "… CERCLA related activities at the Smoky Canyon Mine." • Section 5.4.2.1 describes the interrelationship of the East Smoky Panel groundwater modeling effort and the "various studies conducted for the Smoky Canyon Mine under CERCLA authorities to investigate the release of hazardous substances under (Formation Environmental 2014 and related reports)." Additionally, it explains that the East Smoky Panel Project EIS created an independent groundwater model that, "in part reinterprets groundwater flow directions and recharge areas that were previously assumed in the CERCLA investigations." • Section 5.4.3.1 acknowledges the influence of past mining at the Smoky Canyon Mine on groundwater. This section summarizes information from the RI/FS (Formation Environmental 2014). This EIS section provides nearly two pages of description and citations of selenium concentrations and CERCLA actions related to groundwater quality from past mining. • Section 5.4.3.2 provides information about selenium concentration trends at Hoopes Springs and references both NEPA and CERCLA documents. • Section 5.4.4.1 references CERCLA foreseeable future actions expected at the Smoky Canyon Mine to reduce contamination levels in Hoopes Springs. • 5.4.4.2 describes predicted impacts from the 2007 F&G EIS and also from the RI/FS. It also references the WTPP as a reasonably foreseeable action. The DEIS also references other CERCLA studies/actions within the CEA: • Section 5.1.3 "*remediation-related work at Dry Valley and Wooley Valley has either just recently began and/or is scheduled to begin in the near future (BLM and USFS 2016)*." Description and citations of selenium concentrations and CERCLA actions related to gw quality from past mining. • Section 5.4.3.2 provides information about selenium concentration trends at Hoopes Springs and references both NEPA and CERCLA documents. • Section 5.4.4.1 references CERCLA foreseeable future actions expected at Smoky Canyon Mine to reduce contamination levels in Hoopes Springs. • Section 5.4.4.2 describes predicted impacts from the 2007 F&G EIS and also from the RI/FS. It also references the WTPP as a reasonably foreseeable action.

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				References: Formation Environmental. 2014. Final Smoky Canyon Mine Remedial Investigation/Feasibility Study. Remedial Investigation Report. Prepared for J.R. Simplot Company. September 2014. BLM and USFS. 2016. Final Environmental Impact Statement. Rasmussen Valley Mine. Caribou County, Idaho. Prepared by the U.S. Department of Interior, Bureau of Land Management and the U.S. Department of Agriculture, Forest Service. September.
6	6.1	Tom Myers	A primary hydrologic issues concern contamination of groundwater and surface water with selenium (Se) and other contaminants, such as total dissolved solids (TDS), sulfate (SO4), and manganese (Mn). The proposed monitoring system is insufficient to track contamination on the site or verify the predictions. An additional issue is the effect that dewatering and removal of aquifers would have on surrounding streams and springs.	As stated in DEIS Section 2.5, Simplot would update their existing Comprehensive Environmental Monitoring Program Plan (CEMPP) to include the Project as necessary, to continue providing a level of environmental protection that would meet or exceed applicable regulations. This includes groundwater and surface water monitoring. Specifically, DEIS Section 2.5.5 states that Simplot would continue the comprehensive ground and surface water monitoring program, expanding the program as needed to adequately cover the Project Area. Simplot would continue to use baseline surface and groundwater monitoring data as a basis of comparison to document the effectiveness of site-specific mitigation measures and BMPs employed during active mining as well as long-term protections of water resources in the Project Area. [Emphasis added.] Further, POC wells required by IDEQ will be developed and monitored with IDEQ oversight specifically to track any groundwater contamination. Last, surface water monitoring under the CEMPP has included, and will continue to include, monitoring of both flow rates and water chemistry, so effects to streams and springs from dewatering/aquifer removal will be tracked.
6	6.2	Tom Myers	The DEIS considers contamination as predicted using a groundwater flow model and contaminant fate and transport model. The models underpredict concentrations that could reach Hoopes Springs for various reasons including: • The aquifers are simulated to be so thick the concentrations are diluted by simulated vertical dispersion through the aquifer. • The conceptual model includes unverified inflow from an aquifer underlying the Wells Formation. This inflow dilutes the predicted concentration of water discharging at Hoopes Spring. • The method for estimating the concentration of simulated percolation underestimates concentration at the beginning of percolation. • The stochastic analysis includes too many impractical scenarios and parameter ranges to be a useful method of characterizing uncertainty. • Simulated dispersion is too high because the range specified for the stochastic analysis goes far too high.	On page 113 in the groundwater modeling report, this issue of aquifer thickness is discussed. There are two schools of thought relating to the correct choice for aquifer thickness. As stated in the report, when all other parameters are held constant, contaminant plumes are more dispersed with lower peak concentrations in models that release COPCs in a layer of thick saturated thickness. Decreasing the saturated thickness will result in plumes with higher peak concentrations, but much smaller plumes concentrated in the areas of the source zone. It would be incorrect to only evaluate one interpretation when both are equally defensible. HGG understands both interpretations and considered them in the final evaluation. HGG states in Section 4.5.6 of the modeling report that the purpose of the water flow from the Absaroka Allochthon was to satisfy the deficit in groundwater that discharges from the Hoopes Springs complex and South Fork Sage Creek; only the necessary influx of Absaroka Allochthon water was allowed into the model domain. The interpretation is supported by an extensive body of groundwater and geology data. The method used for estimating the COPC concentrations was to use an average concentration that is held constant for the duration of the entire pore volume. As has been discussed many times, the rinsing out of the COPCs from the overburden material creates a curve of concentrations that start out high at the beginning of PV1 and rapidly decrease until they are approximately asymptotic at about PV 3 or 4. Because there is insufficient empirical data to establish the concentrations needed to define the curve throughout PV1, the Agencies have adopted the strategy of keeping the concentration constant for each PV. In the case of PV1, the two test column results are averaged. Using this method underpredicts the concentrations at the beginning of each PV but also overpredicts the concentrations at the end of each PV. There is no impact on the total mass of COPCs released during the PV duration. It is the mass of COPCs added to the groundwater that describes the fate and transport of COPCs in the groundwater modeling. This same approach has been used for a number of other phosphate mining EISs in southeastern Idaho. The ranges of parameters and simulated scenarios are consistent with previous investigations and site data. Please refer to page 111 of the groundwater modeling report where HGG states that increases in longitudinal dispersivity result in more dispersed plumes with lower concentrations. Decreases in longitudinal dispersivity result in thinner plumes with higher concentrations. Although the EPA and others have established equations to estimate longitudinal dispersivity, most of the inputs associated with establishing those estimates are also estimated themselves. For plumes that have not yet formed, the ranges HGG used are well within acceptable ranges. Furthermore, HGG modeled the complete range and accounted for the full range in their final analysis. Simulated impacts using small dispersion values resulted in very little migration of impacted water and was contained within the interior confines of the pit delineation.
6	6.3	Tom Myers	Mining the southern portion of the panels would require dewatering of water that discharges into streams and springs downgradient. The DEIS does not disclose these impacts nor provide a reasonable reason why an alternative to mining above the water table is not preferable, considering it would shorten mining by just a few weeks.	Please see Comment Response 5.65.

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6	6.4	Tom Myers	Although both are shallow aquifers, the alluvium and Salt Lake Formation may not be connected although the DEIS gets the reasons wrong. Flow in the alluvium is through a porous medium and is generally connected with drainages crossing the area. Fractures control flow in the Salt Lake Formation. The DEIS claims the formations "are not hydraulically connected" (DEIS p 3-35) based on groundwater modeling results. This is not correct because groundwater modeling flowpaths follow the model structure assumed by the modeler; the model does not distinguish among pathways not inserted into the model. However, it is reasonable that the alluvial system and Salt Lake Formation are not connected and that groundwater from Pole Canyon follows the alluvial system (Id.).	Page 41 of the HGG groundwater modeling report states that the Salt Lake Formation is hydraulically disconnected from Tier 2 waters. Groundwater flow in the Salt Lake Formation generally follows the dip of the formation and topography. The structure of the geology of the model was established from a very extensive geologic dataset and is considered a valid interpretation. The structure was not based on assumptions.
6	6.5	Tom Myers	Groundwater levels in the shallow aquifer are as much as 140 feet higher than in the Wells throughout the project area. Figure 4 shows the monitoring wells. Groundwater contours near Pole Canyon are as high as 6800 ft amsl (DEIS Figure 3.5-2) while in the Wells are about 6640 ft amsl (Figure 3.5-4). Poles Canyon is a "known Wells Formation recharge zone for surface water" (DEIS 3-37), so there must also be substantial seepage to the Wells at the point. It is also a location where seepage from a waste rock dump in Pole Canyon reaches the Wells Formation. The Phosphoria cannot be an aquitard at this location.	Comment noted. Lower Pole Canyon is a location where the stream loses flow to the underlying alluvium and Wells Formation.
6	6.6	Tom Myers	Depth to groundwater in the Wells Formations ranges from 151 to 576 feet with the higher depths occurring in the north (DEIS p 3-37), however the groundwater table elevation in the Wells is almost flat at 6640 ft amsl, with very little seasonal variation (DEIS Figure 3.5-9). These statements appear contradictory. Groundwater elevations in the Dinwoody are about 80 feet higher than in the Wells for wells spread through the same portion of the East Smoky Panel (Figure 4, and DEIS Figures 3.5-8 and -9). This difference suggests there is a hydrologic disconnect between the Dinwoody and the Wells and that there would be downward flow wherever there are cracks or fractures in the intervening Phosphoria. It also suggests there could be unsaturated zones between the formations; if so, this could affect the groundwater modeling structure.	The difference in depths to the Wells Formation water table is based on the difference in ground elevation at the monitoring wells that intercept the aquifer (Figure 3.5-1). The East Smoky Panel model accounts for cracks or fractures in the intervening Phosphoria by allowing a small amount of seepage from the overlaying layers to enter and pass through the Phosphoria Formation to the underlying Wells Formation (HGG 2018). The amount of leakage between model layers was addressed during calibration and also stochastically. Approximately 1.1 cfs and 1.5 cfs of leakage that would account for flow through cracks or fractures was simulated in the Agency and Alternate Models, respectively. The amount of flux that may pass through the cracks is unknown; however, we learned from the modeling that the amount of flux allowed to pass through will impact calibration and the flow directions in the underlying aquifers There is a range of flux terms that satisfy the full suite of calibration metrics and we used the upper and lower bound in our stochastic analysis. Reference: HGG. 2018. Technical Memorandum: East Smoky Panel of the Smoky Canyon Mine, Numerical Modeling Report. Final. January.
6	6.7	Tom Myers	The geochemistry of the groundwater among formations was often calcium-bicarbonate, but there were numerous exceptions which the DEIS did not identify (DEIS p 3-39), but there were exceptions.	The Agencies do not understand the comment. The DEIS on the page cited in the comment (page 3-39) very clearly states that while many of the monitoring wells reported water as calcium-bicarbonate, there were exceptions. Those exceptions were then clearly noted, including mentioning and describing the type for the four wells (Well 12, Well 13, GW-16, and GW-26) that the commenter calls out in text associated with the comment.
6	6.8	Tom Myers	The initial overburden removed from the East Smoky Panel would be placed as backfill in Panel B (DEIS p 2-19). This would include approximately 15 % of the Project overburden. Because a significantly larger area would be backfilled than excavated by this project, the DEIS should disclose whether a portion of the East Smoky Panel would only be partially backfilled. This would likely be in the south end of the project. If a less-thick backfill allows quicker percolation, it could be a quicker source of Se to the Wells Formation. Because this area is closest to Hoopes Spring, it could have a larger effect on the discharge from that spring than the model predicts if this factor is not considered. The DEIS should disclose whether a portion of the project would not be backfilled and what the impacts of that exposed area would be	A portion of the final Phase 7 pit would not be fully backfilled and reclaimed (Figure 2.4-2). This is described in Section 2.4.3.1 of the DEIS, but additional narrative has been added to this section to clarify that the Phase 7 pit will be partially backfilled. This has been included in the groundwater model as a higher percolation rate to account for the lack of mitigative control on the annual percolation rate afforded by evapotranspiration in this area. The transient nature of the mine development from north to south and recharge of annual precipitation through open pits during mining as well as backfilled pits was included in the fate and transport modeling and is reflected in the water impact modeling results that were used in the DEIS (HGG 2018). Reference: HGG. 2018. Technical Memorandum: East Smoky Panel of the Smoky Canyon Mine, Numerical Modeling Report. Final. January.
6	6.9	Tom Myers	Alternative 1 to the Proposed Action is a Reduced Pit Shell with Soil-only Cover. The area mined would be up to 78 acres less than that of the Proposed Action. Simplot would accomplish this by mining at a steep pit wall slope, although the actual slope would vary by geologic formation and has not been specified in the DEIS.	While Simplot's pit designs for both the Proposed Action and Alternative 1 are based upon geotechnical drilling, core testing, and other evaluations to ensure that all resultant slope angles will maintain appropriate factors of safety, the detailed specific slopes by formation and structure are not relevant to the EIS impact assessment and do not need to be included.
6	6.10	Tom Myers	The DEIS also indicates there is a potential for slope instability causing Simplot to actually remove some Cherty Shale contrary to the predictions and planning. "However, in the unexpected case where some slope instability was experienced on the east side of the pit, it may be necessary to layback the unstable part of the slope which could, in turn, require mining the Cherty Shale in the affected area" (DEIS, p 4-39). Doing so would increase the amount of Cherty	Please see Comment Response 5.1.

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			Shale incorporated into the pit backfill and thereby increase the Se content. This expectation of less Se provides justification for a less effective cover (estimated percolation through the cover is discussed below). The DEIS does not present a plan to mitigate the occurrence of adding more Se to the backfill. Such mitigation should include improving the cover over as much of the backfill as necessary to minimize the amount of Cherty Shale contacted by the percolation.	
6	6.11	Tom Myers	The mine would also apparently go deeper and remove more ore due to the steeper pit walls, although the DEIS does not disclose the additional amount of ore.	Per DEIS Section 4.2.2.2, the full sentence that the commenter is apparently referring to says: "*Although the pit would have a smaller footprint, by 78 acres, it would be deeper and have steeper side slopes to allow a similar amount of ore removed.*" While it is true the pit would be deeper than under the Proposed Action, it would also have a smaller footprint, thus there is not a substantive "additional amount of ore".
6	6.12	Tom Myers	There are several problems with this alternative, in addition to the cover, which the DEIS does not adequately address: • The steeper pit walls will allow for deeper mining (DEIS Figure 2.6-3). Deeper mining would cause the pit excavation to be closer to the groundwater with more certainty over a large area. The problems with dewatering discussed below would be magnified with this alternative. The DEIS should disclose the additional dewatering and the impacts of doing so. • Excavation would be deeper, but less overburden would be removed while more ore is removed. There would be less overburden to backfill the panels than in the Proposed Action so the percolation could occur quicker. • The DEIS indicates that this alternative would not mine cherty shale and therefore a more conductive cover would be acceptable. However, the DEIS acknowledges that if the steepness expected for this alternative cannot be obtained, some cherty shale could be mined (DEIS, p 4-40). This would increase the amount of Se in the backfill and increase the potential Se leaching into the Wells formation. The simulated concentrations for Alternative 1 would be inaccurate. Without mining cherty shale as proposed for Alternative 1, the simulated Se concentration in the Wells would be 0.051 mg/l (DEIS, p 4-40). The Proposed Action, which includes mining cherty shale would result in a Se concentration in the Wells equal to 0.07 mg/ (DEIS, p 4-40). A scenario with Alternative 1 percolation rates but with higher Se concentrations leaching from the backfill could have Se concentration near the value for the Proposed Action but extending further from the pit. Se concentrations reaching Hoopes Spring could be higher than predicted for either the Proposed Action (0.002 mg/l) or Alternative 1 (0.0007 mg/l) (DEIS, p 4-40) because of the higher load resulting from Alternative 1 percolation with more Se in the backfill.	Narrative on page 4-41 of the DEIS discusses the potential for pit dewatering in the Alternative 1 pit and describes that the bottoms of most of the pits would be 30 to 140 vertical feet above the underlying water table. Only the deeper portions of Phases 6 and 7 might seasonally intersect the water table. This is described as being similar to the Proposed Action. Section 2.6.1.4 of the DEIS describes the backfilling of Alternative 1 and states that the final reclamation contours for the backfilled panel would differ only minimally from the Proposed Action, although mining would extend deeper. Thus, there would be more thickness of overburden backfill in Alternative 1 than in the Proposed Action. As described on page 4-20 of the DEIS, the percolation transit time for thicker backfills would actually be longer, although only marginally so compared to the Proposed Action. To be conservative and provide comparative results, the transit time for Alternative 1 was kept the same as the Proposed Action in the impact analysis. The concentrations of selenium mentioned in the comment (0.051 and 0.07 mg/L) would occur directly under the pit backfills. Table 4.5-8 and the attendant narrative in the DEIS effectively answers the hypothetical situation raised by the comment, i.e. selenium source concentration of the Proposed Action but with the higher percolation rate of the Alternative 1. The resulting selenium concentration at Hoopes Spring under this scenario is shown to be 0.002 mg/L which can be compared to the 0.001 mg/L for the Proposed Action with the 7-inch percolation rate.
6	6.13	Tom Myers	The DEIS should include an adaptive management plan to improve the cover wherever cherty shale is mixed into the backfill. Any management plan must include detailed monitoring of the overburden to assess the amount of cherty shale to be included in backfill. The monitoring should also include sampling for the amount of Se in the overburden.	See Comment Response 5.1. Based upon the modeled concentrations for both the Proposed Action and Alternative 1, the Agencies do not feel that adaptive management for the mixing of Cherty Shale is needed nor is monitoring/sampling for the amount of selenium in the overburden.
6	6.14	Tom Myers	The DEIS should also include model predictions for an alternative with higher percolation and higher Se content to simulate the inclusion of more cherty shale without improving the cover.	Please see the results described in Table 4.5-8 of the DEIS.
6	6.15	Tom Myers	The DEIS rejects the use of synthetic or barrier cover systems to protect groundwater from impacts of recharge leaching Se from the backfill. One reason for this is that "such cover systems present challenges including technical construction difficulties, higher costs to construct and maintain, and limitations on post-mining multiple uses" (DEIS p 2-44). Considering that other phosphate mines in the Blackfoot watershed have used synthetic liners, this reasoning is specious.	In addition to the narrative from Section 2.6.3.9 of the DEIS that is quoted in the comment, other text from the same section provides more context for the decision to not evaluate alternative cover systems. That text describes that groundwater impact modeling was conducted before the decision on alternative covers was made and that, "*the need for alternative cover systems was eliminated from further consideration once it was determined that the relatively simple cover system of the Proposed Action and Alternative 1 are expected to sufficiently protect groundwater and surface water resources.*"
6	6.16	Tom Myers	Supposedly, the "more geochemically reactive portion of the overburden … would be quickly covered during backfill operation to minimize the effects of exposure" (DEIS, p 4-3). Such measures would be effective only if done quickly, prior to significant precipitation. Without accountability that could result from an inspection, this promise is meaningless. Plans to prevent oxidation through covering the seleniferous backfill must be incorporated with measurable and enforceable mitigation plans.	The normal mining process that is followed includes concurrent backfilling and reclamation to the extent reasonably possible. This is intended to bring the pit backfills to approximate final grades in a timely manner to allow placement of the final cover materials with the least amount of double handling. This is a roughly continuous process but is not guaranteed to be completed prior to any significant precipitation. The BLM conducts regular inspections of the active mining areas at the Smoky Canyon Mine to ensure compliance with the approved mining and reclamation plans and applicable BMPs.

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6	6.17	Tom Myers	In general, I support the concept of stochastic modeling to better understand the uncertainties in modeling and to put a confidence band around the predictions. However, as stated in the previous paragraph, that only applies if the simulations are chosen from accurate possible situations. However, the modeling completed herein considers different conceptual models in addition to consideration of the variability of parameters. Because some of these conceptual models are not feasible, all of the simulations using those conceptual models are not useful, and the actual useful number of stochastic simulations is much less than the 2000 reported in the DEIS. The three incorrect conceptual models are as follows: 1. The stochastic simulation includes two different flow calibration models, known as the agency and alternative models. The alternative model relies heavily on an unverified input of upwelling water from the underlying Absaroka Allochthon aquifer. This additional water unrealistically dilutes the contaminants. Therefore, half of the stochastic simulations have their concentration predictions unreasonably decreased. 2. The stochastic simulation considers three separate percolation rates – 2, 7, and 15 in/y. The 7 and 15 in/y rate ostensibly represents the two covers proposed for the Proposed Action and Alternative 1, but neither cover would perform with percolation even close to 2 in/y. Therefore, one third of the stochastic simulations are for a percolation rate that has essentially zero probability of occurring. 3. Two separate saturated thickness values are used to describe the upper Wells formation. One is 200 feet and the varies from 800 to 1000 feet. This was done because HGG (2018) recognized that thick transport layers artificially dilute the concentration by spreading it, or mixing it, through the entire thickness. If the thinner saturated thickness is appropriate, this choice means that just half of the stochastic simulations have an appropriate thickness. However, as described below in the Conceptual Flow Model section, even 200 feet is much too thick to accurate simulate transport. Due to the unrepresentativeness of the three various conceptual models used in the stochastic simulation, very little confidence should be placed on any of the results.	1. Both conceptual models are feasible and should be considered in the evaluation. Please refer to Section 5.1 and Section 5.6 of the Groundwater Modeling Report (HGG 2018). The modeling did not account for any simulations that were considered unrealistic or inaccurate and not supported by data. We have listed a few of the data that support this interpretation that was also listed on page 25 of the modeling report. i. A significant groundwater budget deficit exists within the Smoky Canyon Mine area when only accounting for recharge entering through Paleozoic outcrops west of the West Sage Valley Branch Fault. ii. The potential recharge from water entering the outcrops along the flank of the Absaroka thrust fault is orders of magnitude greater than the combined volume of recharge water available from the southern and western outcrop areas in the vicinity of the Smoky Canyon Mine iii. The long travel time for deep groundwater to upwell and enter the West Sage Valley Branch Fault would provide the age needed to account for the 14C groundwater ages in Hoopes Springs discharge water and some of the East Smoky area groundwater wells when mixed with younger recharge waters (Mayo 2016). iv. Wells Formation groundwater elevations in wells at the Blackfoot Bridge Mine, Woodall Mine, Champ Mine, Mountain Fuel Mine, Dairy Syncline, and East Smoky Panel suggest a regional correlation (HGG 2016). Furthermore, consulting reports from the town of Town of Afton document western flow in the Paleozoic limestone deposits due northeast of the East Smoky Panel Project. HGG states in Section 4.5.6 of the modeling report that the primary purpose of the water flow from the Absaroka Allochthon was to satisfy the deficit in groundwater that discharges from the Hoopes Springs complex and South Fork Sage Creek Springs, only the necessary influx of Absaroka Allochthon water was allowed into the Wells Formation within the model domain. Only 0.8 cfs and 1.0 cfs of Allochthon water entered the Wells Formation, at the West Sage Valley Fault, a small fraction of the total water budget. This amount will not bias fate and transport. 2. The cover modeling included a range of material properties and relative compaction (Stantec 2017). Model results for the Proposed Action cover utilizing Salt Lake Formation clay at a high relative compaction gave results that were less than 2 inches percolation per year. To obtain a groundwater impact analysis with a wide range of inputs, the 2-inch percolation rate was also modeled along with the 7- and 15-inch percolation rates. The 2-inch percolation rate is a valid input for the groundwater modeling but, as described in the EIS, only the 7- and 15-inch rates were used for the environmental impact analysis. 3. On page 113 in the modeling report, this issue of aquifer thickness is discussed. There are two schools or thought relating to the correct choice for aquifer thickness. As stated in the report, when all other parameters are held constant, contaminant plumes are larger, more dispersed, with lower peak concentrations in models that release COPCs in a layer of thick saturated thickness. Decreasing the saturated thickness will result in plumes with higher peak concentrations, but much smaller plumes concentrated in the areas of the source zone. The 200-foot saturated thickness has been used in previous investigations in the Phosphate district, including the Blackfoot Bridge model. Based on preliminary results using a 200-ft thickness for the source zone layer, elevated selenium in groundwater remained within the confines of the proposed pit delineation and low impacted groundwater (>0.001 mg/L selenium) did not migrate as far south. Any further decrease in layer thickness will yield a similar result to the 200-foot thickness simulation, with low impacted groundwater traveling less distal from the pit, with decrease in saturated thickness. Both the 200-foot and the 800-foot saturated thickness simulations provide an upper and lower bound to the uncertainty associated with saturated thickness. Removing the 800-foot saturated thickness evaluation would diminish and bias the quality of the answer. The Agencies disagree that all the modeling conducted was unrepresentative of the potential hydrogeological conditions. In fact, using the robust stochastic modeling approach allowed for incorporation of the relative uncertainties of the groundwater conditions at the site into results that are statistically valid. References:

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				HGG. 2016a. Technical Memorandum: Revised Conceptual Site Model and Request to Modify the Numerical Model Domain, East Smoky Panel of the Smoky Canyon Mine. August 2016. HGG. 2018. Technical Memorandum: East Smoky Panel of the Smoky Canyon Mine, Numerical Modeling Report. Final. January. Mayo and Associates, LLC. 2016. Review of the Existing Conceptual Site Model and Recommended Changes, East Smoky Panel, Smoky Canyon Mine. Prepared for Stantec, Sandy UT. July 2016.
6	6.18	Tom Myers	The DEIS should eliminate unrealistic and inaccurate conceptual model from the stochastic analysis and present results based on the parameter distribution. Unless, it can be better justified as described below, the Alternative model should be removed from consideration. The 2 in/yr percolation alternative will never occur with the proposed covers and should also be removed from consideration. The 800-1000 foot saturated thickness in the Wells Formation should also not be considered; it should be replaced with a more appropriate 20 to 50 foot thickness in layer 3.	The best practice for evaluating risk is to consider a range of possible outcomes. Please refer to Comment Response 6.17. Removing models to focus on only one aspect of the output (high concentrations within the confines of the proposed pit) will diminish the quality of the solution because that approach does not consider distance of travel significant. Both the concentration, timing, and distance of travel are significant and parameters that explore each spectrum of possible outcomes is the correct method and the method used for the East Smoky Panel fate and transport modeling.
6	6.19	Tom Myers	However, even the details of the probability distribution of the parameters shows the simulations are even more dubious in their output.	Please see Comment Responses 6.17 and 6.18.
6	6.20	Tom Myers	The DEIS indicates that drainages will be routed across the backfilled overburden with a design that will ensure they are stable at up to the 100-year storm (DEIS, p 2-12). They would have a clay liner to prevent seepage into the underlying backfill. This plan is destined to fail for three reasons. First, the channels must prevent seepage and be stable in perpetuity. The 100-year storm will be exceeded on average once every 100 years, which means eventually streams will become a significant source of water to the backfill. Unless the channel is hardened in some way to prevent erosion, storms will reshape drainage. It is impossible to plan to avoid this because every large storm hydrograph will have different effects. It is not simply a cross-section that will pass a given flow, but an entire channel that will accommodate fluvial action including erosion and sedimentation. Second, the erosion will destroy the integrity of the clay liner, and eventually there will be seepage from the channel into the backfill. Chert rip rap will eventually fail. An HDPE liner will fail, especially as any soil covering it is eroded thereby exposing it to weathering. Riprap on a clay layer will cause it to rip. The liner, clay or HDPE, must last forever. • The BLM should not allow drainages to cross the backfill because it would be necessary to sustain the inspection and repairs forever, and the agency would need to bond for these actions in perpetuity. • Preferably, the BLM would route the drainages around the panels so the channels do not flow across backfill. This could require spacing between panels.	The narrative in Section 2.4.3.2 states that the channels would be designed for the 100-year storm "*<u>on top of snowmelt</u>*". (emphasis added) This would result in a much more conservative channel design than just that for the 100-year storm. The narrative also states that the underlying overburden fill would consist of low selenium material. This is to reduce the long-term impact of any leakage of water from the channels. There is no ability to leave undisturbed rock under the channel locations because this would require leaving barrier "pillars" of unmined rock and ore within the mine plan, which would not meet the BLM purpose and need: "*This includes ensuring economically viable development of the phosphate resources, in accordance with federal law and regulations governing federal leases, including the requirement for ultimate maximum recovery (43 CFR 3594.1), and allowing the lessee to exercise its right to develop the lease.*"

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6	6.21	Tom Myers	Mining panels 6 and 7 at the south end of the site could require pit dewatering for several weeks (DEIS, p 2-12). The DEIS fails to reveal the effects of dewatering and its justification for avoiding dewatering is lame, as described in the following points. • The DEIS has not considered what the addition of dewatering water would do to the water balance at the tailings facility. Especially since dewatering would occur at the end of mining, the tailings could go into closure with more saturation than ever. The DEIS should discuss the effect on the tailings water balance of discharging potentially substantial amounts of dewatering water to the impoundment. • There is no estimate of the amount of water that would be removed or even any certainty regarding whether dewatering would be required. To the extent there is any consideration of groundwater levels, the DEIS relies on estimates or extrapolations rather than actual measurements. If Simplot developed boreholes to test the ore in this location, there should be measurements of the depth to groundwater. Otherwise, because of the potential impacts, BLM should require Simplot to install a couple monitoring wells in the area suspected to have a high groundwater table. • Dewatering would by definition lower the water table near the south end of the East Smoky Panel and the amount of water removed would be diverted from wherever it would naturally discharge. The DEIS does not consider the impacts to surrounding surface water or wetlands caused by lowering the water table. Dewatering is not mentioned in DEIS Sections 3.5 or 4.5, the Water Resources sections. • The DEIS rejects the alternative of "Not Mining below the Water Table" (DEIS Section 2.6.3.7) because it is "technically not consistent with the purpose and need and not economically practical" (DEIS p 2-43). This reasoning is not credible because it suggests that shortening mining by just a few weeks would violate the purpose and need for the project and potentially render it noneconomic (DEIS, p 2-42, -43). Especially since Simplot would not have to expend the cost of laying a dewatering pipeline for just several weeks of mining, this does not make much sense.	Responses to the multiple comments are as follows: Section 2.4.3.3 of the DEIS indicates that Simplot does not believe the water inflow to the pits will be significant, should it occur at all. Section 2.4.3.4 of the DEIS describes that the tailings pond capacity is adequate to support the East Smoky Panel Project, this includes capacity for tailings solids and liquid. Narrative on page 4-32 of the DEIS states, "*The surface and groundwater directed to the tailings pond for the duration of mining activities would be available for ongoing use in the processing mill and pipelines instead of pumping groundwater from the existing industrial well.*" Thus, the water balance in the tailings pond would be controlled by modifying the rates of water addition to the mill circuit. There is no estimate of the amount of water to be removed from the pits because current groundwater elevation information obtained from monitoring wells and described in the DEIS on page 4-19 indicates that the water table is 5 to 10 feet lower than the projected bottom elevation of the pits. Thus, there may not be a need to dewater at all. However, to be conservative, the potential for seasonal dewatering has been included in the EIS. Minor dewatering of the open pit was not included in the groundwater model because the water table in the model did not intersect the bottom of the pits. Narrative on page 4-32 of the DEIS states: "*Flow modeling conducted as part of the groundwater modeling effort for the East Smoky Panel has shown that the mining would not impact groundwater levels to any noticeable degree . . .*". The pit dewatering lasting "several weeks" (DEIS Section 2.4.3.3) is intended to communicate the seasonal nature of the dewatering if and when the local water table rises to intercept the bottom of the pits during the duration of mining in the East Smoky Panel. Thus, there could be repeated, but short-duration, removal of water from the bottoms of the Phase 6 and/or 7 pits over the time frame that they are open. Because of the unlikely significance of the dewatering actions, BLM has determined that changing the mine designs from those proposed would not be required.
6	6.22	Tom Myers	The DEIS ignores potential effects of dewatering groundwater systems younger than the Wells Formation, such as the alluvial, Dinwoody and Phosphoria Formations (DEIS, p 4-18). The DEIS claims the potential impact is unknown but assumes it to be negligible. "However, the degree of impact of the younger groundwater systems by the pit disturbance is unknown because of the isolated and perched nature of the groundwater systems, but is likely negligible as previously stated" (DEIS, p 4-18). The DEIS assumes away something the BLM and Simplot know nothing about. The DEIS acknowledges there are streams downgradient from the pits that could be affected (DEIS Figure 3.5-13).	Section 4.5.2.1 of the DEIS describes that the groundwater resources within the Salt Lake Formation, Dinwoody, Rex Chert, and alluvium are "*limited in their area of saturation, have limited ability to transmit large fluxes of groundwater, and/or are generally separated from the saturated geologic units that would receive direct recharge during and after mining (Stantec 2016d).*" This understanding is based on field investigations and professional judgment included in the cited technical report, not assumptions. In addition to the narrative quoted in the comment, the section also includes the following narrative: "*Changes in flow in the Alluvial, Dinwoody, and Phosphoria Formation groundwater systems within the Project Area and across the East Sage Valley Branch Fault are expected during the period of pit disturbance. Because outcrops and thus recharge areas to these systems would be removed during pit excavation, groundwater flow is expected to be reduced and could potentially impact the flow of springs downgradient from the Project Area.*" This impact analysis does not assume away any potential impacts as suggested in the comment. Reference: Stantec. 2016d. Water Resources Baseline Technical Report. Smoky Canyon Mine, East Smoky Panel Mine EIS. June.
6	6.23	Tom Myers	The DEIS should include a complete survey of springs and surface water flows that result from these three groundwater systems. For each, there should be a conceptual flow model that describes the spring's source. A monitoring plan must include each spring and a management plan should be implemented to decrease potential impacts. If these fail, there should be a mitigation plan to replace the spring. (is this in the baseline report?)	A complete survey of springs and surface water in the study area for the EIS are described in the Water Resources Baseline Technical Report (Stantec 2016d). The conceptual flow model related to these springs is described in Section 4.5.2.1 in the DEIS. Monitoring and mitigation of impacts to flow in the springs down gradient of the East Smoky Panel is described in Section 4.5.3 of the DEIS. Reference: Stantec. 2016d. Water Resources Baseline Technical Report. Smoky Canyon Mine, East Smoky Panel Mine EIS. June.

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6	6.24	Tom Myers	The DEIS predicts the effect of eliminating these springs on flow in downstream streams (DEIS, p 4-35). It uses a very simplistic ratio that assumes measured flows in September and November represent baseflow and in May and July represent peak flow. Using a ratio of just 1.12, the DEIS estimates base flow at springs ESS-1 and ESS-2 to total 0.17 cfs. There is no evidence these flow measurements are representative, so it is difficult to assess the accuracy of the DEIS disclosure regarding the loss of flows. Also, the DEIS apparently assumes removing these formations will affect only springs, and ignores the potential effects of discharge into streams and how dewatering may affect that.	The Agencies acknowledge that the ratio-based flow estimate method is simplistic, but believe that it represents the best, yet conservative, method to estimate the baseflow rates at those springs given the type and amount of data available. Any sort of modeling effort based upon percentage of recharge area affected, for example, or application of a regional precipitation/elevation-based method would also be simplistic and would ignore data collected specifically for the EIS analysis. Note that impacts were based upon a conservative assumption that all flow from several springs would be lost. Further, note that the subsection titled *Baseflow Reduction* in Section 4.5.2.1 encompasses springs and streams. That subsection discusses the potential effect of aquifer removal on Smoky Creek and on Pole Canyon Creek, both of which were assessed to not be affected. A no-effect determination does not mean that potential effects were ignored. For Roberts Creek, note that UR-3 is the stream channel monitoring site located immediately upstream of the tailings ponds. As stated in the *Baseflow Reduction* subsection, baseflow at that stream monitoring site was assumed to be entirely eliminated, which is definitely not ignoring the potential effects.
6	6.25	Tom Myers	Effect of Removing the Phosphoria on Dewatering - The DEIS notes that dewatering could occur in the deeper portions of mine Phases 6 and 7 (DEIS, p 4-19), as addressed above. The DEIS ignores that mining the aquitard increases the groundwater level in the Wells Formation. Increasing the mound just north of the panel being mined could increase the groundwater flow into the mine. The DEIS should discuss the potential for increased dewatering requirements due to groundwater mounding in adjacent backfilled panels. Mining would remove the aquitard which prevents recharge of the Wells Formation. For the Proposed Action, the open pit area would be 303 acres which the DEIS claims to be an approximate 3% increase in the local recharge area (DEIS, p 4-19). The DEIS statement is based on the scale of the area being considered. It would be more reasonable to consider the area over which the flow patterns are changed by mounding caused by the additional recharge.	The groundwater modeling indicated that a 7-inch annual percolation rate through the cover would result in mounding of the Wells Formation water table of about 5 to 6 feet compared to conditions before mining. At the 15-inch annual percolation rate, the mounding was about 8 to 9 feet. This is a localized effect with the maximum increases in water table occurring under the pit backfills and tapering laterally with distance from the pit backfills. This effect was included in the fate and transport modeling.
6	6.26	Tom Myers	An indicator for the issue of Se leaching into groundwater is "predicted changes in water quantity and quality based on water and contaminant transport modeling" (DEIS, p 4-16). This includes "predicted changes to the quantity and quality to springs and streams" (Id.). Thus, the DEIS relies solely on the results of modeling. While I critique the details of the model below, the only way a model can serve as an indicator is if it has been verified to accurately simulate existing conditions. This site has been operated since the 1980s, and the modeling should accurately predict observed concentrations.	There is no alternative to robust numerical groundwater modeling to predict changes in groundwater quality and quantity and those changes can then be used as indicators. This has been done for every phosphate mine EIS conducted in the district for almost 20 years. The water quality impacts to springs and streams does not rely solely on numerical modeling results conducted for the East Smoky Panel Project. They also include modeling conducted for the CERCLA studies as well as empirical monitoring data. The East Smoky Panel groundwater model has demonstrated excellent calibration with observed groundwater flow and quality conditions using a multi-tiered approach and has been able to identify an upper and lower bracket that defines the range of possible outcomes (HGG 2018). The model also accounts for travel time isotopes and geochemistry and thus is verified to simulate existing conditions relating to flow and transport. Reference: HGG. 2018. Technical Memorandum: East Smoky Panel of the Smoky Canyon Mine, Numerical Modeling Report. Final. January.
6	6.27	Tom Myers	A second indicator is "predicted performance of cover systems and resulting impacts to water quality" (DEIS, p 4-16). Predictions are not a way of verifying that cover systems will work. Simplot has experience testing various cover systems for other portions of Smoky Canyon. This testing data should be included in this EIS to verify the efficacy and choice of cover systems. All cover systems should have extensive monitoring to prove the variable simulated by the models are verified in the field.	The predicted performance of the cover systems is extensively described in Stantec 2017f, which is summarized and cited on page 4-20 of the DEIS. Stantec 2017f describes that lysimeter data and testing that has been done and continues, as required by the BLM, was used. Reference: Stantec. 2017f. Unsaturated Flow Modeling for the East Smoky Panel Mine Proposed Action Cover. Smoky Canyon Mine, East Smoky Panel Mine EIS. March.
6	6.28	Tom Myers	The DEIS analyzes plume maps for the 100- and 300-year times. The DEIS does not explain why these choices were made (DEIS, p 4-24). As discussed below in the Fate and Transport section, due to the substantial shift in source concentrations made at each pore volume transition, the simulated concentrations change substantially. The highest concentrations at the mine occur at the end of pore volume 1, which occurs at 35 or 75 years for the 15 and 7 in/y percolation rates. The second pore volume dilutes the concentration although the plume continues to spread. The DEIS should justify its use of these times for presenting the plumes.	The modeling results in the groundwater modeling report were provided as animations showing the development of the COPC plumes with time so the viewer can see the plume development for each of the pore volumes, and fractions of pore volumes, over time. The reader has the ability to view the progression of the output for each timestep if he or she is interested in any other time period apart from the 100 and 300 years into the future. These animations were provided to members of the public who requested copies of the groundwater modeling report. The 100-year and 300-year time steps from the animations were selected for publication in the EIS, which is standard reporting for EISs in the Phosphate District. Page 4-24 of the DEIS explains that "*multiple model results for each COPC in the Wells Formation over a period of 300 years were generated*" and that "*a summary of results*" is provided in the EIS.

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6	6.29	Tom Myers	Predicted and measured concentrations at Hoopes Spring and South Fork Sage Creek Springs (SFSCS) are critical for the DEIS analysis because they represent the most sensitive discharge point and show whether the transport modeling is accurate. The data show that the modeling is inaccurate, likely due to a problem in the conceptual model for the springs, which indicates the simulated predictions are also wrong due to problems with the verification of predicted concentrations at the springs based on existing mine sources. The DEIS reports that "during the two-year baseline study for the Project, selenium concentrations at Hoopes Spring ranged from 0.108 mg/L to 0.134 mg/L" (DEIS, p 4-37) and that "selenium concentrations ranges from 0.013 mg/L to 0.021 mg/L at South Fork Sage Creek Springs" (Id.) during the same period. The HGG model predicts no Se reaches SFSCS (Id.). Because of the measured concentrations at the SFSCS, the model cannot be correct. This is because the source of Se for each spring is the Pole Canyon area. The measured Se is evidence that not all Se from Pole Canyon discharges at Hoopes Spring but that some passes it and discharges at SFSCS. The model simulates all Se discharging from Hoopes Spring even though the data shows that cannot be correct. The simulated results treat the predictions made by Formation (2014) as the baseline. HGG (2018) simulates background concentration as zero so future cumulative impacts are the sum of Formation (2014) predictions and HGG (2018) predictions. However, Formation (2014) predictions have not been verified by comparing the predictions with observed values. This means the prediction that the Se peak would have been reached and steady-state conditions attained by 2050 (DEIS p 4-37) may be incorrect. Even if the Formation (2014) predictions could be verified, the values predicted for the East Smoky Panel are much too low, as documented in reviews of the modeling presented elsewhere in this memorandum.	The East Smoky Panel groundwater modeling was purposely done stochastically to incorporate all available empirical data, capture the effects of uncertainty in the modeling inputs, and use robust computing technology and code. The results used in the EIS were determined to be statistically valid at the 95% confidence level. The commenter has not provided any factual evidence that the predicted results used in the EIS are inaccurate. The reviewer's statement, "Because of the measured concentrations at the SFSCS, the model cannot be correct" is incorrect. There are multiple legacy sources of contamination between SFSCS and the East Smoky Panel location that are thought to be potential sources for the current contamination at the springs. Potential predicted impacts from the East Smoky Panel should not be confused with existing legacy contamination that is measured in the field. The COPC plume development that is described in the East Smoky Panel groundwater model results clearly demonstrates that the groundwater impacted by the Project would eventually discharge at Hoopes Spring and not make it as far south as SFSCS. The commenter is incorrect that the CERCLA predicted concentrations at Hoopes Springs have not been compared with empirical data, they are compared on a regular basis as the monitoring results are received. Adjustments being currently considered to the CERCLA modeling are related to improving predictions of the peak concentrations expected at Hoopes Springs, but the long-term, steady-state conditions are still expected to be at or near the same low-concentration levels used in the EIS impact analysis. As described in Comment Responses 6.17 and 6.18 we believe the groundwater modeling results used in the EIS are scientifically valid. We also suggest that the model results should be reviewed in light of the dramatically lower soluble selenium concentrations in the column leachates than other ore deposits at the Smoky Canyon Mine. The significantly lower source term used in the East Smoky Panel modeling is due to the inherent geochemistry of the rocks present and plays a large part in the low predicted groundwater quality impacts.
6	6.30	Tom Myers	The DEIS routes the concentrations downstream from the springs showing that many downstream locations will continue to have Se concentrations that violate the criterion (DEIS, p 4-38). If the predictions are incorrectly too low, as documented in this memorandum, the concentrations further downstream will be higher.	Comment noted. See Comment Responses 6.17 and 6.18 and others regarding the validity of the groundwater modeling results.
6	6.31	Tom Myers	The DEIS presents a table of Model Predictions for the concentration of various contaminants (DEIS Table 4.5-9). The table presents concentrations at 10, 50, 100, 200, and 300 years at just four observation points. The DEIS should present the concentrations graphically so the reader can better assess when the peaks occur. The DEIS should also present concentration graphs for more locations.	In response to other comments, the concentrations of COPCs at GW-16 and GW-24 have been added to FEIS Tables 4.5-6 and 4.5-10. Adding additional graphics to the FEIS was determined to not be needed as the COPC modeling animations from the HGG 2018 report have been provided to those that have requested them.
6	6.32	Tom Myers	The plume maps shown below in the Fate and Transport section show there are numerous wells not even used for this analysis, including wells GW-18, GW-19a and b, GW-21, GW-21, and GW-25. Concentrations at these wells could have provided additional information on pathways to Hoopes Spring.	The development of the COPC plumes over time, the predicted concentrations and geographic distribution within the plumes, and the capture of the plumes at Hoopes Springs is graphically presented in the figures included in the DEIS. This was done as an effective communication technique that is easily understandable by the general public. It is not necessary to list concentrations at multiple monitoring wells within the plumes for the reader to understand the extent of the groundwater quality impacts. In addition, the COPC modeling animations from the HGG 2018 report have been provided to those that have requested them.
6	6.33	Tom Myers	The DEIS describes a cursory Adaptive Management Plan in DEIS Appendix 4B. It references the 32 wells used to collect data for the East Smoky Panel EIS, with just 10 wells in the Wells Formation (DEIS App 4B, p 6). Only some of the existing monitoring wells would be continued into the future, with no description of which sites would not continue to be monitored or explanation as to why they would be dropped (Id.)	Clarifying text has been added to the Adaptive Management Plan Section 4.3 to state that as with the entire water monitoring program currently in effect, the details on the plan's monitored locations, sites, parameters, frequency, etc. would be determined with agency input and approval on an annual basis at a minimum.
6	6.34	Tom Myers	Hoopes Spring is the primary site that could be impacted by East Smoky Panel backfill, according to DEIS Appendix 4B. But, the "water quality at Hoopes Springs has been monitored for years and there is an extensive database of water quality records for this site" (DEIS App 4B, p 6). The DEIS appears to use this database and the modeling predictions as reasons to try to monitor pathways to the spring. "Proactive, or indicator monitoring, for selenium contribution to Hoopes	IDEQ has finalized the POC determination (IDEQ 2020), and baseline characterization at the compliance and indicator wells is underway. The IDEQ is expected to define the monitoring required to show compliance with water quality standards which includes existing monitoring wells in addition to potentially monitoring Hoopes Spring. The basis of the AMP narrative quoted in the comment was to suggest that discriminating very low concentration additions of selenium to

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			Springs via the groundwater pathway would be difficult because the predicted selenium concentrations at that location are so low" (Id.). Continuing, "being able to discriminate the arrival of the selenium contribution from the East Smoky Panel at Hoopes Springs is likely not technically feasible" (Id.). This means that Simplot, with BLM /FS concurrence, will rely on simulations rather than monitoring to assert their project is causing no impacts.	Hoopes Spring from the East Smoky Panel to much higher concentrations already present because of other existing sources will be challenging. Decisions on any additional groundwater monitoring will be made by the IDEQ. Reference: IDEQ. 2020. Final Determination Letter from Bruce Olenick, IDEQ, to Lori Lusty, J.R. Simplot Company with enclosed determination. January 7, 2020.
6	6.35	Tom Myers	BLM/FS will rely on monitoring the total concentration "without trying to discriminate the contribution from the East Smoky Panel" (DEIS App4B, p 7). The agencies call this "reasonable" (Id.) but the reality is the plan appears to be to assign any impacts at Hoopes Spring to preexisting conditions without attempting to verify whether the new project is impacting the spring. They are assuming away potential impacts and not even monitoring to verify the assumption. Much of the rest of this memorandum documents how this is a bad assumption and it must be verified with monitoring.	See Comment Response 6.34.
6	6.36	Tom Myers	Hoopes Spring and the SCSCS complex are the primary discharge points for groundwater and Se contamination from both the East Smoky Panel and the existing Smoky Canyon Mine. For verification of ongoing remediation and that the new panels are not contaminating the springs, a very dense monitoring network in the Wells Formation is needed. One goal should be to distinguish between pathways along the fault from the north and pathways from the west along Pole Canyon. Although the proposed panels would intrude very closely to Pole Canyon, it is essential to monitor flow along the fault, the primary pathway. Two permanent Wells formation monitoring wells should be installed near the location of alluvial well GW-15. One should be at GW-15 where it would presumably be monitoring flow from the west and northwest resulting from the Pole Canyon waste dump. A second well should be installed in the Wells adjacent to the fault to monitor flows presumably from the north through the fault system.	Groundwater modeling has shown that water quality at South Fork Sage Creek Spring should not be impacted by the East Smoky Panel. BLM is not opposed to adding more monitoring locations to the existing Smoky Canyon Mine groundwater monitoring network and recognizes the IDEQ leadership in selecting such monitoring locations. IDEQ is a cooperating agency for this EIS and will be informed of this recommendation when they review this comment response. With regards to the recommendations on installing more monitoring wells to monitor the fault pathway, please see Comment Response 6.34.
6	6.37	Tom Myers	North of GW-15, most of the formation west of the fault will be mined, but the Wells beneath the mined-out panels could be transporting fluids from further north. At least two temporary monitoring wells should be installed west of the fault in the upper Wells so that both groundwater flow and contaminants could be monitored. Such monitoring would provide data on both flow directions and contaminant sources north of Pole Canyon. This is necessary because of the flat gradient in the area. If there are locations that will not be mined, these wells should be installed permanently.	See Comment Responses 6.34 and 6.36.
6	6.38	Tom Myers	Because the highest concentrations will not occur until decades after mining, in order to track the pathways in the Wells formation, it is essential to install at least two permanent monitoring wells in the Wells near the fault. These could be in the south half of the project, near panels 5 through 7. If the temporary wells discussed in the previous paragraph could be made permanent, that would be preferable. An assumption of these wells is they would be tracking, or verifying a lack thereof, transport from the East Smoky Panel. These wells could be indicator wells under IAC 58.01.11.401.04.b.	See Comment Responses 6.34 and 6.36.
6	6.39	Tom Myers	The issue of vertical dispersion of contaminants is important in the analysis because if too much is assumed, the predicted concentrations could be too low. For this reason, there should be a least one monitoring well dedicated to confirming or tracking vertical dispersion. Monitoring at all well locations should be of the uppermost 20 feet of the Wells formation because that is where most contamination would occur. At a second point near the well east of GW-15, a deeper well should be installed to verify vertical dispersion.	See Comment Responses 6.34 and 6.36.
6	6.40	Tom Myers	The proposed monitoring east of GW-15 would be closest to the mining area, while not being on it, and on the likely pathway to monitor contaminants from the project to the spring. It is likely essential as a POC. The Wells formation monitoring well at GW-15 is essential to sort out the sources of contamination transporting to Hoopes Spring.	See Comment Responses 6.34 and 6.36.
6	6.41	Tom Myers	HGG's general approach to vertical discretization was to simulate a formation in each layer, with two layers representing the Wells aquifer. "Vertical discretization is best when correlated to aquifer systems or hydrostratiphic units" (HGG 2018, p 7) is true if the model layering is not too	See Comment Response 6.17.

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			thick. Thickness matters more for transport modeling because contaminants spread vertically through the layer and a thick layer dilutes them. HGG designed the vertical discretization according to aquifer unit (Id.), but the layering is too thick.	
6	6.42	Tom Myers	Layer 2 is the Phosphoria Formation which has a primary purpose of being a low conductivity barrier between the surface and lower layers, which HGG terms the Tier 2 aquifer. HGG describes the formation as maybe being "capable of containing and locally transmitting groundwater (secondary permeability) ... but regionally, it behaves as a confining unit separating Tier 1 and Tier 2 waters" (HGG 2018, p 41). It controls vertical discharge to the Wells Formation and limits recharge to the Wells Formation to occur only at outcrops. Based on the 80-foot difference in water level between the Dinwoody and the Wells discussed above, this layer could be unsaturated. • HGG should present evidence that there is saturation throughout layer 2 representing the Phosphoria Formation, or the model should be restructured to simulate only the Wells formation.	The Phosphoria Formation has areas that are both saturated and unsaturated. The Rex Chert member of the Phosphoria Formation is known to transmit water. It is also well documented that the Phosphoria Formation is saturated in areas around losing streams. We selected the modeling code MODFLOW NWT and the Unsaturated Zone Flow (UZF) package to handle the rewetting of cells, which allow for cells to run dry and rewet throughout the simulation, and to be able to model the interchange between the overlying and underlying aquifer systems. Monitoring wells ES-MW3, GW-28A/B, MC-MW-2 and MW-MW-4 are examples of almost a dozen wells that provide evidence of saturation in the Phosphoria Formation.
6	6.43	Tom Myers	Layers 3 and 4 are the Wells Formation west of the West Sage Valley Branch Fault; it is Dinwoody Formation and Nugget Sandstone east of the fault in layers 3 and 4, respectively. Based on HGG (2018) Figures 25 and 26, which show top surface elevations for the layers, the upper Wells Formation, layer 3, is about 500 feet thick in the vicinity of the existing and proposed mine. Further west, the thickness appears to be much smaller. As noted above, the thickness of the Wells may be too much for accurate transport modeling.	See Comment Response 6.17.
6	6.44	Tom Myers	HGG claims to implement simplicity in its model design. "One of the goals of the model design was to create a simple, yet intuitive, model with the minimum number of layers required to simulate the underlying systems, without losing the ability to capture important heterogeneity in the groundwater system." (p 16) HGG's choice here only allowed the model to capture heterogeneity and vertical gradient among the layers, not within a formation; the Wells Formation was divided into two layers, but the upper layer was ultimately not thin enough to accurate simulate the flow and transport in the most important portion of the Wells Formation – where the contaminants enter it on its surface. Five hundred feet is a large volume over which contaminants are immediately mixed.	Please refer to Comment Response 6.17.
6	6.45	Tom Myers	Layer 5 is the Absaroka Allochthon, a formation consisting of Paleozoic limestone, which underlies the Wells Formation and heads in the Salt River Range substantially to the east. This 1000-foot thick layer passes water under the Wells Formation. Due to its potentiometric surface being higher than in the Wells, water is forced to upwell into the Wells Formation. This is a significant part of the HGG conceptual flow model in that HGG claimed it was "beneficial for calibration of the model" (p 29). It provides water primarily to a pathway to Hoopes Spring which causes the model prediction of the concentration from Hoopes Spring to be diluted. I partially refute the concept of and basis for the upwelling flow in the section below on Conceptual Flow Model. HGG simulated flow through layer 5, the Absaroka Allochthon, by specifying heads along the eastern and western boundary of the model domain using a MODFLOW constant head boundary. Flow through the layer would depend on the gradient established by the boundaries and conductivity within the layer. HGG does not specify a target flow rate through the layer nor present the flow simulated by the model. HGG simulates this layer simply to provide a source of groundwater to the Wells, but has not adequately justified its need for including the layer (see the Conceptual Flow Model section). There is no a priori limit to the flow through the layer. HGG uses this layer to simplify the calibration with an unlimited water source. The unverified flow from an unverified source dilutes predicted concentrations at Hoopes Spring.	Please see Comment Response 6.17 and refer to Section 5.6 of the Modeling Report. The flow rate from the Allochthon into the model domain is described as being just sufficient to balance an apparent water balance deficit after all other parts of the water balance are taken into consideration. There is both hydrogeological and isotopic evidence supporting the hypothesis that groundwater from the Allochthon can enter the Wells Formation aquifer in the Project Area.

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6	6.46	Tom Myers	The model simulation requires boundary conditions to provide groundwater flow to the calculations. Boundaries are necessary to solve the flow equations that make up the coded groundwater model. HGG simulated streams as either sources or discharge points for the model, but it is not clear which model package was used (HGG 2018, p 57). HGG Section 4.8 initially states that streamflow "routing was performed using a modified version of the MODFLOW Streamflow Routing Package" (Id.). Then after a brief description, HGG states "[b]ecause the input dataset for the model for streamflow data is relatively simple, the Rivers package was selected as the interface to simulate surface water and groundwater interactions" (Id.). Assuming that the model does not draw more water from the stream into the domain than actually flows in the stream, the choice of package has little effect on the model results. This confusion is an example of the poor documentation in HGG (2018).	HGG documentation is correct in its statements. The preliminary design and initial simulations applied the SFR-2 package but was then later replaced with the RIVER package because the SFR-2 package has added complexity that is not necessary for the East Smoky Panel objectives and there is not sufficient data to complete the full input package for the SFR-2. The SFR-2 package is specifically designed to handle water transfers and rerouting. This is not a major factor associated with the East Smoky Panel Project and the uncertainty associated with the inputs in the SFR-2 overshadowed any of its benefits to the end result and would provide no additional value to the solutions.
6	6.47	Tom Myers	Additionally, either modeling package can accept discharge from the groundwater or provide recharge to the groundwater. As such, HGG should specify the target flow to or from each stream boundary and show whether those targets are met during calibration. Otherwise, it is unknown whether the model accurately simulates groundwater/surface water interactions.	HGG simulated stream flow losses and gains consistent with reported flow values along Smoky Creek and Pole Canyon.
6	6.48	Tom Myers	The other water source to the model is recharge. HGG simulated recharge as distributed across the model domain, as shown in HGG (2018) Figure 26. Distributed means recharge enters the groundwater domain at the point it falls or melts on the ground. Recharge to the Wells Formation aquifer occurs at outcrops based on the average precipitation at the outcrop. HGG did not attempt to calibrate recharge but rather used a method I critique in detail in the following section regarding the conceptual flow model. One major error is the method does not account for geology because it forces water into the ground regardless of the underlying geology. The second major error is that it is not established based on measured discharge from the groundwater domain. At steady state, discharge must equal recharge, and the method does account for that.	The method of recharge has been applied for numerous EIS studies in the Phosphate District and is well accepted in the region. Recharge in the model does occur at outcrops in the model, it is distributed across the entire domain along multiple outcrops of various formations. Recharge in the model does account for geology. Recharge should not be based on measured discharge from only the groundwater domain because that incorrectly assumes all of the discharge originates as recharge from within the confines of the domain. This is rarely the case, unless the system is a closed system which is not applicable for this Project. The isotopic ages and tritium content of wells and springs in the Wells Formation confirms this conclusion.
6	6.49	Tom Myers	HGG states that "calibration focused on simulating groundwater elevations, spring discharge and travel times using the November 2015 dataset" (p 63). This statement demonstrates that the calibration parameters were insufficient and the statement is also incorrect. Calibration must match groundwater elevations, so this is appropriate. However, it must also match the discharges from the domain, which means flow to the springs and streams, not just Hoopes Spring. HGG specifies numerous times that the model is nonunique (HGG 2018, p 64), but this would not be the case if HGG had calibrated to a full suite of discharges. If total recharge equals total measured discharge (see the Conceptual Flow Model review), there is only one set of hydrologic parameters that would provide the best fit to the groundwater elevations. When flow through the system is not restrained by measurements, there are as many sets of parameters as there are potential flow rates.	The comment is incorrect. Every groundwater model is non-unique, regardless of the number of parameters used for calibration. A single best solution is an older school of thought that was replaced on this Project with the concept of multiple best solutions. One single best solution is not attainable because a modification of one parameter with an adjustment to another can yield similar or better results, depending on the target of interest. The model accurately reflects losing and gaining components of the reaches that cross the domain. The statement that if total recharge equals total measured discharge, there is only one set of hydrologic parameters that would provide a best fit is wrong. There is substantial documentation on the "non-uniqueness" of the flow and transport equations and this has been a well-known element of flow modeling. It was overlooked in the past because technology did not have a method for resolving it.
6	6.50	Tom Myers	HGG did not use travel time to calibrate the model, contrary to the quote above. However, it did verify the travel times through the system would be compatible with the measured age of the groundwater. This is not a calibration and it provides just a broad sense that simulated flow through the system is accurate.	The comment is incorrect. Travel time was incorporated in the model calibration. HGG agrees that travel time is a broad sense that simulated flow through the system is accurate.
6	6.51	Tom Myers	HGG indicates the porosity impacts the calibration (p 51), but this is not correct. Porosity has no effect on either steady state or transient flow within MODFLOW. Porosity affects actual travel time and transport because it controls the rate that a particle (of water or contaminant) flows through a geologic media, but HGG did no calibration for concentration.	The comment does not take into account the multi-tiered approach used for calibration. Porosity impacts calibration because one aspect of calibration is whether and when a particle released in the vicinity of Pole Canyon will reach Hoopes Springs. Those results are directly associated with the effective porosity and impacted calibration because those simulations where particles did not reach Hoopes Springs were removed from calibration. Please review section 5.1 and 5.6 of the Modeling Report.

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6	6.52	Tom Myers	HGG Table 4 presents "Representative Total Porosity Values for Various Geologic Materials" referencing Freeze and Cherry (1979), but it cites incorrect values for half of the table. For sandstone, limestone/dolomite, shale, fractured crystalline rock, and dense crystalline rock, Table 2.4 in Freeze and Cherry (1979) indicates the ranges of porosity of 5-30, 0-20, 0-10, 0-10, and 0-5%, respectively. HGG reported values that are grossly higher than reported in the reference. Overestimating porosity would cause an underestimate of concentration because higher porosity causes the model to simulate too much water in the media. This would dilute the load added to the simulation.	The table has been corrected but is only included for discussion purposes and has no impact on modeling results. An errata sheet has been added to the HGG 2018 report and included in the Project Record. Reference: HGG. 2018. Technical Memorandum: East Smoky Panel of the Smoky Canyon Mine, Numerical Modeling Report. Final. January.
6	6.53	Tom Myers	HGG claims an effective porosity of 0.01 provided the best fit for calibration metrics (HGG 2018, p 53). However, the discussion of calibration (HGG 2018. Section 5) does not mention adjusting porosity for calibration. Also, the flow calibration was a steady state simulation based on the November 2015 data set (p 63), so porosity was not used regardless of statements to the contrary. Porosity does not affect steady state simulations. The statement "[t]o maintain numerical calibration, increasing effective porosity requires increasing hydraulic conductivity that is orders of magnitude higher than the pump test analyses suggest" is nonsensical. Porosity is not a parameter adjusted in a MODFLOW simulation and it certainly does not affect the conductivity as simulated within this model simulation. Storage coefficients affect transient modeling and porosity can be related to storage coefficients, but that does not appear to be what HGG is writing about herein. Porosity estimates affect particle tracking and transport calculations because effective porosity represents the actual volume through which water and particles flow which causes it to affect travel time for water and contaminant particles. Darcy velocity is simply an average velocity for a given flow rate through a given aquifer cross-sectional area. Accounting for the solids in the cross-sectional area, the actual velocity equals the Darcy velocity divided by the porosity. If the porosity is 0.01, as assumed by HGG, the particle velocity is 100 times faster than the Darcy velocity. HGG used particle tracking to verify their flow paths and to consider travel times for Se to Hoopes Spring (HGG 2018, p 94). HGG did not adjust porosity to calibrate the travel times.	Porosity was adjusted during calibration. Please see Sections 5.1 and 5.6 of the modeling report. Please see Comment Responses 6.50 and 6.51.
6	6.54	Tom Myers	Porosity estimates affect particle tracking and transport calculations because effective porosity represents the actual volume through which water and particles flow which causes it to affect travel time for water and contaminant particles. Darcy velocity is simply an average velocity for a given flow rate through a given aquifer cross-sectional area. Accounting for the solids in the cross-sectional area, the actual velocity equals the Darcy velocity divided by the porosity. If the porosity is 0.01, as assumed by HGG, the particle velocity is 100 times faster than the Darcy velocity. HGG used particle tracking to verify their flow paths and to consider travel times for Se to Hoopes Spring (HGG 2018, p 94). HGG did not adjust porosity to calibrate the travel times.	HGG did adjust porosity to calibrate the travels times and MODPATH takes into consideration these factors. Please see Section 5.1 of the modeling report to understand the multi-tiered approach for calibration which includes adjusting porosity.
6	6.55	Tom Myers	As noted, porosity affects transport calculations also because it affects the travel time for contaminants. This would be the best way for HGG to calibrate porosity. It could attempt to match observed concentrations at Hoopes Spring by adjusting porosity and dispersivity (Myers).	See Comment Responses 6.53 and 6.54.
6	6.56	Tom Myers	HGG set effective porosity at 0.01, as noted, and specific yield at 0.10 (HGG 2018, p 110). In unconfined aquifers, the two are usually equal because specific yield is the amount of pore space that drains as the water table lowers. Setting specific yield too high would cause an estimate of changes to flow to a stream or spring due to dewatering or other flow change (recharge) to be too low.	The model accurately reflects losing and gaining components of the stream reaches within the domain.

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6	6.57	Tom Myers	There is a "direct relationship between water levels in the Wells Formation and the contribution of water from the Absaroka Allochthon used to satisfy the water deficit" (HGG 2018, p 68). I discuss the water deficit in the Conceptual Flow Model section. It is a very unusual calibration technique to adjust the flow into a formation to alter the head levels within that formation. The standard method is to balance inflows and outflows, accounting for change in storage if a transient model, and then adjust parameters in the formation to match groundwater levels. HGG claims that because the scatter diagrams of simulated heads and observed heads show a good agreement, that the model has "captured the primary mechanisms that drive groundwater flow in all groundwater systems". This is simply not true especially if a full water balance accounting was not completed, as it was not herein.	The statement regarding the water levels in the Wells Formation and the contribution of water from the Absaroka Allochthon is a conclusion based off of reviewing the catalog of calibrated models. The model was not calibrated as described in this comment. The model was calibrated by first developing a water budget for the Wells Formation and compiling total discharge, establishing recharge, and the running of iterative simulations. Adjusting hydraulic properties and applying the multi-tiered calibration approach is discussed in Section 5.1 of the modeling report. HGG does not claim that only scatter diagrams and a goodness of fit can be used to assess calibration. The modeling report states that a number of calibration metrics were used to monitor the calibration progress and analyze the goodness-of-fit between the observed and simulated hydraulic heads. These metrics included scatter diagrams, calibration statistics, calibration targets, flow directions and travel times. It is important to assess all metrics before considering a model well calibrated, because calibration can be achieved in many ways.
6	6.58	Tom Myers	The report refers to an Agency and Alternative Model without ever giving a good clear description of what each refers to. From the fact that HGG refers to an Agency Model several times before it first refers to an Alternative Model (on p 68), it would appear that the Alternative Model was an adjustment to the initial (Agency) model. Both models have to be able to move a particle of water from the Pole Canyon dump to Hoopes Spring, with the difference appearing to be that the Agency Model uses the minimum amount of water from across the West Sage Valley Branch Fault while the Alternative Model uses the "maximum quantity of water permissible across the fault" (HGG 2018, p 68). Presumably, this refers to the amount of water allowed into the model from the Absaroka Allochthon (layer 5), but it is not clear. HGG (2018) carries each model forward for calibration and considered each "representative of the end-members of each spectrum for successful model calibration" (Id.) without a specific description of what implements the differences just noted. The report presents calibration metrics for each model that are very similar and do not provide an indicator as to which is best.	Please refer to page 67 and Section 5.1.1 of the modeling report. A single best solution does not exist. When you modify one parameter, you can obtain similar or better calibration by adjusting another parameter. This is true for all groundwater models. Water budgets, particle tracking, and goodness of fit are all considered. Each solution will have a water budget that reflects those changes. The Agency and the Alternate model represent the end-members that relate to the particle tracking because that element of calibration did not have infinite possibilities.
6	6.59	Tom Myers	HGG ignores two anomalies in the model without providing good explanation. One is they ignore an apparent upward gradient in the Salt Lake Formation, which occurs in model layer 1. HGG identifies wells 7 which is screened at a deeper interval, 50 to 90 ft bgs has a 20-foot higher groundwater elevation than well 8 which is screened at 30 to 40 ft bgs. The wells are relatively close and represent a substantial upward gradient (HGG 2018, p 76). HGG ignores this gradient because the formation is not the "primary focus" of the model. However, the presence of the gradient indicates there is a potential discharge in the model that is not being accounted for. If this is not the model focus, it would have been parsimonious to model only the Wells formation since the Phosphoria separates it from the shallower Tier 1 aquifers.	The Salt Lake Formation does not contribute to the water budget for the Wells Formation and maintaining water levels and flow directions in the Salt Lake Formation east of the fault is independent of the Wells Formation. Leakage from the Phosphoria will impact water levels in overlying Tier 1 deposits and it is more intuitive to include the Tier 1 and Phosphoria west of the West Sage Valley Branch fault for these reasons. However, the Wells Formation is the primary focus.
6	6.60	Tom Myers	Second is the anomalous water levels in the Wells Formation, specifically in wells GW-IW and GW-CO, which have static water levels 83 and 20 feet higher than the typical static water level in the area. HGG does not understand the reason these Wells-formation wells have higher water levels. "The cause of the outlier water level data from the GW-IW and GW-CO is unknown but both wells are located in the vicinity of Smoky Creek, which is likely located within a zone of structure faulting and is known to be an area of localized recharge" (HGG 2018, p 81). HGG Figure 40 shows both wells are under the Phosphoria Formation west of Wells Formation outcrops. HGG's "localized recharge" would be from Smoky Canyon creek seepage through the Phosphoria creating an enhanced localized mound in the Wells formation (HGG 2018, p 83). HGG tested a low permeability barrier "east of GW-CO" (Id.) that did not support the addition of barriers (Id.). HGG believes the problem "to be isolated to the area of these wells and is not considered an integral aspect of the CSM relating to migration of contaminant associated with the proposed East Smoky Panel" (Id.). If the proffered explanation is correct, ignoring it represents a potential huge error in the conceptualization of the flow in the Wells formation, contrary to HGG's continuing discussion. HGG claims that "contribution of added recharge to match water levels at GW-CO would dilute concentrations and create a stronger eastern gradient, pushing water levels back towards the East Smoky Panel, thus containing any potential migration of impacted groundwater" (p 83). This quote has several inaccuracies.	HGG did not ignore the anomalous water levels in GW-CO and GW-IW. This matter is discussed beginning on page 80 of the modeling report. It is standard practice to disregard water levels in model calibration that are believed to be anomalous. That does not dilute simulated concentrations. HGG simulated increased recharge during calibration from Smoky Creek to evaluate the option of increased recharge but the simulations overestimated water levels at nearby monitoring wells as a result and resulted in a stronger easterly component. Water levels at GW-CO are significantly higher than water levels in nearby wells and is not considered a regional condition that should be simulated. However, increasing recharge at GW-CO will result in lower concentration outside of the pit, not higher concentrations as the comment suggests. The potential reasons why these water levels are so much higher than all the other Wells Formation aquifer elevations in the model domain are discussed on pages 80 and 81 of the modeling report. It is thought that any, or a combination, of these reasons can explain the anomalous water levels for the two closely-located wells in this locality. The comment suggests that including these anomalous water levels in the calibration of the model should have been done and would result in a steeper north-south gradient along the fault. However, the empirical data collected on the Wells Formation aquifer along the fault zone does not display said steeper gradient, which would be expected if the theorized strong west to east gradient supported by the anomalous water levels existed. The comment suggests that the area of anomalous water levels at the subject wells be segmented from the rest of the model. Please see the narrative on page 81 of the groundwater modeling report where it is reported that a low permeability barrier was tried in the model east of GW-CO and the results did not support including the barrier or added layering.

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			It argues backwards by claiming "dilute concentrations" which would only be correct where the additional recharge manifests. Increased water levels would increase easterly flows, but the fault would impede those flows and increase groundwater levels at this northerly point. This would increase the north-south gradient along the fault driving contaminants to Hoopes Spring quicker, rather than "containing the potential migration of impacted groundwater". By simulating the area without considering the wells are in a "zone of structural faulting" that are not part of the actual flow in the aquifer increases the available flow into the proposed panel area which would dilute contaminants resulting from the proposed project. The recharge and flow from an area that is segmented increases the volume of water available to dilute the contaminants and decreases the simulated concentration reaching Hoopes Spring. If HGG truly believes the water levels at these wells are anomalous and should be ignored, then that portion of layers 3 and 4 should be simulated as no flow cells so that nothing that occurs within it matters to the remainder of the flow simulation. HGG's conclusion that "we think these water levels are anomalous condition that does not need to be simulated in the groundwater model" (p 84) leads to a model that dilutes the simulated concentrations.	
6	6.61	Tom Myers	There is an additional problem with not segmenting the area around these wells. The model simulates the GW-IW as pumping, as can be seen in he closed contours around that well in HGG Figures 41 and 42. Although the drawdown cone is slight, HGG Figure 41 shows a minor gradient from the proposed East Smoky Panels to the pumping well for the Agency Model. The drawdown is much clearer in HGG Figure 42 which shows a several foot difference between the wells and the panel which clearly draws water from most of the proposed panels. Including the pumping well from an area that could be segmented from the flow model would pull contaminants from the source and dilute the flow to the south.	HGG does not suggest that GW-IW is segmented from the East Smoky Panel area. However, HGG investigated the impacts GW-IW pumping has on the flow field beneath the East Smoky Panel. GW-IW does impact flow beneath the pit backfill slightly; however, during the particle tracking timeframe for the first 12 years, the particles do not appear to migrate significant distances toward GW-IW. This is important when one recalls that the largest contribution of selenium to the groundwater occurs during the timeframe of the first pore volume in the modeling. For the Proposed Action this period is 74 years and for Alternative 1 it is 35 years. Overall, reducing pumping of GW-IW results in less migration to the west and only slightly greater migration to the south.
6	6.62	Tom Myers	HGG claims that upwelling flow from the Absaroka Allochthon is necessary to improve model calibration (p 87). HGG "justifies" this by comparing the calibration of three different models. HGG implies that increasing the amount of water upwelling from the Absaroka Allochthon improves the calibration of groundwater level and is necessary from a water budget perspective. The first claim is wrong and the second is very dubious. HGG (2018) Table 11 compares groundwater elevation residual and statistics for three "quasi-calibrated" model scenarios, A, B, and C, for which the amount of water upwelling increases from A to C (the actual upwelling flow is not specified). Model A, the scenario with the least upflow, is clearly the better calibration even though the average and median are similar to that for Model C, the scenario with the most upwelling. I conclude this because the range of residuals is from -3 to 3 for Model A and from -8 to 10 for Model C. Statistics such as average and median can be highly misleading by averaging out extremes such as for Model C. Figures 43 and 44 show distinct difference between Models B and C, respectively, with the Wells Formation flow in different directions for each aquifer (it is not clear why HGG used Model B because it had poor average and median statistics).	Incorporating water from the Absaroka Allochthon as a small contribution to the Wells Formation groundwater budget is neither wrong nor dubious. The comment does not account for the water deficit that exists in the Wells Formation and for the old ages identified in the Wells Formation monitoring wells and at Hoopes Springs. This deficit cannot be accounted for by young recharge. It is clear that old water must be accounted for in the Hoopes Springs budget and HGG provided a very detailed explanation of where that water originates in the modeling report. There are multiple sources that support western flow of Wells Formation water in Afton and Wyoming, east of the Smoky Canyon Mine, including consulting reports from the Town of Afton and also the high discharge that comes out of Periodic Spring. HGG does not imply that increasing the amount of water improves calibration, HGG states that the amount of water contribution to the Wells Formation from upwelling water is uncertain. HGG includes three quasi-calibrated models in the report. However, the purpose of these quasi-calibrated models is to demonstrate that statistics can never be used independently to justify calibration. The quasi-calibrated models do not satisfy all calibration metrics. Therefore, the exact value of upwelling water is not relevant. The comment makes a critical but very common mistake of evaluating calibration solely on the merits of residuals and supports its determination of calibration on the comment's own biases. The uncertainty associated with the exact amount of contribution of water from the Absaroka Allochthon, and the concept that statistics can never be used independently to justify calibration are the most significant elements that can be extrapolated from the quasi-calibrated models. That is the purpose of this discussion and including Model A, Model B, and Model C. Furthermore, any statement about calibration for quasi-calibrated models is incorrect because some aspect of the models has not matched the calibration criteria. Without understanding the particle travel times and water budget components and the full sweep of metrics, no statement about calibration can be determined.
6	6.63	Tom Myers	HGG does not provide additional water budget data for Model A or C, so it is not possible to assess those based on water budget. However, the water budget presented in Table 12 for the Wells Formation as simulated by the Agency Model and Alternate Model attempts to justify the Alternative Model based on more flow to the springs (Hoopes and South Fork Sage Spring totaling from 10 to 15 cfs). Both models simulate upwelling from the Absaroka Allochthon across the fault, but amounts that are less than the leakage. Spring discharge from the Absaroka	Please see Comment Response 6.62 and refer to Section 5.1 of the modeling report to address the comment regarding the quasi-calibrated models that are included to illustrate that residuals cannot be relied on solely for making a determination of calibration. It is standard modeling procedure to use drains to simulate spring discharge in hydrologic units from which they discharge.

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			Allochthon is 6.0 and 8.4 cfs for the Agency and Alternate models, respectively, amounts that are more than half the total simulated discharge. This is done by simulating a DRAIN boundary in layer 5 to provide a pathway to the spring. Without more conceptual justification, this is simply inappropriate. Extra flow from the Absaroka Allochthon into the spring is clean and dilutes contaminants from the project reaching the spring. It leads to an underestimate of Se concentration coming from the project.	
6	6.64	Tom Myers	HGG presents a method to calibrate the model for upwelling flow, but fails to use it. After consideration of the radiogenic isotope results, it is apparent that the water in the Wells Formation is a combination of systems. The Wells Formation consists primarily of young water that is recharge locally, but also has a connection with older water, which is evidenced in the ages of the water collected at Hoopes Springs and ES-MW7. The older component of groundwater flow is likely influenced by the contribution of upwelling waters from the Absaroka Allochthon. (HGG 2018, p 89) HGG has mixing ratios that could be used to estimate the upwelling as it affects discharges from the model domain. At steady state, the inflow equals the outflow, and outflow is discharge from the springs. The mixing ratio could help the breakdown between recharge of meteoric water and upwelling water. The upwelling water is the older water. Based on the average age and an estimate of travel time within the limestone of the Absaroka Allochthon, the source of water in the Wells formation could be determined.	The amount of upwelling water is not a major contributor to the Wells Formation water budget where impacted water is presumably migrating to Hoopes Springs. The model accurately reflects this. In regard to the comments pertaining to mixing ratios, it is important to understand that mixing ratios are ballpark tools for understanding general features of a groundwater system. It is impossible to calculate an exact value for the amount of water that originates as meteoric water and an amount that is associated with upwelling water; only approximations can be applied. Age calculates are not an exact science; they are very useful approximations, but they are often relied upon to discriminate between modern verses old or mixed-age water. Based on the age approximation, old water apparently mixes with modern recharge at the East Smoky Panel. However, age data or mixing ratios cannot be applied to derive exact values.
6	6.65	Tom Myers	HGG presents a water budget for each model that uses a large proportion of upwelling water and notes that previous modeling had failed to balance the budget because they did not consider upwelling water. I discuss the water budget in the Conceptual Flow Model section below and show that other factors could make up the missing water. The anomalous water levels at the industrial well discussed above could also explain the source of additional water. One explanation for the high-water levels was leakage through the Phosphoria Formation. HGG's groundwater budget does not consider leakage through the Phosphoria but only considers that into Wells formation outcrops. Broader leakage through the Phosphoria could provide some of the needed water.	The old water detected from on-site monitoring cannot be accounted for only through young recharge infiltrating from overlying aquifers that contain high tritium contents. Leakage from the Phosphoria was considered in calibration. There is a level of leakage that is permissible until water levels could no longer be maintained at the elevation indicated in the observed wells. The anomalous water levels at the industrial well cannot account for the source of the additional water because the model needs to account for old water that mixes with modern recharge and the source of water speculated in the reviewer's comment is modern water. Furthermore, if there was a strong source of water emanating from the immediate vicinity of the Industrial Well, this trend would be apparent in nearby wells which it is not.
6	6.66	Tom Myers	The calibrated water surface shows why contaminants do not reach SFSCS (HGG 2018, Figures 41 and 42). Groundwater contours converge at Hoopes Spring so that the gradient south of the Hoopes Spring is from the south to the north. Groundwater reaching SFSCS is from the south edge of the model domain, either distributed reach not captured by Hoopes Spring or recharge from South Fork Sage Creek. This violates the observed Se concentrations at SFSCS discussed above. If the flow model does not allow flow to reach the spring, contaminant cannot reach there either, but that violates the observed concentrations. HGG should reconceptualize its model to assure that contaminants reach both springs.	The contamination observed at SFSCS does not have to flow from sources north of Hoopes Springs. There are large pit backfills and external overburden fills related to Panel D and Panel E that are likely the source of contamination at SFSCS.
6	6.67	Tom Myers	HGG should determine and map a capture zone for each spring. This would show the simulated contaminant/recharge sources for each spring; it would help to verify whether the conceptual model for the springs coded into the model is accurate.	The groundwater contours shown in Figures 41 and 42 in the groundwater modeling report show the effect that discharge at Hoopes Spring has on the water table surface. Also note that the spring discharge for SFSCS (LSS in Table 12 of the groundwater modeling report) is only about 14% of the total spring discharge in the model, the rest being Hoopes Spring (HSS). With the relatively flat overall gradients on the Wells Formation aquifer water table, and the discharge at Hoopes Spring that is more than six times that of SFSCS, it is logical that the discharge at Hoopes Spring captures all the selenium contamination from the East Smoky Panel.

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6	6.68	Tom Myers	The model also simulates a high point in the Wells Formation groundwater table just north of Pole Canyon, as seen by the minor groundwater ridge just north of the canyon shown in FGG (2018) Figures 41 and 42. This groundwater ridge is defined by just one or two feet, but exerts a significant control over the results of this model. Being situated just north of Pole Canyon, the groundwater ridge would prevent most groundwater recharging in the proposed East Smoky Canyon project from flowing south, or require it to do so by following a convoluted path. Flow north of Pole Canyon is mostly toward the Culinary Well, but only at a very low gradient (lower gradient in the Agency Model (HGG (2018) Figure 41) than the Alternative Model (HGG (2018) Figure 42)). HGG noted that previous investigations that had been completed to characterize the subsurface due to the historic contamination for the site had included “local elements of the hydraulic flow system” (p 46). HGG does not specify what those local elements are, but claims the model “was not designed to simulate such local elements of the hydraulic flow system, including variations in specific fracture intervals” (Id.). Continuing, “[i]t is impractical and not useful to determine and try to apply the local elements everywhere in the model” (Id.). When it comes to flow and transport from specific springs such as Hoopes Spring and SFSCS, local elements control. By not specifically simulating the specific pathways for these springs, HGG forfeits significant control on the flow (Myers)	HGG clearly states on page 46 of the groundwater modeling report those local elements refer to discrete fracture intervals. It is impractical and incorrect to try and represent fracture intervals in a numerical model where data does not exist because misrepresenting those high permeability zones will create a bias in the model that supersedes any benefit of inclusion. It is standard practice to exclude fractures in regional fate and transport modeling because of the extreme bias associated with those inputs.
6	6.69	Tom Myers	Contaminants were added to the system as recharge flux in the computer code MT3D-USGS. Percolation was applied at three different rates – 2, 7, and 15 inches per year. Percolation leaches Se from the backfill with time, which is represented as pore volumes in this modeling. Each test column is leached with up to four pore volumes of water and the leachate is sampled and tested. For simulating leaching at the mine panels, the chemistry observed for a pore volume from the test column is assumed to equal the chemistry that would leach from a pore volume of backfill. Concentrations as applied to the model were based on geochemical tests of four different materials present in the backfill, as shown in HGG (2018) Table 13. Concentrations applied to model assume a perfect mixing of materials by weight in the backfill (DEIS, p 4-22). In other words, if the amount of material removed is 20% Rex chert, that percent is assumed to apply throughout the backfill. This explains why Se concentrations for the RPS is less than for the Proposed Action – the proportion of seleniferous rock would supposedly be less than for the Proposed Action. Such perfect blending is very unlikely to occur because the make-up of the waste depends on where in the pit the mining is occurring. It is therefore very likely that some portions of the backfill will have much higher amounts of seleniferous material than others and that the actual concentration will vary. The DEIS should incorporate a monitoring and management plan to assure that various lithologies are both tested for Se content and for the volume of material being mixed.	The content of the pit backfills will be heterogeneous at relatively small scales but taken as a whole it is reasonable to utilize a weighted average blend of lithologies for the impact analysis of the entire pit backfill volume. As described in the geochemistry baseline report for the Project, great care was taken to sample and test the proposed pit backfill materials in a representative manner. Because of the diligence taken to sample and characterize the overburden materials, and the fact that the selenium content of the mixture is the lowest seen to date in the phosphate district, the BLM does not see a valid reason to engage in monitoring future rock chemistry during mining.
6	6.70	Tom Myers	A second problem is the assumption that preferential flow allows percolation to leach from just 15% of the backfill at the field scale (DEIS, p 4-20). This means that the simulations use first pore volume concentrations for just 15% of the time that would occur if the percolation contacted all backfill. Neither the DEIS nor HGG (2018) provides a reference or data to support this assumption. Preferential flow would occur, but the amount of material not contacted would probably vary based on percolation rate, with the higher rates contacting more backfill.	The comment does not doubt the concept that preferential flow occurs within pit backfills, or the value of 15% that was used in the East Smoky Panel analysis. The literature shows that multiple studies of unsaturated fluid flow through rock fills have been done with the results ranging from 5 to 20 percent (Morin and Hutt 1994 and El Boushi 1975). As used in the groundwater impact analyses in the Idaho phosphate district, the percentage of rock wetted by preferential flow does not affect the amount of contaminant predicted to be released. It only affects how fast that contamination would be released, (duration of each pore volume) with larger percentages resulting in longer PV durations and smaller percentages resulting in shorter PV durations. The Agencies have standardized the percentage used in southeastern Idaho at 15% for a number of projects, including the East Smoky Panel. References: Morin, K.A. and Hutt, N.M., 1994, An Empirical Technique for Predicting the Chemistry of Water Seeping from Mine rock Piles: International Land Reclamation and Mine Drainage Conference and Third International Conference on the Abatement of Acidic Mine Drainage: Mine Drainage, Pittsburg, PA, April 24-29, 1994, v.1 p. 12-19 El Boushi, I.M., 1975, Amount of Water Needed to Initiate Flow in Rubbly Rock Particles: Journal of Hydrology, v.27, p. 275-284.

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6	6.71	Tom Myers	Preferential flow suggests another problem. If the percolation is through a small percent of the backfill, the effective rate upon reaching the Wells is much higher at the points the preferential pathway hits the Wells. If 15% is accurate, the percolation rate for the 15 in/y simulation is 15/0.15, or 100 in/yr over 15% of the recharge zone. This could have huge ramifications for the predicted transport if the DEIS preferential flow estimate is correct. If the DEIS preferential flow estimate is not correct, the pore 1 concentrations must be used in simulations for a much longer period, up to 35/.15 or up to 233 years if the percolation spreads evenly over the entire backfill.	The preferential flow adjustment of 15% is not intended to say that only 15% of the basal footprint of the pit backfill will transmit percolating water. It is only intended to help scale application of the column results to the field scale over time in a meaningful way. There is abundant literature indicating that 100% of a large rock fill cannot be expected to be wetted from infiltrating precipitation. If one must assume that there is great uncertainty as to which portions of the backfill will actually transmit percolation you must consider the entire footprint of the pit backfill could contribute seepage to the underlying aquifer. This is what was assumed for the East Smoky Panel modeling.
6	6.72	Tom Myers	The RPS will have less of a cover because there is supposedly less Se to leach so the percolation will be closer to 15 in/y. The DEIS acknowledges that the RPS alternative will only work if the steeper pit walls are stable; if not, the RPS alternative could result in the same amount of seleniferous waste but with more percolation than the Proposed Action. The supposedly environmentally preferable alternative, based on lower Se loading to groundwater, could turn out to have a much higher short-term loading. Higher because the percolation rate would be almost twice that of the Proposed Action but with concentration close to that of the Proposed Action. It would be shorter term because the higher percolation rate would leach a pore volume quicker (within 35 years for 15 in/y or 74 years for the 7 in/y percolation). The DEIS should present a third leaching scenario with high Se concentrations and high percolation rates. This would be the critical scenario and the DEIS should propose mitigation for it.	The third scenario recommended by the commenter was included in the groundwater modeling report (see Section 8.2.3 for the selenium results). The selenium concentration at Hoopes Spring for this simulation was less than 0.001 mg/L for the entire simulation, which is the same result for the Proposed Action and Alternative 1.
6	6.73	Tom Myers	HGG used stochastic analysis to test the effects of varying transport and transient flow parameters (HGG 2018, p 112), including storage, longitudinal dispersivity, ratio of horizontal to longitudinal dispersivity, and the ratio of vertical to longitudinal dispersivity (HGG 2018, p 113). HGG did not vary hydraulic conductivity. HGG found the results were most sensitive to longitudinal dispersivity (HGG 2018, p 115), which is not surprising because horizontal and vertical dispersivity also vary as a function of longitudinal dispersivity, causing much more actual variation than varying the ratios. High longitudinal dispersivity resulted in dispersed plumes and lower concentration and lower longitudinal dispersivity resulted in smaller, less dispersed plumes with higher values. HGG considered a range of longitudinal dispersivity from 1 to 500, three orders of magnitude, without any discussion as to why these values were chosen. In modeling, dispersivity is usually a function of the model scale, meaning cell size, but HGG did not present any discussion regarding the choice.	Hydraulic conductivity was tested and varied extensively during calibration and the findings are documented in Section 5 of the modeling report. HGG has documented the results of modifying hydraulic conductivity and the impacts to the flow system. There is an infinite number of combinations of hydraulic properties that will satisfy calibration. Methods of estimating longitudinal dispersivity have been developed by the EPA and relate to the estimated length of a plume ("1/10" plume length (straight line) and the Xu and Eckstein formula (curve)). https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/longdisp.html Applying a low dispersivity results in impacted groundwater remaining isolated to the immediate vicinity of the pit. Previous studies in the Phosphate District apply dispersivity values that range from 1-10 feet. Increasing dispersivity three orders of magnitude errors on the conservative side for the mine. However, a dispersivity value of 500 feet is well within the range of reasonable measurements. A dispersivity of 500 feet assumes that the plume is approximately 5,000 feet in length. The distance between Pole Canyon and Hoopes Springs is greater than 12,000 feet.
6	6.74	Tom Myers	HGG recognizes that layer thickness affects the dispersion of contaminant plumes with more dispersion and lower concentrations in models with a thick saturated layer (HGG 2018, p 117). HGG tested the effect by using two saturated thickness in the upper Wells Formation layer. One test used 200 feet and the other test used 800 to 1000 feet of saturated thickness near the East Smoky Panel. This clearly varies from thickness used for flow model calibration and discussed above. HGG made other changes such as which layer the wells pump from based on the saturated thickness (HGG 2018, p 118). HGG claims that varying the saturated thickness did not significantly impact the flow field because “the hydraulic properties of each of the modeled layers in the Upper Wells Formation are the same” (HGG 2018, p 117). This is not correct because transmissivity equals the product of saturated thickness and hydraulic conductivity. Hydraulic conductivity was not varied, so transmissivity would have been five times higher for the scenario with a thicker layer.	HGG investigated the impacts GW-IW pumping has on the flow field beneath the East Smoky Panel when pumping is distributed in multiple layers verses only the top layer. GW-IW does impact flow beneath the pit backfill slightly; however, during the particle tracking timeframe for the first 12 years the particles do not appear to migrate significant distances toward GW-IW. This is important when one recalls that the largest contribution of selenium to the groundwater occurs during the timeframe of the first pore volume in the modeling. For the Proposed Action this period is 74 years and 35 years for Alternative 1. Overall, decreasing in the pumping of GW-IW in one layer results in less migration to the west and only slightly greater migration to the south.

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6	6.75	Tom Myers	The stochastic analysis consisted of half of the runs being completed for each saturated thickness, with the other variables listed above being varied for each simulation. The results presented as representative were the one-sided 95% confidence levels. This means that the 95% margin of error for each time step determined from the entire suite of simulations was determined and added to the mean. The implication is that this is very conservative because it accounts for the full range of possible values. This is a misleading assumption due to the range of impossible conceptual models used for the simulation. The large saturated thickness considered herein is an impossible conceptual model, for which half of the simulations were run.	There are no impossible scenarios included in the groundwater model. Please see Comment Response 6.17 for the comment on saturated thickness and to Comment Response 6.76 on the range of possible values.
6	6.76	Tom Myers	For the Proposed Action and 7 in/y recharge, the discharge at Hoopes Spring reaches 0.001 mg/l at 70 years and remains near that level for the remainder of the 300-year simulation (Figure 8). There is not much difference for the RPS. The low simulated Se concentrations at Hoopes Spring result from the numerous biases built into the model and documented throughout this review.	The stochastic approach to modeling the groundwater impacts was selected to incorporate the uncertainties of variables typically related to groundwater modeling without having to make singular selections of these variables, as is typically done with deterministic groundwater models. One can always argue about the "correctness" in the range of variables included in stochastic models but there is no doubt that the stochastic approach reduces bias in selection of model inputs.
6	6.77	Tom Myers	The differences among scenarios are mostly due to timing of load and do not indicate scenarios for which substantial areas would be impacted in one but not the other. The differences reflect biases input to the modeling due to the model structure and due to the method used to input the load to the model. These have been discussed above, but are both the thickness of the simulated Wells Formation and the addition of upwelling water from the Absaroka Allochthon. Contaminants reaching the Wells are immediately dispersed through at least 200 feet of saturated aquifer and vertical dispersion continues to disperse them into layer 4; both factors help to minimize the concentration. Second, upwelling water at the fault would prevent flow away from the source as well as diluting the flow.	See Comment Responses 6.17 and 6.29.
6	6.78	Tom Myers	The method of adding the Se to the model also diminished the effect of the contaminants. As noted above, the method assumed perfect mixing and does not simulate slugs of higher concentrations. Whetstone (2018) found that concentrations were much higher during the first half cycle, so rather than blending concentrations across an entire pore volume, which enters the groundwater for up to 75 years, a shorter-term significantly higher concentration load could have more impact. HGG could have tested this as part of the stochastic simulation (they simulated two different saturated thicknesses for the upper Wells formation, layer, so it would not be difficult to add an additional stress to the mass loading).	The groundwater modeling of proposed mines in the Idaho phosphate district have utilized smooth curves of decreasing concentration and step functions as was used in the East Smoky Panel EIS. Regardless of the method used to discretize the source term, the exact same mass of contaminant is released per pore volume. It is the total mass of contaminant added to the groundwater over time that creates the modeled contaminant plumes. It is true that dividing the concentration of PV1 into multiple steps, or a smooth curve, would release more mass of contaminant in the first half of the PV than a single concentration over the entire PV. On the other hand, the single average concentration for the entire PV maintains an artificially high concentration over the latter half of the PV. With flat groundwater gradients as occur in the East Smoky Panel area, the accuracy of the impact prediction is not significantly affected as the highest concentration impacts remain directly under the pit backfill for the entirety of PV1.
6	6.79	Tom Myers	HGG (2016) proposed that groundwater flows from the Absaroka Allochthon, which lies beneath the Wells formation, upward into the Wells formation to offset a perceived water balance deficit in which the estimated recharge does not balance the flow at Hoopes Spring. HGG (2016) and Mayo (2016) present several arguments to support the idea of upwelling flow, but neither of the arguments stands up to detailed consideration. First, HGG and Mayo claim that recharge into the Wells formation cannot provide the Hoopes Springs discharge. HGG Table 4 notes that recharge is just 1.93 cfs while the outflow is 7.8 cfs for a difference of 5.9 cfs which must be made up. The outflow estimate is not correct because HGG includes pumping from the Industrial Well in the discharge (HGG 2016, p 22). Pumping does not affect natural recharge in Wells formation outcrops west of the mine because it does not draw water from the surface into the groundwater. Average annual recharge is a steady state flux into the system and is independent from the pumping. Pumping draws from groundwater storage and eventually intercepts water that discharges from the aquifer. If the drawdown lowers the water table at a point where a stream flows across an outcrop and there is a hydraulic connection, pumping could increase recharge, but that is not the case here.	Wells Formation water and Hoopes Spring have age that suggest an old component of groundwater is used to satisfy the budget. This cannot come from young water. The reviewer's comment that the groundwater budget is made up is incorrect, the groundwater budget is an interpretation that matches calibration. Extraction from wells is always included as an outflow component in groundwater models; this is standard practice. Using average recharge is also standard practice for predictive modeling and for calibration because exact values of recharge are impossible to derive unless the domain is a closed system and extraction is very closely monitored. The groundwater domain beneath the East Smoky Panel is not a closed system. Regardless of the method used to apply recharge, there must be an old component of water used to supply the water to Hoopes Springs. HGG used hard science, good geology, and extensive datasets to identify the source of the old water. Consulting reports from the Town of Afton and the flux from Periodic Spring support this theory. There is no way to account for old water using only young recharge.
6	6.80	Tom Myers	HGG estimates recharge incorrectly, using an unverified method that did not undergo peer review as would occur for a journal. The recharge estimate was based on the Buck Mayo recharge coefficient method with coefficients specified in HGG Table 31. The method was developed in a consultant's report (Buck and Mayo 2004) that had been prepared for an earlier phosphate mine in the area. The method has not undergone peer review other than internal review by the agencies and has never been verified by actually showing that it predicts the amount of groundwater	This method has been applied in multiple EIS's and has been accepted by peers.

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			discharging from an area. HGG justifies using the model by claiming it "has been used in the past at the Smoky Canyon Mine and elsewhere in the Idaho Phosphate District" (HGG 2016, p 18). Simple use of the method is not verification that it is accurate.	
6	6.81	Tom Myers	The Buck Mayo recharge model probably yields incorrect estimates for two reasons. First, the model does not consider geology; application of the method requires that percolation enter the groundwater at the specified percentage at the point it falls regardless of whether the ground surface is porous carbonate rock (the Wells formation), impervious granite, or sand. The map of recharge based on the Buck Mayo model in the groundwater flow model (HGG 2018) shows that this is how the model is used.	The reviewer's statement that the Buck/Mayo coefficients probably yield incorrect estimates is based on bad assumptions that are incorrect. The Buck/Mayo coefficients were designed specifically for the environment at the Smoky Canyon Mine and do take into account geology. Furthermore, the numerical model applies recharge along outcrops and takes into account geology and hydraulic properties as well. The map of recharge in the groundwater flow model shows the entire distribution across multiple outcrops and applied across multiple layers in the model. See Comment Response 6.48.
6	6.82	Tom Myers	Second, methods such as this can be used only with the same set of precipitation estimates used to develop the method. The method is similar to the often-used Maxey-Eakin method which also estimates recharge based on coefficients for different precipitation amounts in the Great Basin (Maxey and Eakin 1949). A difference is the M-E method was developed to estimate recharge for entire groundwater basins. The recharge coefficients are tantamount to regression coefficients that are multiplied by the amount of average precipitation for a given precipitation depth zone. The method only applies for the original 1936 precipitation map used to develop it and the coefficients must be adjusted if a different precipitation estimate is used. The method is only accurate at a basin scale if the ratio of pervious and impervious surface geology is similar to that in the basins used to derive the method. Also, the recharge within a basin includes mountain-front recharge resulting from runoff from impervious areas recharging downslope. The method cannot be used to estimate a recharge distribution around a basin, and neither can the Buck Mayo method.	Mountain-front recharge resulting from runoff from impervious surfaces is typically simulated as a flux boundary condition in groundwater flow models if that recharge occurs outside of the domain and is flowing into the domain. Overland recharge takes into account precipitation and applies some mechanism for estimating the contribution of water that flows downward and enters the groundwater flow system. Recharge calculations are always ballpark estimates, which provides flexibility in the model design to evaluate multiple interpretations. The Buck/Mayo method was designed specifically for the vicinity of the Smoky Canyon Mine.
6	6.83	Tom Myers	The appropriate way to estimate recharge to an area is to determine groundwater discharge from the area; the discharge must equal recharge. In a peer-reviewed journal article, Myers (2013) estimated recharge around the Blackfoot watershed by calibrating a model so that recharge to the watershed equaled the sum of the discharge from all springs and streams in the area. Recharge for the East Smoky Canyon Panel should be estimated the same way.	HGG followed a similar method of calculating the sum of springs discharging from the Wells Formation. That is how the deficit was identified. There is more than sufficient water to satisfy the budget from water entering the outcrops to the northeast. However, there is not sufficient water to satisfy the budget relying on infiltrating along the outcrops near the East Smoky Panel, nor does it account for the age of the water.
6	6.84	Tom Myers	HGG (2016) overestimates the amount of Hoopes Springs flows discharge from the Wells Formation. Throughout the DEIS and associated documents, the springs are a "complex", meaning there is more than one discharge point. Also, there are various reported flow rates which suggests there are multiple sources. Mayo (2016) showed that Hoopes Spring is a mixture of old and young water. Some water would likely be from a conduit connection deep into the Wells formation. Some would be a more dispersed Wells Formation flow that enters the fault damage zone to flow to the spring. Both of these sources would be relatively constant and not show as much seasonal variation as is shown in the DEIS documents. A third source is likely the alluvial water. This would be a younger source than each of the Wells Formation sources and would cause the observed variability. If there is alluvial water in Hoopes Spring, it is inappropriate to use measured discharges from it in a water balance for the Wells Formation without accounting for the proportion from the alluvium.	All sources of water were accounted for. Please review the budgets provided in Section 5 of the modeling report in Table 12 that show the proportion of water accounted for from the alluvium.
6	6.85	Tom Myers	Third, HGG (2016) and Mayo (2016) postulate that the additional water could be upwelling water from the underlying Absaroka Allochthon. Water that discharges here would have recharged east of Afton in the Salt River Range. The authors present this without describing a mechanism. They present no reason that groundwater in this deep formation would enter the Wells Formation at a pathway that eventually discharges to Hoopes Spring. The Wells groundwater table is very flat at this point, so there is not a substantial gradient difference that would drive flow to Hoopes Spring. If the water entered the Wells Formation over a larger area than a specific pathway as it should be based on observed water levels, there would be a mix of water as well in other Wells Formations wells.	Only a small fraction of the additional water is attributed to upwelling water, which is consistent with only a small fraction of the wells exhibiting old water. There is a strong body of data that supports water moving west, east of the East Smoky Panel. Please refer to previous comments and the discussion in the modeling report provided in Sections 5.1 and 5.6.

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6	6.86	Tom Myers	Fourth, flow through underlying Absaroka Allochthon to Hoopes Spring would take too long to reach the spring. Mayo estimated the age of Hoopes Spring Water to be about 1500 years (Mayo 2016, p 15) which if correct and if the travel time range from the Salt River Range is accurate implies that only a small portion of Absaroka Allochthon water mixes with younger water to yield the estimated age of 1500 year. As noted, HGG postulates that the recharge source for Absaroka Allochthon is high in the Salt River Range near the Absaroka thrust fault (HGG 2016, p 25). HGG believes the water entering this zone flows regionally downdip in a west direction within Paleozoic limestone (Id.). A spring named Periodic Spring provides water for the City of Afton. The spring flows at 44 cfs at elevation 7167 approximately 500 feet higher than Wells Formation water levels near the East Smoky panel. Scaling from HGG Figure 21, the West Sage Valley Fault is about 50,000 feet west of this spring. The actual travel distance would be much longer because of the dip and likely torturous flow path of the fractures. Based on a minimal travel distance of 50,000 feet, the gradient is about 0.01. Assuming the conductivity ranges from 1 to 5 ft/d, as calibrated (HGG 2018), the Darcian flow travel time for the simple straightline pathway ranges from 2700 to 13,700 years. For an average age of 1500 years, only a small amount of this water would be required to mix with much younger water. Considering the flat gradient in the Wells formation, it seems more likely that the mixing of water is short range flow along the fault damage zone and older water emanating from the Wells Formation after residing within in for millennia explains the observed age at Hoopes Spring. Two wells that have older water, based on isotopes, ES-MW8 and -MW7, are north of Pole Canyon in an area of very slow flow. No wells near Hoopes Springs have mixed water as discharges from that spring. There is at least 2000 feet beneath the top of the Wells formation and the completion intervals for ES-MW8 and ES-MW7. It is unlikely a pathway exists that would mix old water from Absaroka Allochthon into the Wells formation at the level and location of these wells.	The Wells Formation does not receive sufficient recharge to supply sufficient water to satisfy Hoopes Springs discharge. The age of the spring is a mix of old and young water. Only a small fraction of upwelling water enters west of the West Sage Valley Branch fault. It is not unlikely that deep water mixes with water in the Wells Formation. There has to be an old component of water that enters the Wells Formation and several studies document flow west from Afton. See Comment Response 6.64 that addresses how ages and mixing ratios cannot be used for discrete calculations. However, the comment does contend that an old component of groundwater contributes to the Wells Formation beneath East Smoky and HGG agrees.
7	7.1	Y2U & KP	We are concerned about the loss of integrity of the Regionally Significant Wildlife Corridor (Corridor) that connects the Greater Yellowstone Ecosystem and Northern Rockies to the Uinta Wilderness and Southern Rockies.	Comment noted.
7	7.2	Y2U & KP	Our review of the DEIS reveals violations of the intent of NEPA, NFMA and the CWA. NEPA considerations include failures to take a Hard Look, evaluate Cumulative Effects or provide Reasonable Alternatives.	The Agencies do not believe that any violations of the intent of NEPA, NFMA, and the CWA occur in the DEIS. The Agencies also believe that the DEIS did comply with required NEPA considerations and took a hard look, evaluate cumulative effects, and provide reasonable alternatives.
7	7.3	Y2U & KP	NFMA failures include inadequate evaluation of population trends for threatened and endangered species, special status species, migratory birds and preserving the productivity of the land with sustainability.	Baseline information (taken from consultation with USFS biologists, onsite surveys, and other pertinent data) is included in the EIS and wildlife baseline report. Potential impacts are also discussed in terms of short-term vs long-term and cumulative.
7	7.4	Y2U & KP	CWA violations of surface and groundwater standards are brushed off with the excuse that the Smoky Canyon Mine is a Superfund Site and these exceedances will be addressed under CERCLA. Yet, not all CWA issues are CERCLA related, such as sedimentation of streams, destruction of streams, springs, riparian and wetland habitats, and stream dewatering by livestock grazing and diversions.	The comment mischaracterizes the statement in the DEIS regarding CERCLA and water quality standards. The impact assessment addresses, as it should, the potential effects of the East Smoky Panel Project Proposed Action and alternatives. Those do not show exceedances to surface water quality standards. Further, see subsections titled "*Streamflow Alterations*", "*Baseflow Reductions*", "*Sediment and TSS in Runoff*", and "*Water Rights and Water Uses*" in Section 4.5.2.1 of the DEIS, as well as the subsection titled "*Wetlands and Riparian Areas*" in Section 4.7.2.1 of the DEIS. Note that livestock grazing is not part of the Project, and thus is not included in the EIS for impact assessment relevant to the CWA.
7	7.5	Y2U & KP	It is especially troubling that Smoky Canyon and other mines are being approved in an area deemed a Superfund Site subject to Natural Resource Damages from past and/or ongoing mining pollution. Even more troubling is the minimal economic benefit. For example, Caribou County economic statistics claim 7% of employment related to the mining of phosphate. While this region only produces 15% of the phosphate rock in the US with Florida and North Carolina producing 85%. There is no evaluation of the value of the National Forest to present and future generations for its inherent benefits of water supply, fish and wildlife and recreation. The American People are left with a permanent burden of water pollution, degraded water supplies, lost fish and wildlife habitat and reduced or eliminated species. These costs are externalized and	The purpose of this EIS is to evaluate the potential effects of the East Smoky Panel Project Proposed Action and alternatives. The EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. Further, the socioeconomic benefit in the EIS was done in an appropriate, reasonable, and objective measure and that the potential effects were adequately examined. Reclamation planning and implementation will require agency approvals and documentation of success. Bonding will ensure that the public and government do not have to pay for future cleanup and reclamation. The Agencies acknowledge that these other resources, including forests, watersheds, water supplies, fish, and wildlife populations provide a socioeconomic benefit when present. In most cases, these would be restored after full reclamation

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			only a model of supposed values of the directly disturbed areas is provided. But that is offset by claimed benefits of the reclamation which will not restore what is lost.	occurs. Some text has been added to Section 3.14 to acknowledge that these other resources have value. Their economic value is difficult to quantify but not thought to be significant.
7	7.6	Y2U & KP	Mitigation for this mine expansion is paltry at best. Paying minimal dollars under the presumed Habitat Equivalency Analysis (HEA) for unspecified mitigation does not address the site-specific nature of the effects, many of which are permanent, such as loss of attributes such as productive topsoil that evolved over thousands of years, native plant communities and forests and altered watersheds, springs and streams. Nor does it address the regional cumulative impacts to habitat and Corridor integrity from the phosphate mining industry and associated activities.	Comment noted. However, HEA is not used for mitigation any longer, due to recent IMs from the DOI (see Section 1.5.3). It is only used to help quantify impacts to wildlife habitat. In addition, the Project's design features, BMPs, and EPMs also are part of the Project that would be implemented to help avoid and/or minimize impacts. Cumulative impacts are addressed in Chapter 5.
7	7.7	Y2U & KP	The DEIS disclaims impacts to wildlife or corridor integrity by setting up a straw man then using that as a basis for its conclusions of negligible impact. The DEIS is merely a document directed at supporting an action already planned. This straw man is essentially restated as saying that even though habitat will be destroyed, degraded and animals killed, there is habitat elsewhere and populations will remain unharmed. But, the DEIS does nothing to quantify this other habitat and its capability and suitability to function as a corridor or to support populations of fish and wildlife, or for that matter, what the population trends might be.	Comment noted. Impacts to wildlife and their habitat have been adequately addressed for the Project. Furthermore, this EIS is not a Land Use Plan, but rather, is tiered to the appropriate Land Use Plans.
7	7.8	Y2U & KP	Baseline data from already disturbed areas is used to evaluate impacts and there is no comparison to data acquired prior to the initiating of mining at Smoky Canyon. Specific examples will be pointed out later, but raptors provide an example. The Study Area for raptors is adjacent to the existing mine and contains documented inactive raptor nests. But this is an area already disturbed by noise and activity at the ongoing mining operation. Where is the analysis of today versus data collected pre-mining? The same could be said of water quality. Where is the historical water quality baseline?	As per NEPA, the affected environment is meant to describe the conditions of the environment prior to the initiation of the proposed action or alternatives. Since the Proposed Action as described in Chapter 2 of the EIS takes place after the previous mining in the area, it is considered a part of the affected environment baseline. Previous studies and surveys are used as a "starting point" for the analysis. Analysis of the Proposed Action in conjunction with other past, present, or reasonably foreseeable future actions is described in Chapter 5. Past surveys are described in the Wildlife Baseline survey report (Stantec 2016e). Historical baseline is also referenced in the cumulative impact analysis in Chapter 5 as it includes the impacts from past actions. Reference Stantec. 2016e. Wildlife Resources Technical Report. Smoky Canyon Mine, East Smoky Panel Mine EIS. June.
7	7.9	Y2U & KP	Regionally Significant Wildlife Corridor - Circa 2000, the Wasatch Cache National Forest produced the map shown in Figure 1 representing the Corridor. The Forest Service should provide a map and analysis of the Corridor addressing habitat fragmentation and the presence of core, corridor, Lynx Analysis Units (including the LAUs proposed, but omitted from the RFP for the 2003 RFP and an analysis of their condition then and current conditions), Roadless Areas, Wilderness Areas, NRAs, areas closed to livestock grazing, security areas, and Goshawk home ranges. Then provide an alternative that proposes road closures to attain a scientifically defensible density per square mile, grazing allotment closures, fence removals, and setting noise limits on vehicles.	Wildlife use of corridors has been addressed on pages D-4 through D-9 of the Revised Forest Plan and this EIS tiers to that analysis and as such is incorporated by reference into this EIS as applicable. It should also be noted that the Revised Forest Plan does not limit OMRDs in areas designated for phosphate mining. After a site-specific, phosphate mine development plan is submitted to the USFS, the area of the specific mine plan is intended to be managed under prescription 8.2.2, Phosphate Mine Areas. However, it does state that road construction should be minimized.
7	7.10	Y2U & KP	Winter use should be closed or severely limited in the CEA and Corridor so that lynx, wolverine and other far-ranging species (elk, deer) have an opportunity to migrate and have security cover during all seasons.	Consideration of closures in the CEA and corridor is not appropriate or relevant to the analysis needed in this EIS. Seasonal travel on the CNF and within the CEA is managed in accordance with the 2005 Travel Plan and would not change as a result of any of the alternatives analyzed.
7	7.11	Y2U & KP	The Forest Service can use its Prohibition Authority (36 CFR 261) to regulate noise and other activities detrimental to wildlife such as hunting, trapping or harassing wildlife.	Comment noted.
7	7.12	Y2U & KP	This NEPA analysis should take a hard look at the mapped area for lynx linkage and conduct the analysis suggested [*in the FEIS for the 2003 Caribou National Forest Revised Forest Plan*.] The mining industry is responsible for significant fragmentation in these areas as is the CNF with its road densities (OMRD plus all the illegal, closed or temporary roads and trails). That Map 1 also shows two areas where the linkages cross highways 30 and 34. The recent Crow Creek Pipeline DEIS also described US 89 in Wyoming as a significant barrier. Mitigation is needed for these places.	Lynx were adequately analyzed for this Project. The FEIS notes that impacts to lynx are expected to be negligible (FEIS Section 4.8.2.1).

ID No.	Co ID No.	Name/ Entity	Comment	Comment Response
7	7.13	Y2U & KP	The DEIS (p3-23) notes the affected environment for noise impacts is limited to 2640 feet from the source for wildlife and 1000 feet for residences. It uses the dBA scale to protect against human health effects which emphasizes mid- and high-frequency sounds, while noting that natural levels are 35 dBA in rural areas. Table 3.4-1 cites noise levels (dBA) from different sources but does not address atvs and dirt bikes common in the Forest, its access roads or snowmobiles, nor does it categorize blasting, mining and haul truck noise levels. The baseline study was conducted on one day at five sites for 15 minutes during the day and at night finding minimum and maximum levels of 25.9 and 66.6 dBA. This is inadequate and certainly is not a hard look.	The Study Area for noise (DEIS Figure 3.4-1) was developed with the interdisciplinary team experts for this EIS and using professional judgement. Note that it extends well beyond the stated distance limits. Noise data in the table cited by the comment (Table 3.4-1) included a range of noise sources and levels for informational purposes only and are not meant to represent exact sources present in the Study Area. Table 4.4-1 did include noise measurements at the existing Smoky Canyon Mine for the access road, blasting, mining, and haul truck traffic. The noise study methodology was approved by the Agencies prior to it being conducted. While the method of study may not be the sole method that could have been used, it is a reasonable and objective method for assessing impacts from this Project under NEPA. Further, note that Occupational Safety and Health Administration (OSHA) regulations would not be applicable to the Project but OSHA methodology was used in the data collection process for the Noise Study. A hard look was taken and an adequate impact analysis was conducted in the EIS.
7	7.14	Y2U & KP	The implication of this is that the affected environment for noise impacts limited to 2640 feet for wildlife and 1000 feet for residences is inadequate and does not provide an adequate buffer, either around the mine footprint or roads in the CEA or Corridor.	The Study Area for noise (DEIS Figure 3.4-1) was developed with the interdisciplinary team experts for this EIS and using professional judgement. Note that it extends well beyond the stated distance limits and provides for an adequate buffer for the Project.
7	7.15	Y2U & KP	We note also that use of the dBA scale likely underestimates the noise effects wildlife might suffer as it truncates the lower and higher frequency sounds. True dB levels using the dBC scale are more representative of mechanical sounds as well as providing a full range of sound levels that might affect wildlife.	Section 3.4.4 of the DEIS acknowledges that sound measurements in dBA give greater emphasis to sound at the mid- and high-frequency levels. An A weighting filter is appropriate and most commonly used for the main focus of this noise investigation – humans. Other possible weighting filters such as the dBC were not used in the noise baseline study, the previous sound measurements at the Smoky Canyon Mine, or in the readily available FHWA information used for comparisons. Further, OSHA's guidelines on workplace noise exposure are based on dBA measurements. While it is acknowledged that wildlife may be affected by noise, those effects are likely highly variable by species' sensitivities, habituations, and the type of noise as well as its duration. Further, the Project would be situated immediately adjacent to ongoing and current mining activities.
7	7.16	Y2U & KP	The closed and open roads and trails, plus illegally created and used trails must be mapped and sound contours plotted showing the distance and aerial effects on wildlife security areas and "quiet" users. How much of the CEA are protected from these sound levels?	This type of analysis is not applicable or relevant for this Project and this EIS.
7	7.17	Y2U & KP	We note also that the Winschell Dugway DEIS (p 65) notes, "*During the dry season, dust from vehicles on the trail is visible for miles*." This also impinges on the Visibility analysis here. What are the human health effects of this dust plus that from the mining aside from the visible deterioration of the naturalness of the Forest, RWA, IRA, CEA, Corridor?	The Winschell-Dugway Motorized Trail Project is located well outside of the East Smoky Panel Air Resources Study Area and well outside the East Smoky Panel CEA and has no relevance to the visibility analysis in this EIS. DEIS Section 4.3.2.1 discussed metals, selenium, and other potential pollutants in dust generated from the mining operation and concluded that environmental and potential human health effects would be insignificant. Further, other relevant constituents (e.g., criteria air pollutants such as carbon monoxide and lead) that do have human health effects when present in the air at elevated levels were discussed in DEIS Sections 3.3.1 and 3.3.2 and the Project impacts from such emissions were analyzed in DEIS Section 4.3.2.1.
7	7.18	Y2U & KP	All Forest Sensitive, Management Indicator (MIS), Special Status, Threatened and Endangered (T&E) species must be analyzed to ensure compliance with NFMA, NEPA, ESA and other applicable regulations regarding capability, suitability of habitats and viability of populations. Past timber harvest activities, roads, mining and related activities (ohv use, including closed roads and trails illegally used) must be analyzed in the context of the importance of habitat connectivity. The Winschell Dugway DEIS admitted illegal trail use on non-motorized trails and rewarded this behavior with a new trail thru an area important to wildlife. The CNF in its analysis of the Winschell Dugway defaulted to Open Motorized Road Density without providing an analysis of true road and trail density and use by atv/ohvs in the Analysis or Cumulative Effects areas. These add to OMRD and must be taken into account in the Smoky Canyon case to achieve a hard look under NEPA. In the Smoky Canyon DEIS road density was not analyzed, security areas were not analyzed, the Corridor was not analyzed.	The analysis presented in the EIS and information contained within the wildlife report contains a discussion on all federally listed species as required by the NFMA, NEPA and ESA. Federally listed species will also be subject to analysis under Section 7 of the ESA and the USFWS will be consulted. The Revised Forest Plan (USFS 2003a) allows for exceedances of the OMRDs in areas designated as Phosphate development. After a site-specific, phosphate mine development plan is submitted to the USFS, the area of the specific mine plan is intended to be managed under prescription 8.2.2, Phosphate Mine Areas. As such, OMRDs were not analyzed in detail and they are not considered to be a limiting factor for this Project. Reference: USFS. 2003a. Revised Forest Plan for the Caribou National Forest. U.S. Department of Agriculture. Idaho Falls, Idaho.

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7	7.19	Y2U & KP	The CNF RFP EIS (D-49) notes there have been 35 observations of lynx in the Caribou Targhee NF. Yet the Winschell Dugway DEIS, based on a "Streamlining meeting" with the USFWS in 2016, which came up with a No Effect determination due to lack of potential impacts to lynx and then dismissed them as an issue. Similarly, this Smoky Canyon DEIS dismissed impacts to lynx as negligible due to transient use of linkage habitat without any analysis and that they would "travel around the periphery of the Study Area rather than directly through it". (4-81). This is not a "hard look" under NEPA. As noted above, the Corridor needs to be analyzed for habitat integrity in the Caribou/Webster/Preuss Subsections and Diamond Mountain Block. This would be a detailed GIS analysis showing all fragmentation, vegetation types and their former and current status as recommended in Volume IV of the CNF FRP EIS.	The 35 lynx observations referenced on p. D-49 of the CNF RFP DEIS included all observations on both the Caribou and Targhee National Forests. A review of the most recently available lynx observation data shows 37 observations, with only 11 occurring on the Caribou portion of the Forest. The 11 observations occurred in habitats typical of the Soda Springs and Montpelier Ranger Districts (in conifer, mixed conifer, mixed conifer aspen, mountain brush, etc.) The one lynx shown as having occurred in the five-mile buffer was reported as "1950 to 1960." As stated in Chapter 3, no other sightings have been reported. The EIS for the Revised Forest Plan examined impacts to wildlife corridors and that analysis has been referenced in this EIS.
7	7.20	Y2U & KP	The DEIS (4-83) notes the primary impact of the mine to wolverine would be disruption of movement through the general area (undefined) and could influence them to travel around the periphery of the Study Area. Once again as for lynx, there was no analysis of movement corridor(s) or their potential habitat, barriers, fragmentation. The FEIS for the CNF RFP provides Map 13 (D-140) showing sighting locations, elevations > 8,000 feet, and security areas. Security areas were buffered from roads and trails by 0.5 miles, showing that these affect the security habitat. A hard look would require the areas shown in the Corridor and Map 13 in the Caribou/Webster/Preuss as well as Diamond Mountain Block have a detailed GIS analysis as described above with appropriate noise and human activity buffers, showing all past, present and foreseeable (Caldwell and Dairy Syncline, Crow Creek gas pipeline) activities, roads, trails, powerlines, pipelines, timber harvest areas.	Impacts to wolverines (and other special status species) and their habitats are described in the EIS and adequately analyzed. Large scale, cumulative impacts are also addressed and adequately analyzed in the EIS.
7	7.21	Y2U & KP	The CTNF should provide a more detailed mapping, capability and suitability analysis for wolverine habitat integrating the above information on the Corridor and current conditions (security cover, snow cover, elevation, mines, roads, timber projects and other fragmenting or habitat degrading activities) for wolverine.	Wolverine habitat within the Study Area has been described and assessed in the wildlife baseline report and in the EIS. Potential impacts to wolverines based on that habitat description and assessment are included in Chapter 4 of the EIS. Additionally, the CTNF undertook a detailed analysis of potential wolverine natal sites in order to address Objective #1 on page 3-24 of the RFP. The result of which determined that no natal denning sites exist in or near the Study Area. This information has been added to the EIS.
7	7.22	Y2U & KP	The DEIS (4-79) notes that elk summer habitat occurs throughout the Study Area, that elk winter range exists on the far western side of the Study Area, and that 17% of this area would be impacted. There is no analysis of the migration routes between summer and winter range for elk and deer for the Corridor, CEA or the Caribou/Webster/Preuss Subsections and Diamond Mountain Block. Figure 5 above shows winter range from the Forest Service GIS data obtained via FOIA, indicating the importance of connectivity for big game between summer and winter. Idaho Fish and Game does flyovers to document populations in winter that should help identify movement patterns. None of this information was presented. As referenced above, security areas were mapped in the FEIS for the CNF RFP (Map 13 pD-140). That FEIS (D-141) also noted that summer security areas were limited on most of the Forest and provided Table 94 depicting security areas by Mountain Range Block. Most are low, including the Diamond Block at 16%, well below the 30% criterion stated. (D-167). Winter security was even more limited due to only 3% of the CNF closed to winter motorized use. The Smoky Canyon/Diamond Creek north were identified as areas of concern for summer and winter habitat for elk. (D-163). We note that cow elk objectives in the Diamond Big Game Analysis Unit are not currently met[13]. A hard look would require the areas shown in the Corridor and Map 13 in the Caribou/Webster/Preuss plus the Diamond Mountain Block have a detailed GIS analysis as described above with appropriate noise and human activity buffers, showing all past, present and foreseeable (Caldwell and Dairy Syncline, Crow Creek gas pipeline) mining activities, roads, trails, powerlines, pipelines, timber harvest areas and security areas. Security areas should be compared to the recommended 30%. We further note that habitats important to deer and elk such as aspen, spruce/fir and riparian areas were described as being at high departure from PFC while most others were at moderate departure. (FEIS D-47).	As stated in Section 3.8.4.1 of the EIS, no mapped migration corridors exist within the Study Area based upon coordination with the IDFG. However, Section 4.8.2.1 of the EIS does present an analysis of how the Project may impact movement of big game. No security areas exist within the Study Area and as such are not analyzed in the EIS. Other past, present, and reasonably foreseeable future actions within the cumulative effects analysis boundary are described in Chapter 5.

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7	7.23	Y2U & KP	The DEIS recognizes certain impacts to sage grouse such as removal of habitat in the mine footprint or power line impacts. It does not discuss the impacts to nesting and brood rearing areas by livestock grazing, a well known detriment to sage grouse.	This type of analysis is not relevant or applicable for this Project and neither the Proposed Action nor Alternative 1 have a livestock grazing component. Also, as described in Section 4.8.2.1, none of these types of habitat would be affected by the Proposed Action.
7	7.24	Y2U & KP	The DEIS (4-73) also notes that the Study Area is not expected to be used by nesting or brood-rearing grouse, but small transient groups. Then it states that there are no Priority Habitat Management Areas (PHMA), Important HMA or General HMA in the vicinity of the Study Area and that no active leks are known to occur within 6.2 miles of the Study Area. Based on this rationale the DEIS concludes the Proposed Action would have negligible to minor impacts on individuals or habitat. (4-74).	Comment noted.
7	7.25	Y2U & KP	DEIS Figure 3.8-1 shows three sage grouse lek locations within a five-mile radius of the Proposed Action. These were taken from Idaho Fish and Game (IDFG) Fish and Wildlife Information System Data. They were last monitored in 2001 (one lek) and 2017 (two leks). One of the leks monitored in 2017 is shown to occur within the footprint of Tailings Pond 2. At odds with this map is Figure 3.8-3 which shows the closest GHMA and a single lek apparently monitored in 2015. The other leks shown in Figure 3.8-1 do not appear. Figure 5.7-1 shows the CEA for the Proposed Action but does not show sage grouse leks or HMAs occurring in the region affected. Table 5.7-1 summarizes vegetation types in the CEA for vegetation (Figure 5.2-1). These include 138,528 acres of sagebrush, 55,649 acres of riparian and wetland and 14,998 acres of grassland. As we noted in our comments on the Rasmussen Mine EIS, which claimed only marginal habitat existed in the area, inspection of habitat showed all the necessary components needed were present. The problem appeared to be the mining activity, haul roads, infrastructure and heavy livestock grazing everywhere except in the IDFG Blackfoot River HMA. Inspection of a map of sage grouse leks derived from IDFG location data (Figure 7) shows that leks are abandoned in the most active portion of the mining area, most leks are not monitored and some have been removed from mapping. This is a problem that allows leks and populations to blink out as they are no longer monitored, making it appear impacts are less than actual. Maybe this benefits the mining industry, but it does not benefit the sage grouse or migrant birds using the same habitats. This NEPA process has failed to take the requisite hard look. That would include mapping all the known leks and presenting the population data and trends. Because a large number of leks appear to be abandoned near mining projects, the proximity of these leks to the mines (all leks) and the declining trends in population compared to the dates of active mining initiation nearest each of the leks should be determined. Road densities and proximity to leks, grazing and the other factors known to degrade sage grouse habitats should be analyzed for the entire mining district and a determination made based on science as to why, when there are hundreds of thousands of acres of sage grouse habitat in the region, leks are being abandoned. Another element of the analysis is connectivity between populations, for example the Bear Lake Plateau population to the south or Wyoming populations to the east.	The most recent lek data has been included in the EIS which includes the best publicly available data from the Forest Service and IDFG. The IDFG database retains the locations of all known past leks, regardless of their status or if they no longer occur. In summary, none of the leks within the Study Area are considered “undetermined” as of 2018. The nearest known active lek is over 10 miles away from the Study Area.
7	7.26	Y2U & KP	In the recent Crow Creek pipeline DEIS, it was clear that the pipeline may also affect greater sage-grouse populations in Wyoming and Utah that cross into Idaho, and the pipeline’s impacts on Wyoming and Utah sage-grouse were not analyzed in that DEIS. For example, the COT Report states that Wyoming’s Star Valley/State Line subpopulation includes two Idaho leks (COT Report, 67). This DEIS for Smoky Canyon does not analyze connectivity between these SE Idaho, Wyoming and Bear Lake Plateau populations or their status.	As described in the EIS, the nearest known active and confirmed leks are located approximately 10 miles east. Additionally, there is only approximately 55 acres of potentially suitable habitat for greater sage grouse in the Study Area. Therefore, habitat connectivity is not considered an issue for this Project, nor is it applicable to analyze it in the EIS.
7	7.27	Y2U & KP	The National Technical Team Report (NTT) provides analysis and recommendations that should be included in the analysis for this project. Some of these include delineating the types and areas disturbed for leks and nesting areas from industrial development. For example, a 4-mile radius from the disturbance is recommended, while citing a Wyoming study showing impacts up to 11 miles. If one placed these buffers around the leks in SE Idaho (Figure 7), it would increase the area of analysis.	The information shown on the figure represents a display of greater sage grouse and not a lek per se. A potential lek site in that area is unconfirmed. The nearest confirmed lek is located approximately 10 miles east of the Study Area. That distance is outside the buffer distance recommended by the NTT Report.

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7	7.28	Y2U & KP	It is time the CTNF, BLM and Project Proponents began applying these [*NTT*] principles and provided the public with a comprehensive analysis and mitigation that at minimum includes the principles laid out above.	An appropriate analysis for sage grouse was conducted for the Project and is included in the EIS.
7	7.29	Y2U & KP	The DEIS (4-9) characterizes Greenhouse Gass (GHG) emissions as 45,157 tons CO2 equivalent (Table 4.2-2) plus emissions from processing plants, noting it is not possible to know the net impact on climate from the Proposed Action. What is not included is the amount of carbon storage lost as the Panel is logged and all vegetation destroyed. Nor are the decreases in soil carbon or additional releases to the atmosphere of carbon in soil accounted for.	A footnote has been added to FEIS Table 4.3-2 to acknowledge this effect. While a full accounting has not been included in the FEIS, due to uncertainties, EPA's annual *Inventory of U.S. Greenhouse Gas Emissions and Sinks* (https://www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf) was used to assess the likely consequence of forest/soil removal.
7	7.30	Y2U & KP	The DEIS (5-11) states that, "Impacts from GHGs may be countered locally by CO2 sequestration in the vegetation of the adjacent CTNF…". This points to mitigation that could include cessation of livestock grazing which would allow carbon to be stored in plants and soil, while rebuilding soils. This would also allow streams and riparian areas to recover, reducing soil loss and stream sedimentation.	Consideration of cessation of livestock grazing is not relevant or applicable for the Project and this EIS. The statement was simply a fact that needed to be mentioned and considered and not necessarily quantified in the EIS.
7	7.31	Y2U & KP	It is necessary to recognize these [*climate change, related vegetation*] connections for lynx, wolverine, sage grouse and other wildlife and provide analysis, standards, mitigations and other on-ground measures such as road crossings, overpasses, road closures, closure of areas to ohvs/snowmobiles, and limiting noise levels to enable these and other animals that rely on migration to be allowed to do so. For example, since climate change is such a central part of the wolverine's fate as evidenced in the cited court ruling and papers, the Forest Service should address its own Roadmap to address climate change. Recognizing the current and coming changes to climate with longer, drier periods and drought, the Forest Service has implemented a Roadmap to address climate change[16]. This roadmap provides guidance to the agency, including, but not limited to: • Assess vulnerability of species and ecosystems to climate change • Restore resilience • Promote carbon sequestration • Connect habitats, restore important corridors for fish and wildlife, decrease fragmentation and remove impediments to species migration. To date, we have not seen the CTNF cite or adhere to these principles in any project EA or EIS. A Hard Look would require such an analysis.	The comment lists several subjects (road crossings, overpasses, road closures, closure of areas to OHVs/snowmobiles, and limiting noise levels) for analysis that are not relevant to the Project. Inclusion of them is not relevant or applicable for this EIS. The National Roadmap for Responding to Climate Change (USDA, Forest Service, July 2010) is not policy but rather guidance meant for use in forest planning level efforts. There is no requirement that the USFS follow the National Roadmap for Responding to Climate Change in every regard relating to implementation of this Project. NEPA's hard look requirement is satisfied without these inclusions.
7	7.32	Y2U & KP	In addition, the National Fish, Wildlife and Plants Climate Adaptation Strategy proposed by the US Fish and Wildlife Service, NOAA Fisheries and the American Fish and Wildlife Association describes climate change effects and emphasizes conservation of habitats and reduction of non-climate stressors to help fish and wildlife adapt.[17] The Forest Service must address conservation of habitats and reduction of non-climate stressors such as the habitat degradation, from livestock grazing, including soil loss, stream dewatering, plant communities shifting to increasers or weeds to help fish and wildlife adapt in accordance with the National Fish, Wildlife and Plants Climate Adaptation Strategy.	The National Fish, Wildlife, and Plants Climate Adaptation Strategy is a set of guidelines and not a regulatory document. While its implementation is not needed in this EIS, the reduction of non-climate stressors a result of the Project is addressed in the environmental protection measures included in the document (see Section 2.5 of the EIS).
7	7.33	Y2U & KP	As we read EAs and EIS for project after project in the CTNF, it appears that conservation biology principles are abandoned, even those promulgated in the FEIS for its own RFP. After reviewing this DEIS and other recent issuances in the CTNF it seems that the agency and Project Proponents have the position that it doesn't matter if all special status species are wiped out in the project area because it won't lead to extinction of the species. Is it the Forest Service and other Project Proponents' belief that if lynx exist in Canada then fine, they aren't extinct, and there is no obligation either legal or moral to restore connectivity or address habitat fragmentation and habitat capability in order to provide for species such as lynx, wolverine, migrant birds, raptors, grouse? We say this due to the ongoing approval of project after project in SE Idaho while the ongoing damage from previously approved actions such as roads, livestock grazing, atv/ohv use, stream diversions continue as if there is no limit to the ability of the system to absorb them.	Comment noted. However, appropriate NEPA analysis has and is being conducted for each and every project proposed on the CTNF and appropriate resource analysis is being prepared.

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7	7.34	Y2U & KP	Management Indicator, Sensitive and Special Status Species - As small organizations, and given the limited time available for comments, it is impossible for us to address all these issues in any comprehensive manner, so these comments apply to all special status species.	Comment noted.
7	7.35	Y2U & KP	We do note that for raptors such as Northern goshawk and others that have been observed in the Study Area, that there are many abandoned or inactive nests (DEIS Figure 3.8-2). However, that map shows close proximity to the existing mine footprint. As raptors are sensitive to human disturbances, to use this as a baseline does not seem valid. Aren't the nests likely abandoned due to the ongoing mining activity? Where are the baseline data prior to the Smoky Canyon mine? Where are the long- term comparisons to this data as mining progresses panel by panel? We did not find this in the DEIS. Where were all the known goshawk home ranges of 6000 acres within the CTNF in SE Idaho? These should have been mapped and compared to the different mines and their footprints, roads, security areas, vegetation or forest cover types.	The baseline condition against which impacts from the Proposed Action and Alternative 1 are assessed is the current environment, not a theoretical reconstructed estimate of the historical condition before mining or other human influences took place. Per 40 CFR 1508.8, effects analyzed in NEPA are specifically those that "are caused by the action", not some other past set of actions. Baseline surveys seek to describe the existing conditions at a site at any given point in time and serve as a "snapshot" of the conditions present. The baseline survey report uses a mixture of previous survey data (where available and still relevant), new field surveys, and input from local and regional experts. Ascribing a cause to why some nests are abandoned is not needed in this EIS. However, the CTNF does conduct long-term monitoring of northern goshawks across the Forest as part of the RFP requirements.
7	7.36	Y2U & KP	Where are the transect or point count data for migrant birds for comparison over the long term? What are the population trends for these species? Many important questions remain unanswered.	Wildlife baseline documents developed for this Project include information on the current status and general trends for species in the Project Area. The EIS includes the analysis on the potential impacts the proposed action and alternatives may have on those populations and impacts to migratory birds have been adequately addressed in the EIS.
7	7.37	Y2U & KP	Population trends and viability assessments for these species and their habitats must be analyzed in concert with the various activities the Forest Service has implemented over the history of the mining in the CEA, Caribou/Webster/Preuss and Diamond Mountain Blocks. Like Canada lynx and wolverine, Northern goshawks also depend on mammals and birds for prey.	Pages 1-4 and 1-5 of the RFP (USFS 2003a) specifically address the need for population trends and viability assessments. In short, the RFP states that "Viability assessments of all vertebrate species are not required. Compliance with 36 CFR 219.19 is not subject to precise numerical interpretation and cannot be set at a single threshold." The RFP also states that the decision maker may use flexibility in selecting the methodology for species assessments that includes the expertise and knowledge of local forest officials. Reference: USFS. 2003a. Revised Forest Plan for the Caribou National Forest. U.S. Department of Agriculture. Idaho Falls, Idaho.
7	7.38	Y2U & KP	There must be an analysis of the current state of habitat, forage productivity and livestock utilization of forage in the project area, with reductions in grazing or closures of pastures and allotments. As Carter et al, 2011 found, grazing by livestock reduces ground cover, herbaceous plant production, carbon and nitrogen stored in herbaceous plants and soils when compared to reference values. They found that the mycorrhizal fungi layer in conifer forest was destroyed by livestock trampling, essentially destroying the nutrient cycling of forest litter at the litter/soil interface.	This is not relevant or applicable for this EIS as livestock grazing is not part of this Project, although impacts from the Project on current grazing practices are relevant and addressed in the EIS. Grazing impacts outside of the Project Area are addressed in the cumulative impact section.
7	7.39	Y2U & KP	Livestock grazing also compacts the soil, reduces infiltration, increases runoff, erosion and sediment yield. The effects of these activities on the nutrient cycle and soil conditions must be analyzed in connection with forest health and in goshawk home ranges.	This is not relevant or applicable for this EIS as livestock grazing is not part of this Project, although impacts from the Project on current grazing practices are relevant and addressed in the EIS. Grazing impacts outside the Project Areas are addressed in the cumulative effects analysis.
7	7.40	Y2U & KP	Habitats capable and suitable for goshawk and goshawk home ranges should be mapped showing all home ranges in a CEA of sufficient size as described above relative to motorized use and other activities and showing their occupancy status.	In 2012, the CNF biologists developed an "Analysis of Capable and Suitable Habitat for Management Indicator Species on the Caribou National Forest," which included the northern goshawk (USFS 2012b). It determined that developed campgrounds, perennial ponds/reservoirs, mining facilities, utility corridors, improved roads, ski areas, and RFP Prescription 8.1 and 8.2.2 (Phosphate Mine Areas) are unsuitable, generally due to increased human presence and activity. After a site-specific, phosphate mine development plan is submitted to the USFS, the area of the specific mine plan is intended to be managed under prescription 8.2.2, Phosphate Mine Areas. The area surrounding the East Smoky Panel Mine generally does not contain habitat in any large blocks. Suitability is further reduced by the existence of current mining. Information on the capability and suitability of goshawk habitat has been updated in the EIS.
7	7.41	Y2U & KP	Northern goshawk, as an MIS, must have a determination of capable and suitable habitat and these home ranges must be analyzed for current condition, and whether capable or suitable, taking into account past timber and forest health treatments, roads and grazing. Is the absence of observed goshawk nests as reported in the DEIS a result of road intrusions, timber harvest, mining?	In 2012 the CNF biologists examined Forest land for suitability and capability to contain habitat for northern goshawk. In summary, it found that habitat is generally lacking in the area surrounding the East Smoky Panel Mine and due to the phosphate mining prescription of the Study Area, habitat conditions were less than favorable. Information from the 2012 habitat report has been added to the EIS. Further analysis of the current state of goshawk populations and population trends are not needed in this EIS.

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7	7.42	Y2U & KP	Snowshoe hares are prey for lynx and goshawk. Their forage base is depleted by historic and current livestock grazing. The population data for snowshoe hare should be analyzed and compared to the level of activities occurring here.	Potential grazing impacts on hares is not relevant or applicable for this EIS. No information on hare populations exist in the CTNF, nor is it needed to conduct an adequate impact analysis.
7	7.43	Y2U & KP	The Forest Plan is 15 years old and the analysis incorporated into that RFP even older. Many projects have occurred in goshawk habitat in the intervening years in addition to older projects. In addition, roads continue to expand, both permanent, temporary and illegal, which engender additional human activity in areas that were previously interior forest habitat. None of this is characterized in the DEIS.	Past, present, and reasonably foreseeable future actions and how they cumulatively impact goshawks are discussed in the cumulative effects analysis. Available data from ongoing monitoring by the USFS indicate stable to slightly improving goshawk populations on the CTNF.
7	7.44	Y2U & KP	The Forest Service Manual 2323.33c - Predator Control states, "*Predacious mammals and birds play a critical role in maintaining the integrity of natural ecosystems. Consider the benefits of a predator species in the ecosystem before approving control actions.*" The NEPA analysis must address the role of predators and the killing of these important animals by livestock permittees, trappers, DWR and Wildlife Services, disclosing the losses on an annual basis since the 2003 Forest Plan was implemented. It should also address the economics of this, and the risk to non-target animals, pets and the ecosystem.	This type of analysis is not relevant or applicable for appropriate impact analysis for this Project.
7	7.45	Y2U & KP	Estimated PM10 emissions for the Proposed Action are 3,376 tons and PM2.5 of 506 tons over the project lifetime for an unidentified time period. Modeling at a 5-mile radius indicates particulate matter effects at 6% of the NAAQS. What about nearby? What about localized effects? Diurnal effects? Peak effects? Figure 9 shows dust blowing from the haul road at the Lanes Creek Mine. BMPs apparently don't control this release. Wasn't it here along Lanes Creek that six horses died from selenium poisoning? Was it in the soil, water, transmitted in wind blown dust, uncontained runoff, sediment pond releases?	Section 4.3.2.1 discussed the potential emissions beyond that given in the comment and conclude that "The intensity of the air emission impacts would be minor at the site-specific perspective and negligible at the local and regional perspective." Project lifetime is clearly stated as up to 12 years. The appropriate temporal units for the air quality discussion are based upon those used in the NAAQS (Table 3.3-2) and in State permits (Table 3.3-3). Further, the Lanes Creek Mine is not related to the Project. Nonetheless, the federal Agencies, the State of Idaho, and mining companies including Simplot have acknowledged the association between phosphate mining and selenium impacts and have actively been investigating and remediating contaminated sites (see Section 2.2.3 of the DEIS). The current state of understanding of selenium in the phosphate-related rock has driven both mine design changes and EPM/BMP development (such as constructing roads with low selenium material and fugitive dust control). These, in addition to compliance monitoring and the Adaptive Management Plan are expected to control releases to air and water from the Project and ensure regulatory programs are met.
7	7.46	Y2U & KP	Also, the averaging over time for NAAQS compliance using remote stations does not tell us what is occurring locally or daily or what the human or for that matter wildlife health effects might be. The Idaho Air Now website22 provides maps showing the Air Quality Index and one can look up daily values. Figure 10 provides a map for August 24, 2018 with the AQI at 151 (combined ozone and PM). The level of 151 is considered unhealthy for all individuals. Lower levels, depending on the range, can be unhealthy for older adults, children, those with heart or lung disease. Idaho DEQ also has the AQI calculator which can be used to determine the AQI for a particular pollutant and concentration. This information needs to be incorporated into the analysis.	The averaging times presented and used in the DEIS to describe air quality are typical and appropriate for assessing project impacts, permit limits, and compliance with federal and State requirements. Simplot would be required to comply with all relevant limits and there is no reason to suspect that they would not be able to do so given their current air permit compliance record, adherence to BMPs, etc. Note that Table 3.3-2 presented various 24-hour measurements from air quality monitoring results at the existing Smoky Canyon Mine. Note that Idaho's development of background air quality (which in turn feeds into permit requirements) includes certain metrics that include extreme events such as wildfire or other transitory phenomena represented on the commenter-provided Figure 10, and others that exclude them. The Study Area and CEA for this Project are in an Attainment area for all NAAQS and Idaho Ambient Air Quality Standards and air quality is generally good. However, Section 5.2.2 notes that air quality conditions are occasionally impacted by short-lived up-gradient winds, fire, etc. The AQI of 151 noted by the commenter represents one of those outlier days. However, it would not be appropriate to use the AQI to assess baseline conditions for the Project.
7	7.47	Y2U & KP	DEIS Figure 3.2-1a presents a map of faults for East Smoky passing through the area of disturbance for the existing and proposed mine expansion. The DEIS (3-7) reports 40 events exceeding 4 on the Richter Scale within 100 km of the Study Area since 1962. Chapter 3 does not discuss the effect of fault disturbance by mining or haul road construction, nor does Chapter 4. Figure 5.5-1 in Chapter 5 shows the extent of mineral leases in the CEA and notes that there have been a total of 31 phosphate mines in the area (5-2), with a total disturbance of 14,200 acres with foreseeable mining disturbance of 21,700 acres (5-7). Other sources of disturbance were mentioned. No discussion was provided regarding mining related to seismic activity. Mining through faults, drilling, blasting, haul roads carving deep grooves through the mountains all occur and will continue. See Figures 11 and 12 for photos of the Smoky Canyon Mine and Haul Road. What are the effects of removal of the large amounts of material on the faults and stresses in these faults? A quick web search indicates that mining can reactivate existing faults.[24] A National	In over seven decades of surface mining in southeast Idaho, there is no recorded history of phosphate mine-induced earthquakes or of earthquakes causing stability problems at these mines. Phosphate surface mines are shallow and unlikely to trigger earthquakes. The average pit depth at the East Smoky Panel Mine would be 250 feet (see Chapter 2 of the EIS). The slow rate of stress removal and subsequent replacement of the material back into the excavation as backfill, further reduces the risk for seismic induction. Furthermore, there is no injection of fluids involved in the East Smoky Panel Project.

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			Geographic Article cites a study[25] of 730 sites where human activity caused earthquakes over the past 150 years. "According to the report's data, found on a publicly accessible database, mining accounted for the highest number of human-induced earthquakes worldwide (many earthquakes clustered around 271 sites). The removal of material from the earth can cause instability, leading to sudden collapses that trigger earthquakes."	
7	7.48	Y2U & KP	In recent years there have been numerous earthquakes in SE Idaho. The website for Quake Bulletin allows searches for earthquake history by location. For example, when a search was done for Soda Springs, the Bulletin listed 1,625 earthquakes. The date, magnitude and location can be found for each using this website. A temporal analysis by location and total occurrence should be done and compared to the progression of mining through the region. Here at Kiesha's Preserve we feel these earthquakes and during exploratory drilling at the nearby planned Paris Hills Agricom mine, could hear/feel the vibrations from the drilling. It is a major concern for us here as faults occur in the area.	See Comment Response 7.47.
7	7.49	Y2U & KP	Groundwater and Surface Water - Due to time constraints and the refusal of the BLM and CNF to grant an extension, our detailed notes/comments for these topics are included in the marked-up PDF of the DEIS which can be downloaded from our on-line storage as it is too large to email.	The Agencies downloaded and reviewed the marked-up PDF. Out of the 455 notated highlights in that file, 145 were extracted that appear to be actual unique comments or comment groupings. Those comments and agency responses are located in a separate matrix (Table 2, Appendix 6A). The remaining 310 either appeared to be simple highlights or a quotation from the DEIS or duplicative of Y2U/KP's comment letter.
7	7.50	Y2U & KP	Problems with the [*groundwater and surface water*] analysis include the lack of an adequate pre-mining baseline for the streams in the CEA. There are no comparisons available for water quality (ground or surface) prior to the initiation of mining at the Smoky Canyon Mine. What were the concentrations in Crow Creek, Sage Creek, Tygee Creek, Pole Canyon Creek prior to initiation of mining at Smoky? How do those compare to today and to the projected levels? What was ground water quality prior to mining compared to today?	The baseline condition against which impacts from the Proposed Action and Alternative 1 are assessed is the current environment, not a theoretical reconstructed estimate of the historical condition before mining or other human influences took place. Per 40 CFR 1508.8, effects analyzed in NEPA are specifically those that "are caused by the action", not some other past set of actions. Baseline conditions for the Project were adequately presented in the EIS.
7	7.51	Y2U & KP	Impacts are based on modeling and predictions as to the effectiveness of cover and BMPs applied. When the Smoky Canyon mine began its first phase, then the remaining phases or Panels, what data was available? What did those models show? How is it that with these models and we suppose, baseline data, we have a Superfund site today? The Pole Canyon Creek Overburden Disposal Area (ODA) is a good example. Apparently, the technology indicated it was not a problem for water quality using the design for disposal here. Yet, today Pole Canyon Creek is contaminated with selenium. The same can be said for Hoopes Spring. What did the prior analysis indicate would occur? How does this compare with today?	The Smoky Canyon Mine was initially permitted in 1981 and the problem with selenium contamination caused by the phosphate mine overburden in southeast Idaho was not recognized until the mid-1990s. The mining companies in the Southeast Idaho Phosphate District began studying the matter with regional studies shortly after the discovery of the selenium problem and this eventually led to the CERCLA investigations at many of the legacy phosphate mines. Simplot entered in an AOC under CERCLA to conduct site investigations at the Smoky Canyon Mine in 2003. However, the development of much of the Smoky Canyon Mine, including the construction of the Pole Canyon ODA had been completed earlier. Since the mid-1990s, the Agencies, industry, and outside groups have made significant progress through the completion of many studies throughout the phosphate production area in understanding the sources, pathways, fate, and risks associated with selenium releases from phosphate mines. The East Smoky Panel Project Proposed Action and Alternative 1 apply this knowledge and these actions will adequately mitigate selenium releases to ensure compliance with applicable environmental requirements.
7	7.52	Y2U & KP	Then there are the springs and seeps that will be forever lost. There was no monitoring of wildlife use of these areas. Simple use of trail cams during a baseline study would have documented the species using these. Instead we get no real analysis. Here at Kiesha's Preserve, one small spring with flow that is hardly measurable provides secure habitat for deer, elk, moose, sage grouse, sharptail grouse and other species. Trail cams document the occurrence of deer fawns, elk calves, and moose calves using this one area. It supports their use of surrounding habitats for bearing their young, summer use and early winter use. The failure to account for the value of those lost springs in the DEIS is a failure to take a hard look.	During the field surveys conducted in 2014, placement of game cameras was driven by survey needs. It is already assumed and well known that wildlife use spring and seep areas at higher rates than other habitat types and impacts to wildlife resources are adequately analyzed in the EIS.
7	7.53	Y2U & KP	Streams are polluted with sediment, E. coli, and selenium. But there is little analysis of the source of the pollution. On the one hand, it is claimed that soil erosion is below the soil loss tolerance in grazed and logged areas based on a Forest Service study. However, it is our experience when it comes to livestock grazing, that monitoring of impacts due to livestock concentrations around water developments, salting areas and uplands adjacent to streams do not occur, yet these areas suffer high levels of bare soil and erosion. These watersheds are grazed by sheep and cattle, water developments and spring diversions are noted, but not how many and	The East Smoky Panel Project does not include livestock grazing, thus this comment is not relevant or applicable to the EIS. Further, the comment mischaracterizes statements in the DEIS regarding CERCLA and the level of selenium impacts from the Project itself.

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			where or what their impacts on stream flows and soil erosion might be. Streams in the CEA are listed for these pollutants, yet minimal mitigation is proposed. Simplot has private land being grazed and we assume diversions on the Forest for its grazing allotment(s). Instead, for selenium, we are told it is already a superfund site, so project impacts are minimal. For sediment, a few BMPs along roads, sediment ponds for the mine, but nothing to mitigate livestock impacts which are universal.	
7	7.54	Y2U & KP	Analysis of selenium in fish tissue shows elevated levels, levels that are above criteria. Effects on reproductive success are noted. There was no analysis of the effect of sediment on reproduction in fish, particularly Yellowstone cutthroat trout.	Sedimentation effects were discussed in the Aquatic Habitat and Fish subsections of Section 4.9.2.1. YCT were also addressed in this section. Also, see Comment Responses 5.77, 5.80, 5.86, and 5.88.
7	7.55	Y2U & KP	Surface water impacts by sediment and metals could be mitigated in part by restoring stream flows, retiring grazing permits through buyouts, removing diversions for livestock water and removing livestock on Simplot's private land to restore stream banks and riparian areas. An analysis of the location of these diversions, the net effect on spring and stream flows, riparian and wetland areas should be done for a hard look.	Analyses of retiring grazing permits through buyouts, removing diversions for livestock water, and removing livestock to improve water quality is not relevant or applicable for this EIS.
7	7.56	Y2U & KP	The DEIS provides summaries of some economic statistics such as the employment rate by industrial classification. Mining in Caribou County accounted for 7.3% of employment. (DEIS 3-216). Income from mining in the Four County area in 2010 was 2.9%. These are the benefits of mining. (DEIS 3-220). It is notable that footnotes in the Tables for these parameters indicate that data for natural resource values was withheld by the Counties "to avoid disclosures of confidential information". This seems strange as these should be public data and withholding it denies the public the information that could be pertinent to the positive or negative impacts of the phosphate mining industry in SE Idaho. These Counties should explain why this economic information is "confidential" and cannot be released to the public.	The referenced tables, including the footnotes referring to confidential information, come from federal Bureau of Economic Analysis (BEA), not the individual counties. The counties provide the data to BEA, but for counties with small populations, some data is not made public. This is presumably to protect the privacy of individuals, whose data on wages, etc. could be inferred due to the small number of individuals considered. Regardless, BEA data was used in the DEIS according to standard practice. No special considerations for withholding it were made.
7	7.57	Y2U & KP	[*Economics*] As the DEIS discloses throughout in its analysis, groundwater and surface water pollution will continue for decades to centuries. Forests, watersheds, water supplies, fish and wildlife populations will be adversely affected permanently. There is no accounting other than the modeled Habitat Equivalency Analysis (HEA) which was absent from the DEIS and apparently only accounts for the mine footprint itself, not the effects across the region. For example, the DEIS Table 4.7-1 indicates loss of 728.2 acres of vegetation communities in the mine footprint and states that some types such as forested types may never recover. (DEIS 4-63). Some of this vegetation is old growth aspen and some such as mixed conifer contains old growth aged trees. (3-98).	Simplot already holds this area under lease, which gives them the legal right to recover the phosphate within. The EIS does not directly weigh the cost vs benefit of mining as the decision to allow mining has already been made and the result would not further inform the decision. The comment is mistaken that HEA was absent from the DEIS; see Sections 4.7 and 4.8. The comment is mistaken that old growth is present; the stand exams described on DEIS page 3-99 revealed that there are old, even very old trees within the Study Area, but confirmed that none of the stands met the Region 4 old-growth definitions. However, the Agencies acknowledge that these other resources, including forests, watersheds, water supplies, fish, and wildlife populations provide a socioeconomic benefit when present. In most cases, these will be restored after full reclamation occurs. Some text has been added to Section 3.14 to acknowledge that these other resources have value. Their economic value is difficult to quantify but not thought to be significant.
7	7.58	Y2U & KP	[*Economics*] The analysis did not map where the existing old growth occurs, and what percentage of this mixed conifer type across the CTNF meets old growth criterion. Surely, if this is a mixed severity fire regime as nearly all wildfires appear to have areas burned at different levels, then either the criterion is flawed and should allow these stands to be left to become old growth or the old growth definition needs to be refined. In any event, destruction of this forest with its very old trees (how old?) that could be hundreds of years old, represents a permanent loss of this habitat for species of wildlife dependent on old growth. No data was provided from the stand exams in comparison to the Forest Plan Criteria or best available science.	Old growth was not mapped because it does not occur in the Study Area. Per Section 3.7.9: "*The stand exams confirmed that none of the stands met the Region 4 old-growth definitions. The stand exams revealed that there are old, even very old trees within the Study Area, but that there are not enough to meet the Region 4 old-growth criteria (Beck 2017).*" Reference Beck, W. 2017. East Smoky Supplemental Vegetation Report. Prepared for the Soda Springs Ranger District, Caribou-Targhee National Forest. July.
7	7.59	Y2U & KP	The USFWS has periodically produced an analysis of fishing, hunting and wildlife watching recreation statistics, including expenditures. The current edition indicates annual national expenditures are $75.9 billion for wildlife watching, $46.1 billion for fishing and $26.2 billion for hunting. State summaries were available in an earlier edition and should be available upon request for more current information. Due to time limitations for comments, we are providing the Idaho figures from the 2001 edition which showed expenditures in Idaho for hunting, fishing and wildlife watching totaled $767 million. Perhaps the CTNF should consider the millions of visitors to Yellowstone National Park to view wolves, bears and other wildlife and what those economic benefits are compared to the loss of these high value species in its Forest on behalf of extractive uses and atv/ohvs. Atv/ohv are not present in YNP in summer, yet look at the number of people visiting. Make the connection.	Recreation type and extent was addressed in DEIS Section 3.10.1.4. Per that text: "*Of all the varied recreation activities that occur on the CTNF, the only activity that occurs in the immediate vicinity of the Project Area is dispersed recreation in the form of big game hunting. Even this activity is minimal due to very limited access and the ongoing nearby mining activities. No developed trails, developed sites, or dispersed camping opportunities exist in the Project Area.*" Given that, even though recreation can provide an economic value, it would not likely be significant for this Project's socioeconomic analysis. Yellowstone National Park is not in the Study Area for socioeconomics and its inclusion is not relevant to address its economic benefits.

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7	7.60	Y2U & KP	In addition, there are mechanisms for evaluating ecosystem services in numerous studies published by Dr. John Loomis of Colorado State University valuing ecosystem services. The loss of these ecosystem services has many attributes over the long term such as behest values, intrinsic values and Loomis provides means of determining market values for these services. What are the losses? What about the Native American values that are compromised? The economic analysis must go much further to meet the NEPA's hard look standard and justify to the public the legacy of Superfund sites and lost ecosystem services from an industry that is a minor contributor to the local and regional economy and represents only 15% of the national phosphate rock industry, the vast majority occurring in the Southeast US.	See Comment Responses 7.57 and 7.59. In addition, the Agencies acknowledge that there could be ways to evaluate the economics associated with ecosystems services. However, the Agencies disagree that it is necessary to do so for this EIS. Simplot already holds this area under lease, which gives them the legal right to recover the phosphate within. Further, Native American Concerns and Treaty Rights were covered in Sections 3.13 and 4.13.
7	7.61	Y2U & KP	Because the impacts of mining are concurrent with motorized recreation use of the CEA, Caribou/Webster/Preuss, Diamond Mountain Block or Corridor, an analysis of this activity and its impacts thru road density, noise, effects on people and wildlife are additive to the mining activity and a hard look at this activity is needed in conjunction with this project and any others proposed. The DEIS provides no data on vehicle use in the CEA. Georgetown Canyon is a heavily used route for atv/ohvs in summer and fall. A similar situation exists in Paris Canyon at Kiesha's Preserve where we are subjected to noise and dust from hundreds of vehicles per day accessing the CNF. Figure 14 is a plot of data from a USU study in Paris Canyon at Kiesha's Preserve showing traffic patterns and types of vehicles during the summer of 2017. Peak numbers reached over 300 vehicles per day. Associated with this traffic is increased airborne dust levels. Figure 15 shows the dust plume filling the canyon after passage of a single pickup truck in early morning. As described earlier, we experience noise levels over 100 dBA from atvs and dirt bikes in summer and snowmobiles in winter. People and wildlife in the CEA for Smoky Canyon likely experience the same problems, but the DEIS has no data or analysis of this issue.	Noise from traffic was addressed in the CEA. See Chapter 5.
7	7.62	Y2U & KP	Road densities and effects on wildlife must be analyzed. Researchers, including those with the Forest Service have documented the effects of roads and atv/ohvs on wildlife and the benefits of roadless areas. For example, Gilbert, Noss and Wisdom et al describe the detrimental effects of road density and human activity on large mammals causing large displacements away from roads and mechanized activity. A recent publication by the National Park Service discussed the effects of snowmobiles on wildlife. Agency researchers at UC Davis have suggested an integrated approach for addressing Canada lynx linkage corridors. An integrated analysis of the effects of roads, human use and habitat fragmentation on lynx and other species that incorporates this information as well as addressing other species of wildlife must be completed.	Chapter 5 adequately discloses cumulative impacts to wildlife resources from roads and a more detailed analysis is not needed for this Project and in this EIS.
7	7.63	Y2U & KP	An evaluation of these interrelated effects on these predators, their prey and habitat requirements must be included.	See Comment Response 7.62. This analysis is not needed for this EIS as the comment refers to a winter travel plan issue. The Travel Plan for the Forest would not be affected by the Proposed Action or Alternative 1.
7	7.64	Y2U & KP	Then provide an alternative that proposes road closures to attain a scientifically defensible density per square mile, grazing allotment closures, fence removals, and setting noise limits on vehicles. Winter use should be closed or severely limited in the Study Area, Caribou/Webster/Preuss Subsections, Diamond Mountain Block and CEA so that lynx, wolverine and other far-ranging species (elk, deer) have an opportunity to migrate and have security cover during all seasons. The Forest Service can use its Prohibition Authority (36 CFR 261) to regulate noise and other activities detrimental to wildlife such as hunting, trapping or harassing wildlife.	This analysis is not relevant or applicable for the Project and for this EIS. Seasonal ranges within the Project Area have been analyzed within the context of the Proposed Action and alternatives. Seasonal ranges outside the Project will continue to be managed in accordance with the Revised Forest Plan and 2005 Travel Plan.
7	7.65	Y2U & KP	Cumulative Effects - Our notes on the DEIS and Cumulative Effects can be downloaded and reviewed at the link provided earlier. There was insufficient time to lay these out as our request for an extension of time was denied by BLM. The preceding narrative points out the need for a comprehensive analysis of the Corridor, water quality, air quality, noise, road density, seismic activity and others. These are all cumulative effects and need to be addressed quantitatively in this NEPA analysis.	See Comment Response 7.49. Further, appropriate study areas and CEAs were defined for water quality, air quality, noise, road density, seismic activity and other resources to analyze this Project and inclusion and analysis of the Corridor is not needed for this EIS. The cumulative effects of past, present, and reasonably foreseeable future conditions were considered in Section 5 of the EIS.

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7	7.66	Y2U & KP	A fundamental aspect of NEPA is to take a "hard look" at current management, conditions, assumptions and implementation. A NEPA document that fails to analyze the following violates the purposes of NEPA: • Validity of assumptions from previous NEPA processes • Accuracy of predictions from previous NEPA processes • Adequacy of Forest Service and BLM implementation of previous decisions • Effectiveness of actions taken in previous decisions These above items are critical to be part of this NEPA process. Without this critical link the validity of the current assumptions are baseless. Without analyzing the accuracy and validity of the assumptions used in previous NEPA processes one has no way to judge the accuracy and effectiveness of the current analysis and proposals. The predictions made in previous NEPA processes also need to be disclosed and analyzed because if these were not accurate, and the agency is making similar decisions, then the process will lead to failure. For instance, if in previous processes the FS said they were going to do a certain monitoring plan or implement a certain type of management and these were never effectively implemented, it is important for the reader and the decision maker to know. If there have been problems with FS's implementation in the past, it is not logical to assume that implementation will now be appropriate.	The purpose of this EIS is to evaluate the potential effects of the East Smoky Panel Project; the Proposed Action and alternatives. It is not relevant for this EIS to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project.
7	7.67	Y2U & KP	Another critical component is permittee compliance. If the grazing permittee(s) have failed to properly comply with their permit terms and conditions and AMP requirements, including utilization requirements, rotation requirements and fence maintenance then it is absolutely critical to discuss this in the document and its effects on the proposed action. If prior timber harvests, salvage sales, prescribed fire and other "forest health treatments" have not been monitored to document regeneration, beetle suppression, restoration of aspen recruitment and herbaceous understory, recovery of ground cover, then there is no valid reason for this project. Report and analyze all past vegetation projects in the CEA.	This Project does not include grazing actions or the types of forest activities mentioned in the comment. The cumulative effects of past, present, and reasonably foreseeable future livestock grazing were considered in DEIS Section 5.9. And the cumulative effects of past, present, and reasonably foreseeable future vegetation were considered in DEIS Section 5.6.
7	7.68	Y2U & KP	Furthermore, the reliance on BMPs is a flawed approach that assumes they work.	EPMs and BMPs at the Smoky Canyon Mine are typically coupled with or include inspections, monitoring, state and federal permits, and agency oversight. These mechanisms, along with Adaptive Management (DEIS Appendix 4B) are adequate to ensure controls either function properly or are replaced.
7	7.69	Y2U & KP	An example of these needed comparisons is the fact that Smoky Canyon Mine is a Superfund Site. This is prima facie evidence that prior predictions and commitments were not accurate. We assume there were predictions of outcomes based on the project plans, but we do not know what those were as they were excluded from the analysis. We wish to (re)emphasize that negative impacts, and conflicts among alternative uses, relating to the comments above must not just be within the scope of the NEPA process, but treated as significant and/or key alternative-driving in nature. These should be analyzed in the Study Area, Caribou/Webster/Preuss Subsections, Diamond Mountain Block and CEA for cumulative effects.	The purpose of this EIS is to evaluate the potential effects of the East Smoky Panel Project; the Proposed Action and alternatives. It is not relevant for this EIS to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project. Further, previously approved mining activities were the focus of other NEPA analyses and were/are publicly available. Last, CEAs for each resource were chosen appropriately and approved by the agencies prior to the Chapter 5 analysis included in the DEIS.
7	7.70	Y2U & KP	The DEIS does not provide a reasonable range of alternatives. All alternatives result in expansion of the mine. The No Action alternative is just a postponement, not a real alternative. A reasonable alternative would provide for actions by the agencies and Simplot to correct the damage to this fragile landscape, which is greatly understated in the DEIS. [*List of mitigation alternatives follows*]	An adequate and appropriate array of alternatives was considered in the EIS. NEPA and agency policy on how to develop, select, and screen alternatives was followed. Section 2.6.3 included nine additional alternatives for consideration, in addition to the Proposed Action and Alternative 1 that were fully analyzed. These additional nine alternatives were described in Section 2.6.3 and a brief summary of the rationale for not fully analyzing them was included. Simplot holds valid leases to mine phosphate in this area, so the No Action Alternative must recognize that possibility. Last, the purpose of this EIS is to evaluate the potential effects of the East Smoky Panel Project. This EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies, except as applicable cumulative effects which it does in Chapter 5.

ID No.	Co ID No.	Name/ Entity	Comment	Comment Response
8	8.1	Earthworks form letters	The Smoky Canyon Mine has already caused severe selenium pollution in streams below the mine, including Sage Creek and Crow Creek, which provide important habitat for Yellowstone Cutthroat Trout. Selenium concentrations in these streams have increased dramatically, and exceed aquatic life standards. Despite the ongoing selenium pollution from the mine, Simplot's proposed expansion (East Smoky Canyon) is predicted to contribute even more selenium to these streams. Although the agency's preferred alternative would result in fewer impacts, the Draft Environmental Impact Statement (DEIS) says that it may result in an unstable highwall that may necessitate the mining of selenium-ore, and negate the reduced impacts. As a result of this uncertainty, the DEIS offers no real alternative to the proposed action.	The DEIS described the existing baseline conditions in regard to selenium (see Sections 3.5.1.2, 3.5.2.3, and 3.9.5) and also evaluated the selenium contributions of the proposed Project (see Sections 4.5.2 and 4.9.2). Impacts to YCT were analyzed in the EIS and in a Biological Evaluation that will be part of the Project Record. The Agencies disagree that Alternative 1 does not offer a real alternative to the Proposed Action. Several phosphate mines in southeast Idaho have experienced unstable mine pit highwalls. Historically, the unstable highwall area in these mines has been limited to a small fraction of the total area of mine highwall. The intent of the statement in the EIS (Section 4.5.2.2) acknowledging the potential for an unstable highwall was to disclose the unexpected possibility that a small portion of the total cherty shale unit could end up being mined. The full statement also states that the studies by CNI indicate that the steeper slopes should be stable (see quotation below). Mostly likely, the slopes will be stable and mining of cherty shale will be eliminated. If a small portion of cherty shale needed to be mined it would still be an advantage over the Proposed Action. *"Alternative 1 includes steeper pit slopes than the Proposed Action which would allow mining activities to avoid including Cherty Shale overburden in the pit backfill. Geotechnical evaluation (CNI 2017) has indicated that these steeper slopes should be stable. However, in the unexpected case where some slope instability was experienced on the east side of the pit, it may be necessary to layback the unstable part of the slope which could, in turn, require mining the Cherty Shale in the affected area."* In addition to limiting the cherty shale material, Alternative 1 also reduces the mine disturbance footprint by 78 acres and reclaiming the topography of Panel B closer to original contours. The Cherty Shale comprises about 2.7% of the rock to be mined in the Proposed Action pit and 0% in the Alternative 1 pit. If some Cherty Shale needed to be mined in the Alternative 1 pit due to some highwall instability it is unlikely that the amount to be mined would be greater than that proposed to be mined in the Proposed Action pit. Any amount of Cherty Shale that would be mined would be moved to the Panel B backfill along with the other overburden lithologies mined during initial operation of the Alternative 1 pit. This would basically be a mixture of overburden very similar to that for placement in Panel B as part of the Proposed Action. The comparison of this overburden mixture to that already approved for Panel B is discussed on pages 4-22 and 4-23 of the DEIS. An additional alternative to cover this unlikely condition is therefore not required. Reference: Call & Nicolas, Inc. (CNI). 2017. East Smoky Canyon Mine Feasibility-Level Pit Slope Angle Geotechnical Study. Prepared for J.R. Simplot. February.
8	8.2	Earthworks form letters	The Forest Service and BLM must require Simplot to demonstrate that it can address its existing selenium pollution before approving an expansion.	The purpose of this EIS is to evaluate the potential effects of the Proposed Action and Action Alternatives for the East Smoky Panel Project. It is not relevant for this EIS to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project.
8	8.3	Earthworks form letters	The agencies must consider alternatives that will prevent additional selenium from reaching Hoopes Spring and the Sage Creek and Crow Creek watersheds.	An adequate and appropriate array of alternatives was considered in the EIS. NEPA and agency policy on how to develop, select, and screen alternatives was followed. Section 2.6.3 included nine additional alternatives for consideration, in addition to the Proposed Action and Alternative that were fully analyzed. These additional nine were described in Section 2.6.3 and a brief summary of the rationale for not fully analyzing them was included. Neither the Proposed Action or Alternative 1 contribute selenium to Hoopes Spring and the Sage Creek and Crow Creek watersheds in levels that, by themselves, result in an exceedance of the chronic cold-water quality selenium criterion.
8	8.4	Earthworks form letters	Mining companies should be held accountable for their pollution, and our public lands and waters must be better protected.	Comment noted.
9	9.1	Brock Brown/Simplot	I support the Agency Alternative 1.	Comment noted.
10	10.1	The Shoshone-Bannock Tribes	The Tribes object to this mining project.	Comment noted.

ID No.	Co ID No.	Name/ Entity	Comment	Comment Response
10	10.2	The Shoshone-Bannock Tribes	The proposed project area creates additional impacts to resources promised to be available for Tribal member use, through the Fort Bridger Treaty.	The Agencies recognize the treaty rights and interests of the Shoshone-Bannock Tribes and will adhere to their federal Indian Trust responsibilities. The EIS acknowledges there would be an interruption during mining activities to the Shoshone and Bannock Tribes' access to public land to exercise treaty rights and traditional uses, however access would be restored at the completion of mining. The project would result in adverse impacts to some of the natural resources that the Tribes may require in the exercise of their treaty rights. Potential short-term impacts would be associated with the disturbance or displacement of plant and wildlife species used for traditional purposes and subsistence. The land would be reclaimed after mining.
10	10.3	The Shoshone-Bannock Tribes	The project is within the Tribes ' aboriginal territories and will exacerbate environmental contamination in the area not only for the proposed 12 years the pit would be open, but also for decades. That exacerbation is not fully known, nor has the BLM, USFS or Proponent adequately evaluated nor communicated the expected synergistic impacts for this additional mine on the already stressed environmental conditions in the area.	The purpose of this EIS is to evaluate the potential effects of the Proposed Action and Action Alternatives for the East Smoky Panel Project. The EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor and manageable contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project.
10	10.4	The Shoshone-Bannock Tribes	The Tribes have consistently objected to expansion of Smoky Canyon mining projects because of the adverse impacts that the Smoky Canyon Mine has on the Tribes' cultural practices and treaty fishing, hunting, and gathering rights.	Comment noted. The Agencies addressed these issues in DEIS Section 4.13.
10	10.5	The Shoshone-Bannock Tribes	Unfortunately, the DEIS fails to address the United States government's trust responsibility to protect the important Tribal interests threatened by this proposed project. This project will further diminish already impacted resources and the cumulative impacts have not been adequately identified nor addressed.	The DEIS adequately addressed the United States government's trust responsibility to protect the important Tribal interests. Further, the EIS addresses the cumulative effects to Native American Concerns and Treaty Rights in Section 5.12 of the EIS.
10	10.6	The Shoshone-Bannock Tribes	The Tribes are very disappointed the Federal Agencies continue to display ignorance surrounding impacts to Tribal resources by coining the impacts as local, short-term, and negligible (less than 0.1 percent of the CTNF), stating there would be no impacts to Tribal sacred sites or prehistoric archaeological sites from the Proposed Action and Alternative 1	The Agencies have not been made aware of any specific sacred sites or prehistoric archaeological sites from the Proposed Action and Alternative 1 that were not otherwise described in the cultural resources reports prepared for this Project.
10	10.7	The Shoshone-Bannock Tribes	After reclamation, Tribal access would be restored, as vegetation would be replanted, wildlife would return, and water would be usable. The Tribes disagree with the assessment that after reclamation, water would be usable.	The DEIS analysis indicates that surface water quality impacts from the Project itself would be minimal with no standard exceedances specifically due to the Project. However, the DEIS also acknowledges that the Proposed Action and Alternative 1 would incrementally add to existing degraded water quality in area streams. Per the description in the No Action Alternative for water resources, it is reasonably foreseeable that the operation of the WTPP will significantly reduce selenium concentrations in the receiving streams. Thus, the East Smoky Panel Mine would make negligible and manageable contributions to the environmental impacts while progress is being made on remediating existing problems through the CERCLA process.
10	10.8	The Shoshone-Bannock Tribes	Current groundwater and surface water in the area is not drinkable nor useable for Tribal members to fully practice their cultural ceremonies, as promised through Treaty rights. Because of contaminants within the footprint of the mine, water does not always meet drinking water standards and additional mining activities are certain to contribute additional contamination.	The Agencies acknowledge existing mining related impacts to surface water and groundwater in the area. However, the purpose of this EIS is to evaluate the potential effects of the Proposed Action and Alternatives for the East Smoky Panel Project. The EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. Further, compliance with the Idaho Ground Water Quality Rule is under the control of the Idaho Department of Environmental Quality which would oversee and implement required Point(s) of Compliance for this Project. In addition, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor contributions to the environmental impacts while progress is being made on remediating existing problems. Further, extensive ongoing monitoring and adaptive management would be implemented as part of this Project.

ID No.	Co ID No.	Name/ Entity	Comment	Comment Response
10	10.9	The Shoshone-Bannock Tribes	The federal agencies and the proponent have failed to discuss radiation in any media. Radionuclides including Uranium 238 and all daughter progeny are expected to be present and may be released. Assessment, characterization, cumulative impacts and synergistic effects from radiation in the area is must be addressed.	The impacts due to radiation were not included in the DEIS because they were not brought forward as an issue through the scoping process. However, the issue of the radiological risk at the mine has been evaluated in the Smoky Canyon Baseline Human Health Risk Assessment (BHHRA) (Formation 2015). This assessment determined that uranium and decay products that were a result of activities at the Smoky Canyon Mine did not pose a cancer risk above the regulatory cancer risk thresholds for the various scenarios evaluated in the comprehensive risk assessment, including a Native American receptor exposed to uranium and decay products in soil, surface water, game, tea and other produce. Mining of the East Smoky Panel would not have a greater impact on soil, groundwater, and other environmental media than past operations due to current regulations, compliance activities, and other safeguards. Additional information related to the risk evaluation of uranium and decay products in the Smoky Canyon Baseline Human Health Risk Assessment (Formation 2015) is provided in the following from that document. Overall, the radiological risk evaluation, that was conducted as part of the Site RI/FS using EPA's radiological preliminary risk goal (PRG) calculator in the risk calculation mode, demonstrated that uranium and decay products do not pose a cancer risk above IDEM's regulatory cancer risk threshold of 1E-05 at the Site since: 1) none of the Site-wide receptor risk estimates were greater than 1E-05 including estimated risks to the Native American receptor; and 2) the Hypothetical Resident Excess Lifetime Cancer Risk (ELCR) was not appreciably different than the same scenario using a reasonable background soil concentration and public water supply concentration. It is worthwhile to note that for radiological risks, EPA considers a cancer risk of 3E-04 to be protective (USEPA 2014). All estimated cancer risks associated with uranium and decay products for the various exposure scenarios, including the Native American receptor, evaluated at Smoky Canyon were below 3E-04. Additionally, uranium and decay products were not considered a risk driver at the Smoky Canyon Site for the following reasons: • Soil risks do not exceed USEPA's target cancer risk goal for radionuclides of 3E-04 (USEPA 2014). Estimated soil risks from uranium and decay products for the Native American receptor were less than 1E-05. • Most of the soil pathway risk estimate is due to the consumption of homegrown produce in a hypothetical residential scenario, and there is a large degree of uncertainty associated with this pathway in USEPA's PRG risk calculator model. In fact, using the background soil concentration of 2.5 mg/kg results in a 1E-04 cancer risk from the produce consumption pathway alone. USEPA recognizes that the risks associated with this pathway drive the total risk or result in the lowest PRG/RSL. • The Domestic Water Supply EPCs (1.6 ug/L) used in the risk estimate for the Hypothetical Resident receptor exceeded IDEM's regulatory goal of 1E-05. This concentration, however, is below the federal drinking water limit or Maximum Contaminant Level (MCL) of 30 ug/L and the average uranium activity concentration from the public water supply in Idaho Falls (2.8 ug/L). It should be noted that this pathway was not considered to be complete for the Native American receptor and, therefore, this information is provided simply for completeness sake as it relates to the overall Smoky Canyon BHHRA conclusions. References: Formation. 2015. Draft Smoky Canyon Mine Remedial Investigation/Feasibility Study: Site-Specific Human Health Risk Assessment Report. Prepared for J.R. Simplot Company. Formation Environmental, LLC. November 2015. USEPA. 2014. Preliminary Remediation Goals (PRGs) for Radionuclides. Available at http://epa-prgs.ornl.gov/radionuclides/download.html. Tables released November 2014; website accessed July 15, 2015.
10	10.10	The Shoshone-Bannock Tribes	The DEIS fails to recommend substantive conditions that will adequately mitigate the impacts to Tribal trust resources. The Tribes believe this is in part due to the lack of identified impacts from both cumulative and synergistic effects. Without this information, the Agencies and Proponents do not have the full impacts categorized nor can measures to fully mitigate these impacts be proposed.	The Agencies recognize the treaty rights and interests of the Shoshone-Bannock Tribes and will adhere to their federal Indian Trust responsibilities. However, the Agencies disagree with the assertion in the comment that they have failed to identify and categorize impacts on Tribal trust resources. Implementation of Best Management Practices, Environmental Protection Measures, reclamation practices, and ongoing remedial actions under CERCLA would and/or are helping to minimize and/or mitigate impacts.

ID No.	Co ID No.	Name/ Entity	Comment	Comment Response
10	10.11	The Shoshone-Bannock Tribes	The Shoshone-Bannock Tribes are trust beneficiaries to whom the representatives of the Federal government owe a legal and fiduciary duty. The Bureau of Land Management (BLM) and the Forest Service must ensure that agency decisions in this process are consistent with the Fort Bridger Treaty and the federal trust responsibility. The United States government and its agencies have a clear trust responsibility to protect Tribal natural resources. United States v. Cherokee Nation, 480 U.S. 700, 707 (1987); Klamath Water Users Protective Ass' n v. United States Dept. of Interior, 189 F. 3d 1034, 1040 (91 Cir. 1999). Federal Agencies must thoroughly evaluate any impacts on Tribal treat rights, trust resources, and select an alternative that will adequately protect those rights. The federal agencies have failed in this regard.	The issue is Tribal treaty rights under the Fort Bridger Treaty of 1868 between the U.S. and the Shoshone and Bannock Tribes (U.S. Congress 1868). Federal trust responsibilities apply more directly to Indian lands, property and financial responsibilities. However, federal responsibility for the protection of treaty rights have the same legal status as trust responsibilities whether or not they are directly associated with trust responsibilities and are legally enforceable without reference to trust responsibilities (Morisset 1999). The Secretary of the Interior has issued an order affirming American Indian Trust responsibilities (USDI 2014). The Secretarial Order "reaffirms the Department's obligations and demonstrates our continuing commitment to upholding the important federal trust responsibility for Indian Country." The U.S. has a trust duty to protect treaty rights and federal management of treaty rights such as fisheries and hunting is a moral obligation and legally equivalent to trust responsibilities. The Agencies recognize the treaty rights and interests of the Shoshone-Bannock Tribes and will adhere to their federal Indian Trust responsibilities. However, the Agencies disagree with the assertion in the comment that they have failed to evaluate any impacts on Tribal treaty rights and trust resources and believe that an alternative has been selected for the Project that will adequately protect those rights. References: Morisset, Mason D., Esq. 1999. Recent Developments in Defining the Federal Trust Responsibility (The Case of the Reluctant Guardian). Morisset, Schlosser & Jozwiak, Attorneys at Law. 16 pages. [Web Page] located at: http://www.msaj.com/papers/43099.htm. U.S. Department of Interior (USDI). 2014. Reaffirmation of the Federal Trust Responsibility to Federally Recognized Indian Tribes and Individual Indian Beneficiaries. Order number 3335. August 20, 2014. 6 pages.
10	10.12	The Shoshone-Bannock Tribes	The DEIS does not adequately address the mine's impact to the Tribes' treaty rights to hunt, fish, gather and practice all and fully their cultural and customary activities. As federal trustees, the United States government agencies should ensure that the lands and natural resources in the mining area are restored a, protected and preserved for the current and future exercise of the Shoshone-Bannock Tribes' reserved rights.	The treaty with the Shoshone-Bannock does not prevent the United States from allowing future actions that constitute occupancy of federal lands within the treaty area. Simplot may also exercise rights granted by its phosphate lease contract with the United States. The mining proposal includes significant reclamation activities designed to maintain the treaty rights and cultural activities of the Shoshone-Bannock to hunt, fish, and gather on the public lands in the area, as well as provide restored habitat to sustain wildlife. The mine would be required to emphasize revegetation with native plants including consideration of culturally important plant species to the Shoshone-Bannock people.
10	10.13	The Shoshone-Bannock Tribes	As reflected in the indicators listed previously, tribal concerns include potential changes in the quality and quantity of groundwater and surface water, traditionally valued vegetation (culturally significant plants), grazing resources, and wildlife. Changes in quality of these resources may include increased uptake of COPCs by vegetation and wildlife, changes in the natural setting of traditional resources that would diminish their value to traditional practices; diminished value of traditional hunting, fishing, and gathering areas; rendering of culturally important natural resources unfit for harvest or consumption; and impairment of access to resource areas. Many of these resources or issues overlap with other resource concerns discussed in this EIS, but also must be considered in consultation with the Tribes. Tribal consultation to date has not identified culturally unique resources in this Study Area, including any sacred sites.	Potential short-term impacts would be associated with the disturbance or displacement of plant and wildlife species used for traditional purposes and subsistence. The land would be reclaimed after mining. Regarding access to resource areas, the EIS acknowledges there would be an interruption during mining activities to the Shoshone and Bannock Tribes' access to public land to exercise treaty rights and traditional uses, however access would be restored at the completion of mining. The Project would result in adverse impacts to some of the natural resources that the Tribes may require in the exercise of their treaty rights.
10	10.14	The Shoshone-Bannock Tribes	The above impacts are partial. As communicated earlier because the agencies and proponents have failed to identify all cumulative and synergistic impacts from existing contaminants in surface waters, ground water, soils, vegetation, wildlife, fisheries, aquatics, visual, cultural the additional stressors have not been adequately characterized.	An appropriate analysis was conducted in the EIS to identify cumulative and synergistic impacts from existing contaminants in surface waters, ground water, soils, vegetation, wildlife, fisheries, aquatics, visual, and cultural resources in the cumulative effects section for this Project. The purpose of this EIS is to evaluate the potential effects of the Proposed Action and Action Alternatives for the East Smoky Panel Project. The EIS does not need to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. However, Section 2.2.3, plus the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects (Section 5.4), discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine. The East Smoky Panel Project would make negligible to minor contributions to the environmental impacts while progress is being made on remediating existing problems. In addition, extensive ongoing monitoring and adaptive management would be implemented as part of this Project.
10	10.15	The Shoshone-Bannock Tribes	In addition, the failure to identify radiological impacts both cumulative and synergistic in the above resources leave a large data gap that must be filled before the true and full impacts from this project can be known.	Please see Comment Response 10.9.

ID No.	Co ID No.	Name/ Entity	Comment	Comment Response
10	10.16	The Shoshone-Bannock Tribes	The Tribes disagree that consultation to date has not identified culturally unique resources in this Study Area, including any sacred sites. The Shoshone-Bannock Tribes have continually communicated to the Agencies each Mine Site has unique and sacred values, uses due to a sacred and spiritual landscape. For the agencies to communicate the lack thereof is disingenuous.	The Agencies do not intend to be disingenuous in this regard. The FEIS Executive Summary has been slightly modified regarding the language about sacred sites and text has also been added in Chapter 3 and 4 stating that no “specifically” identified sacred sites are known or have been identified.
10	10.17	The Shoshone-Bannock Tribes	Every resource is expected to be impacted, as categorized in Chapter 4. It seems convenient for the agencies and proponents to communicate the impacts are temporary and partial and will be mitigated when existing contamination in the area has not been mitigated and continues to negatively affect Tribal members.	Impacts described in the DEIS are likely to be temporary and are accurate for this Project. The site conditions (e.g., geology) and the mine plans (e.g., cover systems) are substantially different from those previously used and/or in place at the Smoky Canyon Mine and much has been learned about selenium issues over the past several years. Mitigation for existing impacts is being handled under the CERCLA process and is not related to this Project or this EIS.
10	10.18	The Shoshone-Bannock Tribes	The Tribes do not agree with the federal agencies permitting activities that will lead to Irreversible and Irretrievable Commitment of Resources and will not be held accountable for this loss of resource in any future Natural Resource Damage Assessment.	Comment noted.
10	10.19	The Shoshone-Bannock Tribes	If this project moves forward the Shoshone-Bannock Tribes request: • Complete and comprehensive Ethnographic studies for Tribal cultural resources be funded; • Funding for monitoring for biological impacts from selenium releases into the environment; • Complete characterization of the synergistic effects from existing contaminants and additional contaminants expected including radiation.	The Tribes have requested ethnographic studies for other EISs prepared by BLM. BLM has worked with the phosphate industry to make resources available for an ethnographic study as requested previously by the Tribes. BLM has requested direction and assistance from the Tribes in undertaking a study and look forward to working with the Tribe to access Tribal Elder oral histories. Meanwhile, BLM will continue to communicate with the Tribal staff and Fort Hall Business Council as has been done in the past to locate and protect culturally important resources.

Appendix 6A - Table 2 – Yellowstone to Uintas Connection and Kiesha's Preserve DEIS Comments within DEIS PDF Document

This table is a supplement to Appendix 6A, Table 1. One of the entities (Yellowstone to Uintas Connection/Keisha's Preserve) who commented on the Draft EIS did so in two separate ways: (1) via submitting a comment letter; and (2) requesting that the Agencies download and extract some additional comments from a pdf of the Draft EIS. The Agencies downloaded and reviewed the marked-up pdf, as requested. Out of the 455 notated highlights in that file, 145 were extracted that appear to be actual unique comments or comment groupings, and responses are included in the following table. The remaining 310 either appeared to be simple highlights or a quotation from the DEIS or duplicative of Y2U/KP's comment letter (which is identified ID No. 7 and included in Table 1 in Appendix 6A). Unique comments from the pdf were numbered and are listed in the following table. Due to the nature of these comments, the highlighted text that provides the context of the comments is also included in the table, as are the relevant page numbers.

Comment Number	Highlighted Text	Comment	Page Number	Comment Response
1	All run-of-mine (ROM) overburden would receive a geologic store and release cover system consisting of chert, overlain by Dinwoody and/or Salt Lake Formation, and a topsoil layer.	Store and release cover. Does it provide soil properties to support return of the native plant communities, forested areas removed by mining?	ES-2	DEIS Section 4.6.2.1 describes the potential effects to soil productivity and/or fertility, which could in turn affect reclamation success. It also notes that topsoil would be sampled prior to placement to determine agronomic characteristics, which would then dictate fertilizer types and application rates, if any are needed. Note that the topsoil replaced on the surfaces that would receive the store and release cover would need to be capable of providing a vegetative community suitable to support the post-mining land uses of grazing and wildlife habitat. Long-term revegetation would include a mixture of native grasses and forbs, as well as reforestation of some areas. Seed mixes to be used and re-forestation goals would be determined by the USFS. (DEIS Section 2.4.9.4)
2	A Revised Forest Plan (RFP) amendment would be required to change the management prescription of the lands contained in the proposed transmission line reroute to allow designation of a 200-foot wide utility corridor for the new route and revised SUA.	200 foot ROW for power line would require change of management prescription to allow this ROW	ES-2	Comment noted.
3	Under the No Action Alternative, the proposed M&RP for development of the East Smoky Panel and proposed SUAs would not be approved, no modification to the existing mineral lease would occur, the CNF RFP would not be amended, and mining at other panels of the Smoky Canyon Mine would continue as currently authorized.	No action alternative would allow continuation of mining existing panels, the RFP would not be amended. A desirable outcome?	ES-3	The need to amend the RFP or not to amend it is not considered as either desirable or undesirable. Instead, the agencies have an obligation to comply with NEPA as they process and analyze the proponent's proposal. If there is a resultant need to amend the RFP, it will be amended. Per DEIS Section 2.4.6, 36 CFR 219.13(b)(5) requires the responsible official to determine and assess the specific substantive requirements within 36 CFR 219.8 – 219.11 that are directly related to the plan amendment. The analysis in this document discloses the effects to resources and includes the substantive requirements within 36 CFR 219.8 – 219.11.

Comment Number	Highlighted Text	Comment	Page Number	Comment Response
4	…a portion of highwall and pit would not be reclaimed due to lack of available backfill.	12 acres of pit and highwall not reclaimed due to lack of backfill, seleniferous materials exposed? Runoff chemistry? Ponding? Toxicity?	ES-4	Precipitation that contacts the highwall and the partial pit backfill area would infiltrate through the backfill in the same manner as it infiltrates through the full backfill areas. There would be no ponding, thus no risk of toxicity to wildlife. This area of the pit was considered and included within the groundwater model. Additional narrative has been added to Section 2.4.3.1 of the DEIS to clarify that the Phase 7 pit would be partially backfilled.
5	A large percentage of the fugitive particulate emissions generated from mining and transportation activities would settle out quickly near their point of generation.	Air quality similar to prior operation. Is there monitoring data, baseline? It notes a "large" percentage of particulates would settle out near their point of generation. Model, analysis, soil and air sampling for toxic material, ambient air quality?	ES-4	Section 3.3.1.3 notes that the existing Smoky Canyon Mine has an air quality permit issued by the IDEQ and describes air monitoring done to support future air permitting activities at the mine. Soil sampling in the project area was discussed in Section 3.6.2 of the DEIS.
6	…manganese plume greater than the secondary groundwater standard of 0.05 mg/L is predicted to extend from the East Smoky Panel west under much of the B-Panel and down to Hoopes Spring. The greater than 0.05 mg/l plume for manganese in the Wells Formation develops rapidly below and south of the pit backfill and then gradually continues to move south.	Mn concentration would exceed std down to Hoopes Spring and continues to move south. Concentration lower under Alt 1. TDS greater than std but what about eventual increase in TDS in surface waters?	ES-5	Predicted manganese and TDS concentrations in the two potential locations where the groundwater could reach surface water (Lower South Fork Sage Creek Springs and Hoopes Springs) are described on DEIS pages 4-38 and 4-39 for the Proposed Action and page 4-48 for Alternative 1. For the FEIS, data tables have been added in these sections to provide more detail on the concentrations expected over time.
7	These direct impacts to soil resources include loss of soil during salvage, loss due to erosion of stockpiles or reclaimed areas, exposure and potential mobilization of selenium, and reduced productivity.	Soils suffer direct impacts due to loss during salvage, erosion of stockpiles or reclaimed areas, exposure and mobilization of selenium and reduced productivity. Temporary veg cover, incorporation of slash for organic matter, concurrent reclamation reduces stockpile time. Topsoil sampling would determine agronomic characteristics which would dictate fertilizer types and application. Major impacts. How will they match replaced soil with current soil characteristics to allow return of the native plant communities for each ecological site?	ES-6	DEIS Section 4.6.2.1 notes that topsoil would be sampled prior to placement to determine agronomic characteristics, which would then dictate fertilizer types and application rates, if any are needed. DEIS Section 2.4.9.4 describes revegetation of the site, which cannot completely mimic the ecological sites previously present due to the need to restrict selenium uptake. The resulting species composition and community structure would be different than before the disturbance but would produce a vegetative community suitable to support the post-mining land use of grazing and wildlife habitat.
8	However, even after reclamation, the Proposed Action would result in the net debit of 33,551 DSAYs and Alternative 1 would result in 5,488 fewer DSAYs than the Proposed Action. This habitat alteration and forest fragmentation would cause long-term species composition changes. However, both the Proposed Action and Alternative 1 would unlikely impact entire populations and would have negligible to minor impact to individuals…	33,551 DSAYs lost and long term species composition changes. But, unlikely to impact entire populations. When you add the impacts of all the mines (total acres lost in the phosphate patch for each habitat type), added roads, human disturbance certainly local impacts are huge. Just because a species would continue to exist outside this project area does not mean that populations are maintained in healthy condition or are able to maintain gene flow. What about the corridor? No mention.	ES-7	Potential direct, indirect, and cumulative impacts to wildlife are discussed in Chapters 4 and 5 of the EIS. The Project would impact habitat immediately adjacent to existing mining disturbance that has been there for more than 20 years.

Comment Number	Highlighted Text	Comment	Page Number	Comment Response
9	The Proposed Action and Alternative 1 would result in direct disturbance of approximately 21 acres of Aquatic Influence Zones (AIZs), but given the nature of the AIZs as non-perennial and lacking connection with perennial waterbodies, effects to them would overall be minor. Reductions in flow in Roberts Creek due to spring flow disruption or elimination would have a moderate impact to aquatic habitat, but impacts would be reduced to minor given the current habitat quality.	Loss of 21 acres of AIZ lacking connection to perennial water bodies result in minor effects. But, these are important to recharge, for animals like sage grouse, amphibians. What is the total lost for all the mines? Then the dewatering of Roberts Creek is minor impact due to current habitat quality. So is this its natural condition or is the current habitat quality a result of mining, grazing? What is its potential vs current condition?	ES-7	It would be out of scope for this EIS to address the loss of AIZs for "all of the mines". Cumulative impacts within the identified Cumulative Effects Area are described in Chapter 5 of the EIS. DEIS Section 4.8.2.1 acknowledged potential sage grouse impacts due to displacement and/or habitat loss and potential amphibian impacts due to localized drying or reduced surface water. DEIS Section 4.9.2.1 accurately describes impacts to AIZs and impacts resulting from Roberts Creek flow diminishment. Per NEPA requirements, impacts are assessed in comparison to the existing condition.
10	Over time these slopes would erode and weather and the horizontal lines would become less discernable.	Go about discounting visual effects. We go from forested mountain slopes and streams to a mine pit and 715 foot highwalls with benches. "Over time, these slopes would erode and weather and the horizontal lines become less discernable. Over what period of time? 10,000 years? 1 million years? How ridiculous.	ES-9	This paragraph is discussing the construction and mining aspects of the Project. The majority of highwalls would be backfilled as part of reclamation and the few acres of remaining highwall would be approximately 80 feet high after being partially backfilled, face west, and not be readily visible outside of the mine area.
11	…(existing sources of light outside the mine are from a few residences and the occasional vehicles passing through the area).	Light effects would be noticeable due to the lack of lighting in the area...of course, when people camp they enjoy the night sky. The residences may have been built to enjoy the natural environment. This would impact them. As far as occasional vehicles passing thru.what traffic data is collected on the roads in the Project and Cumulative Effects Areas?	ES-9	Comment acknowledged. Page 4-106 of the DEIS described potential impacts to viewers in an area from 5-10 miles away from the mine due to lighting. The Project would be a continuation of the existing mining operation and does not include increased production or increased employment, so traffic related to the mine would not change (DEIS Section 4.10.2.6).
12	Overall, the impacts of the Proposed Action and Alternative 1 would be beneficial, short-term, and major.	Social and economic impacts beneficial. What about the legacy of superfund sites, polluted streams left by the mining industry in the phosphate region? Who is paying for the cleanup? Who will pay in the future if this plan fails?	ES-10	CERCLA is not a part of this Project or this NEPA evaluation. The Project, as with Simplot's existing Smoky Canyon Mine, would be subject to a reclamation performance bond, as described in DEIS Section 2.4.11. Ongoing CERCLA studies and cleanup requirements would continue to be directed by the federal agencies overseeing the process.
13	The Project Area is generally defined as the geographic area that includes the proposed disturbance footprints of the Project.	Project area defined as disturbance footprint. How does this compare to the 49% loss above for the Study Area? How do the Study Area and Project Area differ?	1-1	The 49 percent loss referred to by the comment is from the Executive Summary land use discussion. DEIS Section 3.1.3 described how the Study Areas and the Project Area differ.
14	USFS authorization is required for operations related to the Project located outside of the phosphate lease boundaries on National Forest System (NFS) lands, such as portions of the haul roads, borrow areas, stormwater control features, and topsoil storage areas.	USFS authorization outside the lease boundary. What about CTNF lands in the lease? Figure 1.1-1 indicates the mine footprint and lease are also in the National Forest?	1-2	As stated on DEIS page 1-4, immediately following Figure 1.1-1 on Page 1-3, "*The USFS must determine whether and how to authorize these operations. Because the on-lease operations would occur on NFS lands, the USFS is a joint lead agency in the analysis of potential effects to those lands. The BLM would consult with the USFS in completing the effects analysis for on-lease operations and ensure that any mining and reclamation operations approved for NFS lands would comply with the RFP.*" No change.

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15	…comply with the RFP.	BLM consult with USFS to ensure compliance with RFP. I would note that the FEIS for the RFP emphasizes many wildlife aspects that do not get addressed. Those figures from Vol IV of that EIS must be incorporated into a cumulative and direct effects analysis for this mine and all other past, present and future foreseeable actions. That analysis expresses an intent that the Forest Plan itself has watered down. Roads, both open and closed, illegal or legal, temporary or permanent, Crow Creek pipeline, transmission lines, other mines and their infrastructure, Winschell Dugway, all need to be mapped for the entire phosphate region combined with an overlay of the Corridor.	1-4	The Agencies assume the comment is referring to figures in the RFP EIS Appendix D of Volume IV. Those figures address a much larger area than is needed and/or appropriate for this Project's EIS cumulative effects analysis. In addition, the portion of the comment that describes the RFP's EIS analysis as "*watered down*" is not relevant to this EIS; NEPA for this Project does not include reanalyzing the impact assessment in the RFP's EIS. Further, mapping "*the entire phosphate region combined with an overlay of the Corridor*" to address wildlife cumulative impacts is not within the scope of this EIS. The particular wildlife categories or species covered in those maps (Canada lynx, wolf, bald eagle, peregrine falcon, boreal owl, flammulated owl, great gray owl, three-toed woodpecker, sharptailed grouse, northern goshawk, wolverine, sage grouse, big game) were all addressed in the DEIS.
16	The CNF RFP which guides land use developments and activities in the Project Area, recognizes phosphate mining as an appropriate use of NFS lands in this portion of the CNF.	RFP recognizes phosphate mining as an appropriate use in this portion of the CNF. What portion? Where is a map showing this? Analysis needs to cover this entire "Portion".	1-10	"*This portion*" is referring to the Project Area, referred to earlier in the same sentence. Figures 2.4-3 and 3.10-1 show the management prescriptions that define appropriate usage of this area according to the RFP.
17	Desired Future Conditions: Lands within the Forest serve to help sustain and provide opportunities for traditional American Indian land and resource uses.	DFC for American Indian land and resource use..traditionally we had bears, lynx, wolverine, bighorn and fish populations without selenium, streams without cows and sediment..where is the provision for lands to have these characteristics.	1-13	Please see DEIS Appendix 4A, which describes the proposed Project and assesses its consistency with the RFP. In attaining DFCs, the USFS uses goals, standards, and/or guidelines. The USFS is responsible for evaluating proposed activities in consideration with the RFP and these measures.
18	Figure 2.4-6	Haul road and other road not connected, Facilities shown but not identified, other roads appear, but not in legend.	2-25	The intent of this figure is to group certain similar categories of proposed disturbance. See other figures in Chapter 2, including Figure 2.4-1 for facility identification. The Smoky Canyon Road is the only other road besides the haul road that is depicted in the figure, and it is accurately included in the legend as a solid black line.
19	Simplot would continue appropriate BMP's to address dust concerns, primarily by watering and/or applying magnesium chloride as appropriate to the haul and access roads as necessary.	Air quality monitoring not described only BMPs for roads such as watering and MgCl	2-28	As stated in DEIS Section 2.5.2, IDEQ is the regulatory agency responsible for ensuring that Simplot complies with its air permit. IDEQ does not currently require air quality monitoring from Simplot, but if that changes with any upcoming permit amendments Simplot would be expected to comply.

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20	Environmental staff would inspect areas shortly after they are topsoiled to ensure coverage with topsoil thickness of at least six (6) to twelve (12)-inches. (M&RP 2015)	Topsoil placement only 6 - 12 inches deep.how does this compare to the native soils? Effect on productivity, species?	2-28	DEIS Table 4.6-1 provided estimated soil depths for the native soils that would be salvaged. As that table shows most have an estimated average depth of more than 12 inches. DEIS 2.4.9.3 outlines that "A minimum of 6 inches of topsoil would be distributed over disturbed areas to prepare for revegetation. The amount of topsoil used would be dependent upon the amount of topsoil salvaged during mining. Should more topsoil be available, the minimum thickness may be increased." Regarding the effects on productivity and species, please see Comment Responses 1 and 7.
21	Timber would be cruised by the USFS and then harvested from proposed disturbance areas as directed by the USFS.	Timber harvest from proposed disturbance areas would be as directed by CNF. What separate regs govern timber harvest?	2-29	In addition to the CTNF timber harvest direction, please see the Idaho Forest Practices Act (Title 38, Chapter 13) and related Idaho Department of Lands information.
22	To minimize selenium in runoff, ….	Minimize selenium in runoff by covering seleniferous overburden with low seleniferous material prior to topsoiling. Monitoring of runoff?	2-30	Runoff will be managed and monitoring according to the terms of the required stormwater permit and associated SWPPP.
23	Drainage and diversion channels would be constructed as necessary to divert run-on water around disturbance areas and collect runoff from disturbed area to route it to settling ponds and other sediment control features.	Diversion channels for run on and runoff alter natural drainage patterns. Sediment ponds are source of pollutants to wildlife.	2-30	Alteration of drainage patterns was discussed in the subsection titled *Stream Alterations* in Section 4.5.2.1. Sediment ponds provide an important means of water and sediment management at the mine. Ponds used at the East Smoky Panel Mine would be similar to those currently in use at the Smoky Canyon Mine. Simplot is required to report wildlife incidents to the agencies, and none were reported in the 2017 annual monitoring report.
24	Where a drainage channel must be permanently routed over overburden fills, if it erodes into underlying overburden, any seepage could enter the underlying overburden and potentially leach COPCs. These channels would be designed to be stable without damage for the peak flow from the 100-year, 24-hour storm on top of snowmelt. A clay liner would be installed under the channel or the overburden directly underlying the channel bottom, and chert or other low seleniferous overburden would be placed for a distance of 50 feet on either side of the channel. The channel would be protected from erosion with chert riprap. An HDPE plastic liner could also be used.	Drainage channels over overburden fills could leach COPCs. Design, clay liners, HDPE could also be installed beneath. Life? Society will face a future burden as factors such as animal burrows, livestock grazing can affect the integrity of these protections. Need additional provisions such as permanent closure to grazing to reduce erosion over the long term.	2-30	Please see Comment Response 6.20 in Appendix 6A – Table 1.

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25	Simplot would continue the comprehensive ground and surface water monitoring program, expanding the program as needed to adequately cover the Project Area.	Ground and surface water monitoring continue as needed to cover the Project Area. We have terms like Project Area, Analysis Area, Cumulative Impact Area.difficult to follow the first two and they all vary by discipline.	2-31	The term *Project Area* was defined in DEIS Section 1.1. The Project Area's relationship to the terms *Study Area* and *Analysis Area* was described, and those two latter terms defined, in DEIS Section 3.1.3. The EIS does not use the term *Cumulative Impact Area*. Cumulative Effects Areas (CEAs) were defined for each resource in DEIS Chapter 5. It is typical and appropriate for different resources to have different Study Areas or CEAs from other resources because potential effects do not always occur at the same scale. Where it made sense (e.g., water and fisheries/aquatic resources Study Areas; surface water, soils, vegetation wetlands aquatic life, visual, air, and noise) CEAs used the same boundaries.
26	Monitoring and evaluation of the potential effect of the mining operation on wildlife and their habitat on NFS lands would continue.	Monitoring of wildlife and habitat on NFS lands would continue. Need a description of this monitoring. Long term monitoring of fisheries and aquatic resources done as needed. Vague. There needs to be an annual, quantitative program like we used to have for mining.	2-31	Per Section 2.5, "*Simplot would update their existing Comprehensive Environmental Monitoring Program Plan (CEMPP) to include the Project as necessary…*". The CEMPP is a living document that Simplot revises as needed, which covers water, vegetation, wildlife, aquatic resources including fish, and other topics. Monitoring requirements include various time scales and results in quantitative reporting where relevant. Environmental monitoring data collected under the CEMPP is routinely reported to the appropriate regulatory agencies.
27	Biological surveys for migratory birds, raptors, or other special status bird species would be conducted between March 1 through August 31 in areas planned for disturbance….	Surveys for birds and raptors March 1 to August 31 for areas to be disturbed. But the footprint of disturbance has wider effects. How are these monitored?	2-32	In addition to surveys within the footprint of disturbance, the surveys typically include a buffer area that is also surveyed. If active nests are discovered during the surveys, appropriate avoidance plans are implemented to prevent the active nests from being abandoned by mining activities.
28	Figure 2.6-5	finish contour doesn't match existing, flat surface vs slope, change in hydrology	2-38	While the comment is correct that final slopes would be somewhat different than the pre-mining or current condition at Panel B, the resultant configuration would be stable, and runoff would be managed. See FEIS Sections 2.4.5.2 and 2.5.5. for how runoff would be managed.
29	The Project Area (the area that would be directly impacted by the Project) is located within the large-scale ecological unit called the Webster Ridges & Valleys subsection discussed in the EIS for the CNF RFP (USFS 2003b).	Project area located in the Webster Ridges and Valleys Subsection discussed in the EIS for the CNF RFP. This brings in the EIS and sets the stage for all the analysis in that EIS to be included. Perhaps the analysis should include the entire Subsection.	3-1	It would not be appropriate, nor is it necessary, to include the entire Webster Ridges and Valleys Subsection in the analysis for this Project. The fact that the EIS for the CNF RFP is referenced in the EIS has no bearing on the appropriateness of the impact analysis for the Project.
30	Historically, ARD has not been identified as a problem in the Southeast Idaho Phosphate District and past testing suggests that Meade Peak materials are not likely to generate ARD at the Smoky Canyon Mine.	ARD not a problem in the SE Idaho Phosphate District.so how does all the selenium end up in the Blackfoot River? Blamed on past operations per Rasmussen, i.e. failure to adequately cover overburden.	3-10	While ARD may leach certain metals or metal-like compounds, non-ARD or alkaline waters are more likely to leach other metals or metal-like compounds. Although there can be some overlap with constituents leached in a wide range of pHs, selenium leaching is much more typical of the latter.

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31	Only 3 of the 77 tested samples had ANP:AGP ratios less than 3; two were from the Cherty Shale (0.28 and 1.8), the other was from the Meade Peak Middle (2.1).	Here it is shown that the ARD potential exists in the Cherty Shale and Meade Peak Middle. Use analysis of CaCO3 to show low potential to produce ARD, but do not discuss that potential for the Cherty Shale and Meade Peak specifically.	3-10	While details on ABA by geological unit was not included in the DEIS, this information is available in the geochemistry baseline report (Whetstone 2017), which is part of the Project record. Table 17 of that report indicates that average NNP in 6 samples of Cherty Shale was 40.1 t $CaCO_3$/Kt and average NNP in 10 samples of Meade Peak Middle was 180 t $CaCO_3$/Kt. ABA results for all the other relevant geological units relevant to the Project were also included in the table.
32	As described in the geochemistry report (Whetstone 2016), a number of SPLP leachates had concentrations of aluminum, cadmium, chromium, iron, manganese, and selenium that were greater than potentially applicable water quality standards. Additionally, nickel, thallium, and zinc concentrations were greater than water quality standards in fewer leachates.	Leach test results show potential for exceedance of standards. These include Al, Cd, Fe,Mn,Se, Ni, Th, Zn. This is counter to the ARD analysis	3-11	See Comment Response 30.
33	The nearest IDEQ monitoring station to the East Smoky Panel Mine Project is in Soda Springs, Idaho. This station monitors and records SO_2 data. A monitoring station located in Pocatello, Idaho measures PM_{10}, $PM_{2.5}$, and SO_2 concentrations. NO_2 data was gathered from the Boulder, Wyoming station.	No air monitoring stations in mining district, only Soda, Pocatello and Boulder Wyoming. Mining District should have a dedicated monitoring station or stations.	3-13	Stipulating an air monitoring station to be placed in the Mining District is not related to the Project. IDEQ establishes Idaho's air monitoring network as funds and priorities allow. Note that DEIS Section 3.3.1.3 included data from a one-year air monitoring program at the Smoky Canyon Mine and that data has been submitted to IDEQ to supplement the more regional station data.
34	…those sites represent a worst-case assessment of regional air quality due to their location relative to local industrial sources of emissions.	These stations claimed to represent a worst case scenario, but no data with which to compare. Also smoke from fires is regional.	3-13	For many potential air pollutants, it is commonly understood that concentrations would be greater closer to the source of industrial emissions. Agreed, that smoke from fires can be regional.
35	State air quality permits for sources that reside within approximately 50 km (31 miles) of the Project were reviewed for emissions data.	Emissions data from sources within 31 miles. HAPs are noted, but so far not mentioned re: Simplot. What are the elements in the HAPs?	3-16	EPA considers HAPs to be pollutants "*known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects*". The list of 187 individual chemicals can be found at https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications.
36	The local, one-year data set (RTP Environmental Associates, Inc. 2015) at the Smoky Canyon Mine also reflected wind flow patterns that were strongly influenced by terrain.	Terrain effects, i.e. mountain and valley, do they experience the up-and down canyon flows we have here?	3-20	Per the highlighted text where the comment was made, wind flow patterns at the mine are strongly influenced by terrain. Whether or not those are the same patterns experienced at the commenter's location is not relevant to this EIS.
37	3.4.2 Noise Effects	FS and BLM have no noise regs, OSHA does not apply, but what about MSHA? Do they have personnel monitoring of noise levels? Present the data. They do acknowledge use of OSHA methods. Cite EPA outdoor noise limits. What about sage grouse?	3-23	Please see DEIS Table 3.4-1 for MSHA noise requirements. Please see DEIS Section 3.4.4 where EPA outdoor noise limits were identified. Whether or not Simplot personnel are monitored for noise levels is not relevant to the impact assessment; however, Simplot is and would be required to meet all relevant MSHA requirements, including those related to noise. Regarding sage grouse, DEIS page 4-73 acknowledges impacts through short-term displacement of individuals, which encompasses impacts due to noise.

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38	Table 3.4-3 Noise Monitoring Results (dBA)	Noise results in LMAX, LMIN and LEQ. does the formula reduce the instantaneous level?	3-27	The chosen sound level meter generates an A-weighted decibel reading every second and logs the data internally throughout the duration of the sampling period. Data was collected continuously for 15 minutes. 'A' frequency weighting and a 'SLOW' response time were settings selected on the meter for this analysis. Most OSHA related testing is performed using 'A' Weighting and SLOW Response Time settings, which is what was used for this analysis. Calculations were not independently performed to derive Lmax, Lmin, or Leq.
39	Further, within a portion of the Study Area, a RI/FS (Formation Environmental, LLC 2014), as implemented under CERCLA, is being conducted to address existing environmental contamination issues at the Smoky Canyon Mine.	Mention RI/FS on existing mine for environmental contamination issues. What are the issues, sources, cleanup procedures? How is the mine expansion any different? Did it include soils? Surface or groundwater? Vegetation? Remember the six dead horses at Lanes Creek.	3-28	The RI/FS is a comprehensive and lengthy process that is part of the CERCLA process and is not directly related to the Project. Providing a lengthy discussion of the RI/FS in the EIS was deemed unnecessary to adequately analyze the impacts of the Project.
40	Groundwater samples collected from GW-15, GW-16, GW-22 (98'), and GW-26 had dissolved selenium concentrations greater than the 0.05 mg/L primary standard in every monitoring event. Several monitoring wells (GW-22 (150'), MP01, MP02, and MP03) had concentrations greater than the dissolved selenium standard in one or more of the monitoring events. Mean selenium concentrations for the four groundwater systems (Alluvium/Salt Lake Formation, Dinwoody Formation, and Wells Formation)…	Elevated selenium in these locations occurred in the Alluvium, Salt Lake, Dinwoody and Wells Formation, so apparently the claimed isolation of these is not so isolated from mining activity. Will these areas be subject to excavation for the expansion? If so, what testing of soils and disposal will be required?	3-40	The DEIS Section 3.5.1. discusses the relationship between groundwater systems and geologic units in the East Smoky Panel area where separation and isolation were described. It is accurate as written. The water quality data reported in DEIS Section 3.5.1.2 and highlighted by the comment reflects water chemistry that has been historically impacted by the Pole Canyon overburden disposal facility. The hydrogeology associated with the Pole Canyon area is further described in the DEIS Section 5.4.3.1 and generally indicates that the selenium entered the alluvium via the constructed rock drain. As shown on Figure 3.5-1, the areas where these monitoring wells are showing elevated selenium are outside of the East Smoky Panel Project Area, thus outside of any related disturbances, and would not be subject to excavation. Therefore, testing of those soils and disposal of the same are not relevant.
41	The RFP (USFS 2003a) states that no more than 30 percent of the NFS lands component of a watershed or subwatershed should be in a hydrologically disturbed condition (defined in the RFP as "Changes in natural canopy cover (vegetation removal) or a change in surface soil characteristics, such as compaction, that may alter natural streamflow quantities and character")….	Forest disturbed % in Sage and Tygee HUCs. Doesn't discuss the nature of the disturbance and odds are that soil erosion and compaction from livestock is ignored.	3-42	The nature of the disturbances included in the calculation was clearly presented in the highlighted text as "*Changes in natural canopy cover (vegetation removal) or a change in surface soil characteristics, such as compaction, that may alter natural streamflow quantities and character*". Whether or not livestock-related actions are included or not is not relevant to the calculations because the important metric is what the Project is adding to the percent disturbed and the Project does not include adding livestock grazing. The FEIS states in Section 5.4.5.2 that, cumulatively, the totals for each of these two areas would remain at less than the 30 percent hydrologically disturbed area recommended by the RFP.

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42	Figure 3.5-10	Figure should show existing mine to reveal proximity to these contaminated wells. This figure also points out a vacuum east of the Project Area where no monitoring wells are shown. This is in Salt Lake and Alluvial formations.	3-43	This figure rightly focuses on the Project. Figures 1.1-1, 2.3-1, 2.4-1, and 2.4-2 show the existing mine and can be referred to as needed. Figure 3.5-10 shows several wells located to the east of the northern part of Project Area and east of the West Sage Valley Branch Fault. The comment is correct that there are no monitoring wells completed in the alluvium or Salt Lake Formation due east of the south half of the Project Area.
43	Figure 3.5-10	Groundwater selenium exceeding IDAPA 0.05 level is that a result of existing mining or background? This is in salt lake fm and alluvium	3-43	Page 3-40 in DEIS Section 3.5.1.2 notes that elevated selenium in these alluvium and Salt Lake Formation wells is likely associated with previous mining activities. Water chemistry in that area has been historically impacted by the Pole Canyon overburden disposal facility, as described in the DEIS Section 5.4.3.1.
44	Figure 3.5-11	Figure shows selenium below standard in Dinwoody Fm. Not consistent with those reported above.	3-44	The comment is unclear about what the inconsistency is. A review of the text in pages on water quality located in the DEIS above the cited figure page do not appear to have any inconsistent information about the Dinwoody Formation wells.
45	Figure 3.5-13	Surface water monitoring sites. Note tailings ponds not in defined Project Area. How is this possible. Are they existing ponds for the Smoky Cny Mine. Yes, they are existing. Note the lek shown in the tailings pond was destroyed, otherwise how can it be shown?	3-46	The agencies made the determination that it was not necessary to include the tailings ponds in the EIS because they were previously analyzed in other NEPA documents for the Smoky Canyon Mine and that analysis does not change with the proposed mine expansion at the East Smoky Panel. There will be no change to the existing footprint or operations at the tailings pond with this Project. An historic sage grouse lek was impacted by the development of the tailings pond greater than 20 years ago. The Idaho Fish and Wildlife Information System database still shows the location of this historic lek.

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46	Flow measurements at Upper Smoky Creek (USm) ranged from 0.27 cubic feet per second (cfs) to 1.6 cfs, but the creek became dry or had very low (unmeasurable) flows by the time it reached Middle Smoky Creek (MSm) about 1.5 miles downstream.	Middle Smoky Creek no flow. This indicates it must percolate into alluvium. What are implications for this geology and the tailings ponds that are adjacent?	3-47	The gain/loss conditions have been well-studied in numerous other past EISs and reports but were not repeated in the DEIS as they were not relevant to the East Smoky Panel Mine Project's predicted impacts. However, Formation (2014) notes: "*As Smoky Creek flows eastward from highlands of the Webster Range, the creek gains flow as it crosses the Dinwoody Formation outcrop west of the mine. Flow remains relatively uniform across the Phosphoria Formation outcrop and then Smoky Creek loses a portion or all of its flow, depending on the time of year as visually observed or measured, as it crosses the Wells Formation outcrop. Surface water flow loss to the Wells Formation is efficient, and the creek rarely maintains flow across these strata. As Smoky Creek crosses the Boulder Creek Anticline, the creek flows perennially from springs and base flow issuing from the Lower Dinwoody Formation aquifer.*" Formation Environmental. 2014. Final Smoky Canyon Mine Remedial Investigation/Feasibility Study. Remedial Investigation Report. Prepared for J.R. Simplot Company. September 2014.
47	Immediately downstream of the tailings pond at LT-3, flows ranged from 0.22 cfs in November 2014 to 1.84 cfs in May 2016. The mouth of Tygee Creek (LT-6) had measured flows ranging from 12.4 cfs in November 2015 to 21.6 cfs in May 2016.	Tygee Creek flows measured immediately below tailings ponds..how is the water able to make it under the ponds? Or is this water coming from the ponds, or is it emerging groundwater?	3-47	Figure 3.5-13 shows the Roberts Creek Diversion, which intercepts flow from Roberts Creek, small seeps, and occasional runoff from upgradient land. The diversion conveys this flow around the south end of the tailings ponds and back around to the north, discharging any flows into Tygee Creek below the tailings dam and upstream of LT-3. A clarifying statement on this has been added to Section 3.5.2, on page 3-41 of the DEIS.
48	TMDLs were developed for *Escherichia coli* (*E. coli*) and sediment/siltation, but not for selenium (due to CERCLA precedence).	No TMDLs for selenium in streams due to CERCLA precedence. Does this mean there are no limits on Simplot discharges of selenium? Are they unregulated? So, does this just become another superfund site.	3-51	IDEQ's process is approved by EPA. These streams are still assessed every two years and their impairment status is still determined (see DEIS Table 3.5-3). So, no, they are not unregulated. There is more than one way that IDEQ handles or categorizes impaired stream reaches. Further, both EPA Clean Water Act regulations (40 CFR 130.7(b)(1)) and Idaho water quality standards (IDAPA 58.01.02.055.02) enable the process that the comment refers to regarding CERCLA. Under federal regulation, where pollution control requirements required by local, state, or federal authority are stringent enough, TMDLs are not required. Under State regulation, when other pollution control requirements will achieve full support of uses within a reasonable amount of time, TMDLs are not required. CERCLA cleanups must meet water quality criteria before the process is complete. CERCLA is enforceable, whereas a TMDL is not.

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49	Notably, Roberts Creek (ID17040105SK007_02g) was recommended to be delisted for combined biota/habitat bioassessments and instead be reported as "unassessed" (IDEQ 2017b).	Roberts Creek to be delisted for biota/habitat and be reported as "unassessed" another example of destruction and forgiveness of that destruction.	3-52	IDEQ's process is approved by EPA. Unassessed simply means that the State feels that data is inadequate to evaluate support of a beneficial use for the current cycle. The 2016 Integrated Report (recently approved by EPA) provides the following rationale for delisting Roberts Creek: Segment ID17040105SK007_02g Roberts Creek (5.6 MILES) Combined Biota/Habitat Bioassessments Data and/or information lacking to determine water quality status; original basis for listing was incorrect. 12/4/2017 (HH, AS): The only BURP assessment at Roberts Creek was conducted in 2002 at a flow of 0.09 cfs and took place during a rain storm. 2002 was the second driest year on record, exceeded only by 2001, and was the third year of the worst drought on record in the watershed. Assessment data indicate that the quantity of fine sediment encountered during the Wolman pebble count was excessive (over 70%). Streambanks, however, were very stable (99%). In contrast to the Wolman pebble count, 40 TSS and 35 turbidity samples were collected from three sites upstream of the BURP location between June 2000 and 2012 (Formation Environmental 2013). TSS samples were low, with an average concentration of 5.5 mg/L with a maximum value of 10 mg/L. Similarly, TSS averaged 2.6 mg/L with a maximum value of 16.08 mg/L and all others below 6 mg/L. The inconsistency between the Wolman count and the long-term sediment data suggests that the drought and low-flow conditions under which the BURP assessment was performed may have negatively influenced the results. In addition, median selenium (0.00023 mg/L) and total phosphorus values (0.045 mg/L) are quite low, and available temperature data show no exceedances (Formation Environmental 2013). Median nitrogen (nitrate + nitrite) concentration is also relatively low (0.09 mg/L) and DO values do not reflect any DO depletions associated with excessive aquatic vegetation that might indicate excess concentrations of nutrients (Formation Environmental 2013). Notes from the 2002 BURP assessment indicate that the assessment was conducted in a marshy reach and that sedges were growing in the streambed. Retention of fine sediment would be greater in these locations and an assessment performed at such a locality is not representative of the rest of the stream. Because of the lack of clear evidence of impairment, the calculation of a TMDL is not appropriate. Additionally, NHD lists this stream as intermittent. As per WBAG3 Section 2.1.1, BURP indices are not appropriate to apply to these waters. Therefore, DEQ proposes putting Roberts

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				Creek in Category 3 as unassessed and delisted for combined biota/habitat bioassessments. IDEQ. 2019. Idaho's 2016 Integrated Report. Final. Boise, Idaho. Approved by EPA in June 2019.
50	Table 3.5-3 (Last column, Second row).	Note E. coli not supporting beneficial uses in some streams. Here is a mitigation. keep cattle away from streams after all Simplot runs a cattle operation on Crow Creek, maybe elsewhere.	3-52	It is not relevant for this EIS to address grazing along Crow Creek. The Project does not involve any grazing proposals.
51	The surface water data set generally met these water quality standards. Exceptions included the elevated total selenium concentrations at several sites that exceeded both chronic and acute aquatic life standards of 0.005 mg/L and 0.020 mg/L, respectively (**Table 3.5-4**). In addition, EPA's secondary drinking water MCLs of 0.05 mg/L for….	Selenium exceedances of chronic and acute aquatic life standards of 0.005 and 0.02 mg/l. Do they matter?	3-53	Yes, the DEIS acknowledges the exceedances, attributes them to previous mining activities, and describes the CERCLA processes underway to remediate. In addition, the FEIS has been revised to reflect the current Idaho selenium criteria as recently approved by EPA.
52	This would subsequently reduce the amount of topsoil and subsoil available for reclamation.	Shortage of topsoil for reclamation?	3-75	The DEIS Section 4.6.2.1 described the estimated available topsoil and stated that based upon this information there would be well over the minimum required reclamation. No change.
53	*Total* selenium concentrations ranged from non-detectable (less than 0.02 mg/kg) up to a maximum reported concentration of 12.8 mg/kg. The maximum *Total* selenium value was detected in soil profile 14ES10 (62 to 106 cm).	Selenium in soil ranged up to 12.8 mg/kg. Is this surface sample? How about a contour map of selenium in soils related to mining disturbed areas and haul roads.	3-75	The answer to the question on whether the sample of interest is a surface sample can be found in the sentence that the commenter highlighted: the sample was from 62 to 106 cm, so no, it is not a surface sample. A contour map of selenium in soils related to mining disturbed areas and haul roads was deemed unnecessary for this EIS. Figure DEIS 3.6-1 shows soil map units and soil sample locations/names.
54	Within the Study Area, there is one approximately two-acre pond created to divert Roberts Creek around the tailings ponds. Immediately outside the Study Area are the two tailings ponds, approximately 70 and 300 acres in size. The tailings ponds are managed by Simplot as to not attract wildlife by reducing shoreline vegetation and habitat (Stantec 2016e).	Tailings ponds managed to reduce wildlife by reducing shoreline habitat. So, what data on wildlife use of ponds, chemistry and toxicity of ponds?	3-99	Simplot is required to monitor wildlife, including at the tailings ponds. Simplot is also required to collect surface water monitoring data quarterly from two sites at the tailings ponds (TP2 and TP-2D). The collected data is reported to the agencies as required. In 2017, the latest annual report currently available, there were no wildlife incidents and no documented sightings of federally listed threatened or endangered species at the tailings ponds. In that same report, water quality data is summarized as: "*…water quality at these locations remained generally consistent with past conditions…slight decreases in dissolved (0.0049 mg/L) and total (0.0043 mg/L) selenium concentrations and chloride (30.9 mg/L) were observed at TP2, whereas slight increases in dissolved (0.0011 mg/L) and total (0.0016 mg/L) selenium were recorded at the TP2 toe drain*."

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55	**Figure 3.8-1** shows the location of any Idaho Fish and Wildlife System (IFWIS) records of special status species observations within five miles of the Study Area.	Idaho Fish and Wildlife System records of special status species observations within five miles of Study Area. What monitoring was done by the agencies or Simplot for the mine permit and what did those surveys show if actually done?	3-99	Simplot monitors for threatened and endangered species as part of compliance obligations under their existing mine permit. In 2017, the latest annual report currently available, there were no documented sightings of federally listed threatened or endangered species at the mine or the tailings ponds. Results from the baseline surveys for special status species undertaken for this EIS as part of the East Smoky Panel were described throughout DEIS Section 3.8.
56	Only BLM-sensitive species that have the potential to occur in the Study Area are included.	Only BLM sensitive species included. What about Forest Sensitive species?	3-103	The cited text is saying that, for the BLM list, only those BLM-sensitive species that have the potential to occur within the Study Area are listed. Forest sensitive species were included in Table 3.8-1 under the USFS column heading.
57	There is no suitable breeding habitat for peregrine falcons in the Study Area, but waterfowl use of the tailings ponds may attract foraging peregrine falcon. Peregrine falcons have been observed in the region of the Study Area and although none were observed within the Study Area, one peregrine falcon was incidentally observed in July 2014, approximately 0.5 miles northeast of the Study Area near the tailings pond (**Table 3.8-1**).	Peregrine observation near tailings pond. Indicate waterfowl use of tailings pond. What is water quality of ponds?	3-114	See response to Comment 54. Note that the siting was not at the pond but was half a mile away and note that the tailings ponds are managed by Simplot as to not attract wildlife (including waterfowl) by reducing shoreline vegetation and habitat (DEIS page 5-33).
58	They are primarily browsers, and much of their diet is shrubs and trees, especially in the winter (USFS 2003b).	Deer primarily browsers. Not true, but cite Forest Plan.	3-116	The DEIS correctly cites the CNF RFP FEIS for the statement that deer are primarily browsers. Further, the Mule Deer Foundation (https://muledeer.org/hunting/mule-deer-facts/) and the University of Idaho (https://muledeer.org/hunting/mule-deer-facts/) consider mule deer as primarily browsers.
59	However, the IDFG does not collect or have any specific information on big game migration corridors within or adjacent to the Smoky Canyon Mine area (Stantec 2016e).	IDFG does not collect data on migration of deer in vicinity of Smoky. Mines should be paying for surveys as the Forest Plan recognizes their importance.	3-117	The Agencies preparing this EIS cannot compel or require IDFG to require the mines to pay for migration surveys.
60	In total, there are 249 acres of AIZs in the Study Area.	249 acres of AIZ in the study area. Pole Canyon Creek in a pipe, so rqmts don't apply, downstream on private, so criteria not applicable. What is an ODA?	3-125	AIZs cannot be designated on private land because the USFS does not have management authority on those lands. An ODA is an overburden disposal area. This term is defined in the DEIS including in the acronym list and the glossary.
61	These sites were also monitored from 2005–2009; however, monitoring occurred during the summer rather than in the fall and TRC (2008) did not consider the data comparable to the fall data. As a result, the data has not been included in subsequent annual reports and is not included here.	Embeddedness assessments from1990 - 2002 not included due to summer timing, only fall data included beginning in 2010. Perhaps the summer data should be collected once again for comparison rather than tossing it out.	3-126	The summer data has not been tossed out; it is simply not used in this comparison. The agencies determine the appropriate timing requirements for monitoring including for embeddedness. Both embeddedness and benthic macroinvertebrates are scheduled to coincide with the fall water sampling. This schedule is advantageous for those measures (i.e., during low flow season) and provides synergies with various types of media sampled at the same time.
62	Mean summer flow for the same period at HS-3 is 6.73 cfs. As discussed in **Section 3.9.5**, water from Hoopes Spring is the primary source of selenium to Sage Creek and Crow Creek.	Hoopes Spring appears to be good habitat, but is primary source of selenium to Sage and Crow Creeks. What is being done about this?	3-141	DEIS Sections 2.2.3, 3.5.3, 5.4.3.1, and 5.4.6 describe that Hoopes Springs and its eventual remediation is a major component of the CERCLA process that is underway for the Smoky Canyon Mine.

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63	There are pools present as well as large beaver dams. The LS location is downstream of the mine haul road crossing with disturbances noted at the site (Formation Environmental 2016c).	Sage Creek upstream with pools and beaver dams but downstream of haul road disturbances present, but undefined. Listed for Se. Low embeddedness, some erosion and unstable banks in lower reach. Grazed? Likely?	3-141	The existing affected environment for grazing was discussed in Section 3.10.1.3 for a Study Area that did not include Sage Creek. The CEA for grazing also does not include Sage Creek. Information on whether Sage Creek is grazed or not is not relevant to this EIS. However, the DEIS notes in Section 5.8.3 that "*The effect of grazing near aquatic habitats is well documented (USFS 2003b) and is typically detrimental towards fisheries*."
64	Table 3.9-9 (S. FK. Sage Creek table column heading)	Fish species documented between 1979 - 2017. YCT present in 8 of 12 streams, Leatherside Chub in 5 of 12. Brown trout in five of 12, brooks in 6 of 12. Reasons for presence and absence? Which are more tolerant of selenium?	3-152	There are many reasons that fish can be present or absent in at any given site during any given survey. Effects thresholds for selenium for aquatic life were discussed in Section 3.9.5.1 of the DEIS. Refer to EPA's Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016 for more information.
65	Similar to lower Sage Creek, numbers of brown trout and YCT have been lower in recent years, likely from lower than normal flows and shorter snowmelt runoff durations, although variation in numbers captured is not atypical of western streams where annual variations of 50 percent or more are common (Platts et al. 1988).	Crow Cr fish populations fluctuation blamed on natural factors. What about Earthworks selenium data	3-162	Earthworks' data was discussed in Section 3.9.5.2.
66	Idaho is currently in the process of determining what criteria to adopt (Mabey 2017). Until they adopt criteria, the fish tissue thresholds outlined in EPA (2016b) are not binding.	Idaho has not adopted these criteria. Of course after all these years of phosphate mining, they don't act.	3-169	Idaho adopted new selenium criteria, including various site-specific selenium criteria, and sent the revised water quality standards to EPA in August 2018 for approval as required. IDEQ received EPA approval (with some disapprovals on certain aspects) in July 2019. The FEIS has been revised to incorporate the new criteria.
67	However, within the currently mapped SPNM class in the Study Area, there are disturbances associated with past and current mining activities associated with the Smoky Canyon Mine, and thus, the class assigned for this area might not be applicable. These classes are described in more detail as follows.	Semi Primitive Roaded in Study Area, but past and current mining activities have occurred, thus this might not be applicable. Question is when did these occur? Before or after RFP?	3-180	The comment has led the Agencies to discover an error in the DEIS: Figure 3.10-3 correctly maps the Project Area and the entire Study Area as Roaded Natural/Roaded Modified. Near, but outside of the Study Area boundary, are areas mapped as Semi-Primitive Motorized or Semi-Primitive Non-motorized. The source of this data is the 2005 Travel Plan. However, the paragraph in which the cited text occurred was based upon older data (the 2003 RFP) and is outdated. The FEIS was revised accordingly.
68	Figure 3.11-1	Key Observation Point and visibility analysis... How was this determined? Seems the mine will be visible from many places, but of course forest plan allows modification and the points are lower than the mine	3-187	DEIS Section 3.11.1.1 described in general how KOPs are chosen, including the important criteria for selection. DEIS Section 3.11.3 described how the KOPs for this EIS specifically were chosen.
69	Under the No Action Alternative, Simplot would not be allowed to proceed with mining ore in the East Smoky Panel until an M&RP acceptable to the BLM and USFS were developed and approved.	No Action Alternative would not allow mining to proceed until an M&RP acceptable to the BLM and USFS were developed and approved...seems circular as already in process of approving.	4-4	Simplot as a leaseholder has mineral rights and if the current M&RP is not approved, then another plan with different details could be proposed and analyzed.

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70	Air quality impact modeling conducted for the Smoky Canyon Mine EIS for Panels B and C (2002) indicated that particulate matter effects at 5-mile radius receptors from the operations were approximately 6 percent of the NAAQS. With the annual emission estimates for the Proposed Action being similar to the annual quantity of modeled emissions, it is unlikely that the NAAQS thresholds (**Table 3.3-1**) would be approached.	2002 modeling shows particulates to be 6% of NAAQS at five miles. Are these additive to the existing mine? Will both operate at the same time? What about concentration vs distance?	4-8	The emissions would not be additive, but a continuation of similar mining activities and within the same general area as modeled for Panels B and C.
71	Noise from drilling, blasting, equipment operation, and other vehicle use can affect the environment for humans and wildlife. This includes affecting the quality of the recreational user's experience on a given property. The noise impacts could potentially diminish the quality of that property for a particular endeavor. Noise may also affect wildlife usage of a given property. Chronic or episodic noise-related disturbance may result in wildlife movement away from the source of disturbance. Additionally, noise impacts could affect the quality of wildlife-based recreation for hunting, trapping, and nature study.	Description of noise impacts to receptors, including episodic noise, displace wildlife, quality of recreation, wildlife related. Diminish quality of property.	4-13	Comment noted. Noise impacts are analyzed in the EIS. The Project is situated immediately adjacent to active mining activities and impacts to wildlife and recreation are thoroughly analyzed in the EIS.
72	Table 4.5-1 (Column two header)	Transit times thru pit backfill, but doesn't it vary in thickness as topography changes?	4-21	Section 4.5.2.1, *Percolation through Reclaimed Mine Panels*, describes how the column testing was set up and conducted according to Agency approval.
73	Fate and transport modeling for the East Smoky Panel backfill for the Proposed Action (7-inch percolation rate) showed a large manganese plume greater than the existing condition of 0.004 mg/L at the observation point GW-27 and the groundwater secondary standard of 0.05 mg/L extending from the East Smoky Panel west under much of Panel B and down to Hoopes Spring.	Modeling shows Mn exceeding groundwater secondary standard under existing mine and to Hoopes Spring. Modeling of these COPCs over long time periods emphasizes that if they are wrong, future generations will be left with the problem.	4-26	Comment noted. The Agencies would require ongoing monitoring and adaptive management with appropriate remediation if modeling proved to be incorrect.
74	All four basins are already subject to flow alterations from existing mining disturbances. Runoff has been withheld from approximately 880 acres of the 4,200-acre Smoky Creek drainage (i.e., about 22 percent). The Proposed Action would reduce Smoky Creek's contributing area by another 125 acres (3 percent). Runoff has already been withheld from approximately 180 acres of the 1,600-acre Robert's Creek drainage (i.e., about 11 percent). The Proposed Action would reduce Robert's Creek's contributing area by another 530 acres (33 percent). Runoff has already been withheld from approximately 150 acres of the 2,000-acre North Sage Valley drainage upstream of the confluence with Pole Canyon Creek (i.e., about 8 percent). The Proposed Action would reduce the North Sage Valley's contributing area by another 335 acres, but it would also add to it by redirecting flows into this drainage from the north via the run-on diversion, for a net effect of increasing the watershed area by about 120 acres (i.e., about 6 percent).	Flow alterations Smoky Creek watershed reduced 25% Roberts reduced 44% North Sage Drainage up from Pole Canyon Creek, reduced by about 25%, but redirecting run on gives net effect of increasing the watershed by 6%. Wouldn't this enter Pole Canyon Creek?	4-34	The comment adds the already existing flow alterations to those predicted for the Proposed Action. This is not appropriate in Chapter 4, as the intent is to analyze the impacts due to the Project. The current flow alteration acreages are simply to provide context. Further, redirection of runoff to Pole Canyon Creek were described in the same paragraph as text highlighted by the comment.
75	Simplot would not need to obtain any new surface water rights, nor would any changes to their existing surface water rights (such as place of use, point of diversion, nature of use) be needed.	Simplot water rights, need to be given up to support more flow in streams. Beyond just replacing lost flow from this project.	4-39	BLM has no jurisdiction over Simplot's water rights. However, Simplot would be required to replace water lost as a result of the Project (DEIS Section 4.5.3) and this could result in use of water rights held by Simplot.

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76	Water rights may need to be acquired or modified following Idaho State rules, laws, and regulations. These spring mitigation measures would not necessarily restore the original functions and values of any wetlands at the native springs that are being replaced; these measures and their duration would be determined by USFS on a case-by-case basis.	Spring replacement determined by USFS. Need more specific requirements now. Buyouts of permits, water rights granted on FS lands revoked if possible.	4-51	The mechanisms by which water replacement per DEIS Section 4.5.3 would occur would be determined on a case-by-case basis. As such, it is not feasible to provide specific details at this time. The section in the EIS provides: (1) sufficient details on the process by which the decisions would be made; and (2) some examples of types of replacement options that could be considered.
77	Even if Simplot provided another source of water to supply upper Tygee Creek, it would not likely be at the same locations or provide the same values as these small surface water sources.	Water supplied to upper Tygee Creek would not likely be at the same locations or provide the same values as these small surface water sources. Certainly a livestock pond doesn't replace a spring and its associated wetland values for wildlife. Even small springs valuable note KP sage and sharptails, elk, deer, moose. Rearing area. Did they ever monitor these for wildlife use?	4-53	Section 4.5.3 acknowledges that differences in functions and values are possible. Regarding wildlife use, see DEIS Section 3.8 for details on the data collected for the baseline study.
78	For both the Proposed Action and Alternative 1, unreclaimed areas of soil disturbance for highwall and stormwater features would produce an irreversible and irretrievable commitment of soil resources disturbed by these features.	Did not include soil disturbed areas in irreversible and irretrievable commitment, when the soils that are replaced will never be the same.	4-57	Loss of productivity of disturbed soils from their original undisturbed condition was described in Section 4.6.4 as Unavoidable (Residual) Adverse Impacts.
79	The seed mix does not contain any trees, legumes, or plants that would extend substantial root mass to depths below the cover.	Seed mix avoids trees, legumes or plants that would root below the cover, thus taking up selenium. What if natural recruitment brings these plants in over time? What about burrowing animals?	4-60	Under the Agency Preferred Alternative, the potential for selenium uptake is greatly reduced as the seleniferous nature of the overburden materials would be reduced, and potential issues with selenium update by plants, even if deep-rooted is not anticipated. The same would apply to burrowing animals.
80	As stated in **Section 3.7.3**, no wetlands occur within the Study Area; therefore, there would be no impacts to wetlands.	No wetlands in Study Area, thus no impacts, then they go on to describe dewatering and long term impacts. Note the springs and seeps lost discussed in terms of the WTPP would be lost, don't they have wetlands?	4-60	Revisions and text clarifications were made in the EIS. Potential indirect impacts to wetland areas are described in the EIS.
81	Wildlife may also be indirectly affected by exposure to COPCs in vegetation. An effective cover design over backfill and overburden, and the use of a seed mix with species that are relatively shallow-rooted and not selenium accumulators, would address issues associated with adverse COPC concentrations in reclamation vegetation.	Wildlife indirectly affected by exposure to COPCs in vegetation, but use of shallow rooted species that are not selenium accumulators would address the issue in reclamation. Not hardly as burrowing animals, insects, eventual possible colonization by deeper rooted species could all lead to eventual exposure.	4-65	See Comment Response 79.
82	The habitats in the Study Area are naturally patchy; therefore, the effects from additional fragmentation caused by the Proposed Action are anticipated to be minor. Additionally, no impacts are anticipated at the landscape scale as the impacts from the Proposed Action comprise a small portion of the overall habitat available.	Claim habitat fragmentation on migratory birds minimal due to patchy nature of habitat in the Study Area. No impacts on landscape scale as the Study Area is a small portion of the overall habitat available. There is apparently always habitat available elsewhere, but where is the analysis? Study Area definitions so variable it is hard for the public to understand.	4-67	The Study Area for wildlife was determined by the Interdisciplinary Team for this EIS. Section 5.7.6 describes the cumulative effects on wildlife habitat fragmentation. Further, Study Area definitions and maps are provided throughout the DEIS for each resource. Difference resources have different study needs and potential effects, so it is reasonable to expect that the areas studied would also differ.
83	If ground-disturbing activities must extend into the nesting season, a nest clearance survey using agency-approved methods would be conducted within a 0.5-mile buffer of disturbance areas and any active nests discovered would be allowed to fledge out before being disturbed.	Boreal owls nest survey in 0.5 mile buffer, and fledging allowed before taking the nest. Since we don't know if or how many nests in the area, how does the HEA account for this?	4-69	The HEA is irrelevant to addressing impacts to potential boreal owl nests because HEA has to do with acres of habitat, not specific individual nests.

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84	As a result of the relatively small area of mature forest that would be impacted, and lack of indication from baseline studies for a robust boreal owl population in the Study Area, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species.	Small amount of forest removed and lack of indication of robust boreal owl population in the Study Area, population level effects unlikely. If the population is not robust and habitat is there, why is it not robust? The proximity to existing mining may have already had this effect.	4-70	Comment noted. Potentially suitable habitat for boreal owls could be a limiting factor as well as proximity to existing mining activities.
85	Because of the relatively small area of big sagebrush habitat that would be impacted, as well as reclamation practices that would return much of the disturbed habitat back to big sagebrush habitat after cessation of mining, direct and indirect impacts under the Proposed Action are not expected to have population-level effects on Brewer's sparrows.	Brewers Sparrows no population level effects as reclamation will return sagebrush to the disturbed area..but isn't sagebrush a deep rooted species?	4-70	Yes, sagebrush can be relatively deep rooted. It is not listed in the conceptual seed mix (DEIS Table 2.4-2) that would be used for reclamation of the pit backfills and overburden. However, per DEIS Section 2.4.9.4, there would also likely be "islands of diversity" (defined as native forbs, shrubs, and trees that would be seeded or planted in clusters where they are most likely to establish and where there are no concerns relative to the uptake of selenium, although concerns of selenium update are not anticipated) included in the reclamation plan. Last, sagebrush communities make up less than 10 percent of the Project's disturbed area.
86	As discussed in **Section 3.8.3.3**, great gray owl individuals and two nesting territories were detected in the Study Area during baseline surveys. Therefore, ground-disturbing activities would be planned outside of the avian nesting season…	Great gray owls nesting in the Study Area and fledging allowed prior to being disturbed, i.e. destroyed. Noise, collisions with power lines and vehicles at night. Deflect around whether the known nests are in areas to be cleared for mining and hauling. Don't say if nests are in the disturbed area.	4-72	The DEIS (Section 3.8.3) notes that great gray owl nests were found and that great gray owl individuals were seen. DEIS Figure 3.8-2 clearly shows the locations of all nests observed, by species, including those identified as great gray owl nests, and provides the Project Area boundary on the figure as well. This issue was not deflected in the EIS.
87	One study found that greater sage-grouse tend to avoid habitat located within 600 meters (1,968 feet) of power lines (Gillan et al. 2013; Braun 1998). By avoiding use of the habitat, the birds lose the benefits of that habitat. Thus, the effective habitat loss and fragmentation created by power lines may extend to an area much larger than the actual power line corridor. These impacts are expected to be minor, as the power line would not fragment any PHMA, IHMA, GHMA, or other important habitats for greater sage-grouse.	Sage grouse avoid power lines (600 meters). Habitat loss and fragmentation may extent to wider area and no impact to PHMA, IHMA, GHMA or other important habitats for sage grouse. Need analysis of power line and road corridors for all mines.	4-74	The text cited by the comment and text both above and below analyze the impact to greater sage-grouse from the Project. Analysis of similar impacts "for all mines" is not warranted or applicable to this EIS. However, see DEIS Section 5.7.6 for cumulative impacts to wildlife in the CEA, including due generally to roads and powerlines.
88	If northern goshawks are nesting in the vicinity of the mine, noise and human activity may disturb or disrupt nesting pairs. No northern goshawk nests have been confirmed within the Study Area….	Goshawk have no nests in the Study Area, but note that noise and activity may disturb nesting pairs. Since the Study Area is adjacent to existing mining operation is it any wonder no active nests. Plenty of nests located, but inactive or undetermined. Consequence of existing disturbance?	4-74	In 2012 the CNF biologists examined Forest land for suitability and capability to contain habitat for northern goshawk. In summary, it found that habitat is generally lacking in the area surrounding the East Smoky Mine and due to the phosphate mining prescription of the Study Area, habitat conditions were less than favorable. Information from the 2012 habitat report has been added to the EIS.

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89	Because of the relatively small area of mature forest that would be impacted, and lack of evidence from baseline studies that there are any active or historical northern goshawk territories within the Study Area, direct and indirect impacts under the Proposed Action are unlikely to have population-level effects on this species.	Once again no population level effects, this is called the death of a thousand cuts. What are the population trends for all these birds and mammals? Claim small are of mature forest removed and lack of evidence of active nests.	4-75	Pages 1-4 and 1-5 of the Caribou National Forest RFP (USFS 2003) specifically address the need for population trends and viability assessments. In short, the RFP states that "Viability assessments of all vertebrate species are not required. Compliance with 36 CFR 219.19 is not subject to precise numerical interpretation and cannot be set at a single threshold." The RFP also states that the decision maker may use flexibility in selecting the methodology for species assessments that includes the expertise and knowledge of local forest officials.
90	Approximately 701 acres of potentially suitable peregrine falcon foraging habitat (forest, mountain brush, shrubland, grass/forb areas) would be removed under the Proposed Action.	Peregrines lack nesting habitat and 701 acres of foraging habitat would be removed, no population level effects.	4-76	See Comment Response 89.
91	Direct impacts on mammals would be similar to those described for terrestrial wildlife in general. Small mammals may be crushed or trampled by mine equipment or vehicles. Large- and intermediate-sized mammals may be killed by moving vehicles along haul roads. Mortalities are expected to occur on a short-term, individual, and localized scale; therefore, population- or community-level impacts on wildlife from mortalities would likely be negligible.	Mammals direct mortality from collision, but short term individual and local so population level impacts would be negligible. But there are no population analyses of trends in any of the mammals and doubtful analysis of cumulative effects from all the disturbance in the mining region.	4-78	See Comment Response 89.
92	In addition, there currently is and has been an active mine immediately adjacent to the Project Area and it is likely that some individual big game may have become habituated to noise, disturbance, and human presence associated with mining activities in the area.	Active mine adjacent to the Project Area and big game individuals may have become habituated. But there is no baseline data on deer and elk counts for comparison. What was it like before the Smoky Mine? After?	4-80	As per NEPA, the affected environment is meant to describe the conditions of the environment prior to the initiation of the proposed action or alternatives. As the Proposed Action/Alternative 1 (the Project) described in Chapter 2 of the EIS would take place adjacent to previous mining areas, it is considered a part of the affected environment baseline Study Area and the current conditions. Previous studies and surveys are used as a "starting point" for the analysis. Analysis of the Proposed Action in conjunction with other past, present, or reasonably foreseeable future actions is described in Chapter 5. Past surveys are described in the Wildlife Baseline survey report (Stantec 2016e).
93	The Proposed Action would not result in any loss of breeding habitat for the northern leopard frog and boreal toad as no riparian or wetland areas would be impacted.	Claim no loss in breeding habitat for leopard frog as no riparian or wetland areas impacted. Yet springs will be lost and some like Hoopes Spring are contaminated.	4-84	Although the EIS does acknowledge that there is a potential for a loss of springs and associated habitat from the Project, surveys conducted for these species in the past have not discovered them in the area. Thus, the potential for breeding habitat for these species to be impacted even if springs are impacted, is not anticipated.
94	Assuming this is the case, the effects of decreased flow (and associated effects to macroinvertebrates) on YCT would be minor, as these fish would likely just move out of the most affected reaches. For other fish species that are more resident, such as dace, sculpin, redside shiner, Utah chub, and northern leatherside chub, the magnitude of impacts would be greater.	Tygee, once again, since upper reach already degraded, fish are likely moving up from downstream, so with reduced flow would just move down…don't fish normally move up and down stream? This for YCT. Chub, dace, sculpin, shiner are resident the impacts would be greater and could be eliminated from the upper reach. No direct effects due to negligible effect on habitat. So, losing most of the flow is negligible?	4-94	The DEIS text on Tygee Creek is correct. That text described adverse impacts to fish due to streamflow decreases as *indirect* effects. *Direct* effects assigned as negligible are those due to habitat. (Emphasis added.)

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95	Simplot has indicated a willingness to provide adjacent, off-NFS land forage to mitigate this lost grazing time on NFS lands.	Grazing mitigation...simplot offered off NFS land forage. How about buying out permits?	4-103	This Project does not include grazing projects, so it is not needed to discuss permit buyout in this EIS. In addition, as described in the EIS, Simplot would coordinate with the permittee to reduce impacts to grazing activities from the Project.
96	Simplot's M&RP proposes temporary and permanent mitigation measures that would help to minimize impacts to visual resources. Temporary measures include: hydroseeding the large cut slopes on the haul roads; revegetation on cuts and fills that would remain disturbed for the life of the mine; minimizing un-reclaimed pit disturbance as much as practical; and minimizing dust by watering or using magnesium chloride on haul and access roads.	Simplot visual resource mitigation is nothing more than using erosion control that is necessary anyway.	4-107	There is no reason to discard a BMP, EPM, or mitigation simply because it has more than a single benefit to a single resource. Visual resource impacts would be minimized.
97	Stonegate Agricom Ltd. proposed to develop the Paris Hills phosphate project in Bear Lake County which would be a 2,495-acre underground phosphate rock mine where three previous mines operated intermittently during the 20th century. The proposed Paris Hills mine has total measured and indicated mineral reserves of 16.7 million tons of marketable rock and expected average annual rate of production of about 0.9 million tons (Stonegate Agricom Ltd. 2017). However, this proposal has been curtailed because of financial constraints and the proposed project is situated south of the CEA and thus, not included in the acreage for reasonably foreseeable disturbance.	Stonegate Agricom description. Note that it is now owned by Itafos and should be included.	5-6	This addition has been made in the FEIS.
98	The combined past and present disturbance (approximately 14,200 acres) and reasonably foreseeable future disturbance (6,650 acres) totals about 20,850 acres of mining related disturbance in the CEA.	Cumulative disturbances 21,700 acres (4%) and if all leases developed it would be 39,300 acres or 7.7%. I would note that this is mine footprint, not roads, buffers, noise travel distances etc.	5-7	The disturbance acres given in the highlighted text include more than just a mine footprint; however, they do not include acres that might be indirectly affected by a disturbance such as buffers or noise travel distances. The use of the term *disturbance* is referring to actual direct acreage physically disturbed.
99	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).	Travel on unpaved roads does not mention dust, use examples from Paris Canyon. Mining is major fugitive dust producing activity in the CTNF.	5-8	While the introduction section (DEIS Section 5.2.2.1) quoted by the comment does not mention fugitive dust due to travel, it is included in DEIS Sections 5.2.2.2, 5.2.2.3, and 5.2.2.4.
100	It is not possible to quantify these effects in this CEA due to the uncertainty of these conditions, so cumulative effects of adding the particulate emissions from the Proposed Action or Alternative 1 to potential smoke emissions from fires cannot be determined.	Not possible to add wildfire emissions to cumulative effects, however the AQI provides an opportunity to do this and was ignored.	5-9	The comment misses the point of the DEIS statements. Air quality data used for regulatory purposes is primarily averaged over time. Wildfires and prescribed fires, both of which were being discussed in the cited statements are encompassed within the data but are not predictable in the future. The AQI would not be appropriate to use in this case.
101	Figure 5.2-1	Cumulative Effects Area, Surface Water, Soils, Vegetation, Fisheries, Air, Noise. Doesn't include areas such as Diamond, all of Webster subsection. Should include entire phosphate region.	5-10	Guidance from 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 in the FEIS Chapter 5 for each specific resource. However, for simplicity, ease of cumulative impact analysis, and in an attempt to avoid having only slightly different CEAs for some resources, CEA

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102				boundaries were left identical for the resources where it seemed reasonable and conservative to do so. Including all of Diamond Creek, the entire Webster subsection, and the entire phosphate region for the noted CEAs is not justified by the potential cumulative effects of this Project.
102	Noise attenuates within the direct effects area, so cumulative effects are not anticipated outside of this CEA. 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.	Noise attenuates within the direct effects area. Assume this means the mine footprint only. Yet in Winschell Dugway noise was analyzed and carried long distances. Here in Paris Canyon, we can hear trains in Montpelier 10 miles away and truck traffic on highway five miles and more away.	5-12	The direct effects area equates to more than just the mine footprint – as described in the DEIS Section 3.4, the Noise Study Area encompassed a larger area than the mine. As stated in DEIS Section 3.4.2, how noise travels depends upon many considerations, including topography, climate, flora, among others. The site-specific characteristics in the Study Area were considered in determining the noise receptors and all five were outside of the mine footprint. The results of the study similarly are affected by these site-specific characteristics. How these characteristics compare to or vary from those at Winschell Dugway or Paris Canyon is not relevant to this EIS.
103	The effects of adding the Project to the past, present, and foreseeable future disturbances to noise resources would not result in adverse cumulative impacts.	Noise effects are discounted due to mines not overlapping CEA. However, haul roads and access roads, Forest roads and ohv/atv trails occur throughout the mine region. These all need to be analyzed in terms of cumulative impacts by adding buffers to all roads and using the dB associated with ohv/atvs as well as haul trucks. Note the levels of sound and traffic levels measured at Keisha's Preserve shows over 300 vehicles a day accessing the CTNF thru Paris Canyon and sound levels over 100 dB.	5-12	See Comment Response 5-10. Further, Keisha’s Preserve is well outside the CEA for noise, so traffic and sound levels measured at that location are not relevant to this EIS.
104	The noise from these operations would be cumulative as mining would continue in Panels F and G at the same time mining at the East Smoky Panel would occur, basically replacing the mining activities at Panel B. Noise from haul traffic between the mine panels and the mill at Smoky Canyon would be the same as present conditions. The public driving on the Smoky Canyon Road is currently exposed to the mining and haul traffic noise.	Noise impacts from existing and proposed mine expansion additive. But no mapping of sound contours with public accessible areas or wildlife security, IRAs to show the impact area.	5-13	Mapping of sound contours is not needed to accurately assess the impacts from the Project or its cumulative impacts.
105	The public driving on the road to the main Smoky Canyon Mine entrance is currently exposed to the mining and haul traffic noise and residents along Crow Creek are exposed to some noise from mining currently occurring at Panels F and G which would last until 2027.	"Some noise" affecting residents. How much noise? What are effects. State Cumulative Effects negligible.	5-13	Please see the results of the baseline noise study (DEIS Section 3.4.6). DEIS Section 5.3.6 discussed the rationale for assessing a negligible intensity impact.
106	The boundary was developed with the IDT experts and professional judgement. The CEA encompasses 148,861 acres. This is the same boundary as was used for the Smoky Canyon Mine Panels F & G EIS (BLM and USFS 2007), also there has been a slight refinement in the acreage determination.	CEA boundary for surface water is the same as used for Mine Panels F & G EIS. The analysis should include an evaluation of what past NEPA and Consultant reports have predicted and what has actually occurred to validate claims made for the current mine expansion. Also wildlife baselines for the different mine panels should have been compared to quantitative wildlife data for this expansion baseline. We see no long term transects and comparisons.	5-14	Regardless of what was previously predicted for surface water impacts in previous NEPA and consultants’ reports, the DEIS does discuss the current surface water environment and the projected future surface water environment as predicted. Similarly, the DEIS discusses the baseline wildlife data, which is the relevant dataset for this EIS.

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107	Under the Proposed Action or Alternative 1, there would be no change in the mine's water supply wells or water consumption, thus, cumulative effects analyzed in this section are limited to those activities that have the potential to affect groundwater quality, not quantity.	No change to groundwater quantity due to continuation of use of the mines water supply wells. But, we don't have the benefit of the past analysis and it should be updated for this expansion. Further, there are impacts to watersheds, streams and springs that need to be addressed in terms of quantity due to the mine disturbance, combined with analysis of water withdrawals from diversions in the CEA and at a minimum on the CTNF. Livestock water withdrawals, ponds, diversions all have effects. For example how do these affect streams and recharge in gain/loss stream sections? Seeps, springs? How much wildlife habitat has been lost due to the alteration of these water sources?	5-14	The cumulative effects analysis in the EIS adequately shows that the cumulative effects for water quantity have been adequately assessed in the EIS for this Project as the Project would not result in a change to the current mine’s water supply or consumption.
108	Forest management activities including timber harvests, livestock grazing, and public recreational uses occur within the CTNF located on the east and west slopes of the Crow Creek watershed upstream (south) of its confluence with Sage Creek. The CTNF comprises most of the west slopes of the Sage Creek and Tygee Creek watersheds and all of the Diamond Creek watershed in the CEA	Forest management activities affecting surface water, watersheds in the CEA. No analysis of the impacts of these activities on surface or groundwater. Should be addressed in the cumulative effects analysis.	5-15	Cumulative impacts to surface water and groundwater were appropriately analyzed based upon the types of impacts that the Project could cumulatively contribute to.
109	Past mining operations in the Panel A area of the Smoky Canyon Mine have apparently affected groundwater quality in the underlying Wells Formation aquifer (BLM and USFS 2007). As reported in the RI/FS (Formation Environmental 2014), samples collected from GW-IW in 2000 and 2001 had selenium concentrations that ranged from 0.007 to 0.022 mg/L; selenium then slowly increased (with some seasonal spikes) until it reached a high concentration of 0.126 mg/L in June 2011…	Past mining operation on groundwater quality as regards selenium. How did modeling in the EIS for these past mining operations compare to the monitoring results? What are the implications of this or these comparisons to the current modeling effort for Wells? Note the Rasmussen mine expansion predicted significant impacts on Wells from selenium over long term. These are all cumulative impacts.	5-15	Please see Comment Response 5.42 (Appendix 6A, Table 1). Further, the discussions in DEIS Section 5.4 do incorporate past Smoky Canyon Mine activities related to selenium contributions in the discussions on the RI/FS, CERCLA, and the WTPP.
110	Mitigation measures introduced by Simplot and adopted by the Agencies were designed to reduce the groundwater quality impacts to acceptable levels within a relatively short distance from the margins of the Panels B and C operations area.	Here, mitigation measures for the Panels B and C are "designed" to reduce water quality impacts to acceptable levels within a relatively short distance. How has monitoring data compared to these predicted outcomes?	5-16	The environmental effects of Panels B and C have been monitored since the 2002 SEIS/ROD and have been the subject of intense evaluation in the CERCLA process that has occurred since that SEIS.
111	Another fraction of contaminated alluvial groundwater in the Pole Canyon area is believed to enter the Wells Formation where it impacts the regional aquifer.	Pole Canyon contamination in alluvial water also impacting Wells aquifer. Was this predicted in the approval process for the Panels affecting Pole Canyon? What did the analysis actually predict?	5-16	See DEIS Sections 2.2.3 and 5.4.3.1. At the time that the Pole Canyon ODA and the underlying rock drain were installed, the issues surrounding selenium contamination in the phosphate patch were not known. CERCLA remedies at Pole Canyon have been implemented in recent years to address the issues that have been identified at Pole Canyon.
112	Hoopes Spring is located along the trace of that fault and is a key discharge point (along with South Fork Sage Creek Springs) for groundwater from the Wells Formation in the vicinity of the Smoky Canyon Mine (Ralston 1979, NewFields 2005, Formation Environmental 2014).	Hoopes Spring and S Fk Sage Creek gain discharge from Wells aquifer and thought to come from Pole Canyon ODA. Again, what did the studies and approval process predict? While the Removal Action and cover described herein, are claimed to reduce the contamination, Pole Creek has been lost and the contamination will continue for an undetermined time. Where is the assurance it will not degrade over time and the overburden again leach high levels into these surface water sources? Panels D and E are also claimed to be influencing water quality at Hoopes Spring. Was this predicted in the approval process for those Panels?	5-16	See Comment Response 3.47 (Appendix 6A Table 1) and Comment 111. The purpose of this EIS is to evaluate the potential effects of the Proposed Action and Action Alternative. This EIS does not need to analyze past sources of selenium contamination, including Pole Canyon, Panel D, or Panel E, or to evaluate the effectiveness of mitigations from previous mining operations including future CERCLA remedies. That said, the water resources sections of the No Action Alternative (Section 4.5.2.3 in the FEIS) and the cumulative effects section (Section 5.4) briefly discuss past contamination and remedial investigations under CERCLA that are currently underway at the Smoky Canyon Mine.

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113	The mine was noted as associated with elevated selenium in the listed stream segments. However, the assessment and TMDL did not address selenium-impaired stream segments because they are currently under CERCLA responsibility (IDEQ 2017b).	TMDL did not address selenium contaminated streams due to CERCLA action. But, this is long term and could be rectified in part much more rapidly by returning diverted flows to the stream courses. Simplot could do this, the CTNF could begin removing livestock water developments and stock ponds to restore springs, streams and habitat that conserves water. An analysis of the potential for this added water and habitat to effect more rapid reduction of selenium should have been incorporated. These points are part of what should constitute a hard look under NEPA.	5-18	It would not be appropriate to address existing selenium contamination and its remediation through removing livestock water developments, etc. The CERCLA process that is underway will consider several remedial alternatives.
114	Thus, the timing of impacts to surface waters from Panels F and G is well beyond the 2050 end-date modeled in the RI/FS.	Surface water impacts for selenium not predicted in Panels F and G. End date now well beyond prediction and concentrations in Sage Creek are already above Alternative D predictions for Panels F and G. As repeated above, an analysis of the past predicted outcomes should be done and the incorrect conclusions addressed in the context of current modeling for East Smoky. A permit should not be approved without such an analysis. These errors, or inconsistencies make such statements as, *"The Panels F and G Project would not be cumulative to the East Smoky Panel Project for groundwater because it is not anticipated to impact Hoopes Spring or groundwater north of South Fork Sage Creek."*	5-20	First, Panels F and G would potentially discharge selenium to surface water at different locations than the East Smoky Panel Mine would. Further, the Panels F and G contributions are expected to occur several hundred years from now and thus cannot be included in the RI/FS model. The text in Section 5.4.4.2 is noting that in downstream waters, selenium concentrations are greater than those predicted for Panels F and G, but that does not mean that Panels F and G are the only possible source for those elevated levels. Many places in the DEIS describe existing sources of selenium due to mining at Smoky Canyon, including Pole Canyon, Panel D, and Panel E. In addition, please see the Comment Responses for 5.32 and 5.42 in Appendix 6A Table 1.
115	However, Simplot's consultants note that subsequent sampling shows that Hoopes Spring selenium concentration has peaked and is beginning to decrease (Townsend 2017).	Claims selenium in Hoopes Spring has peaked. Chart shows continuing increase. Periodic spikes return to trendline upward. A decrease in the rate of increase is not a decrease. Were these selenium concentrations at Hoopes Spring predicted?	5-22	Please see Comment Response 5.43 and associated FEIS text changes.
116	Figure 5.4-2	Selenium concentration at Hoopes Spring claimed to be decreasing, based on one point being high and the rest returning to uptrend, this has happened before but uptrend continued.	5-22	Please see Comment Response 5.43 and associated FEIS text changes.
117	Selenium impacts to surface waters were predicted to occur from Panels F and G development (BLM and USFS 2007), additive to impacts that were already occurring. The selenium concentrations from Panels F and G were expected to peak within a 50 to 100-year timeframe and then steadily decrease. The EIS considered that assumption to be conservative because the regulatory agencies and Simplot would be implementing programs over a much lesser period of time to remediate the current selenium loading to South Fork Sage Creek and lower Sage Creek. However, data collected for the RI/FS and for the East Smoky Panel Mine indicate that these estimated peaks were not realized, at least for streams that are already known to be impacted.	To add flesh to our comment regarding past predictions, here the DEIS does recognize that the peaks predicted were not realized. So, the public is to trust that the innumerable predictions and assumptions in this DEIS are accurate?	5-22	Please see Comment Response 5.42 in Appendix 6A Table 1.
118	While the Proposed Action and Alternative 1 modeled groundwater impacts do not show selenium exceeding the regulatory groundwater standard (0.05 mg/L) at any time during the 300-year model simulation time frame, those analyses did not consider the current mining impacted groundwater at the four modeled groundwater points.	Modeled groundwater impacts did not consider current mining impacted groundwater. Seems a more comprehensive model is needed that models the entirety of the phosphate patch.	5-23	Please see Comment Response 5.32 in Appendix 6A Table 1.

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119	However, for manganese, the Proposed Action predicted groundwater concentrations were greater than the regulatory standard (0. 05 mg/L) at the end of the 300-year simulation at both of the model observation points and at GW-27, with a concentration of 0.101 mg/L at the latter.	Mn greater than standard at 300 years. So? Earlier it was explained away as not important, but if a standard exists, it must be dealt with.	5-23	The Agencies are not sure why the comment indicates that manganese exceedances were not "dealt with" in the EIS. First, manganese contributions from the Project were explicitly noted throughout the DEIS surface water and groundwater text and figures. Second, exceedances were not "explained away" but were compared to the Idaho Water Quality Standards. There is no manganese standard for surface water but the predictions in surface water were compared to the groundwater standard simply for discussion purposes. The Idaho Ground Water Quality Rule provides a groundwater standard for manganese as part of the list of "Secondary Constituent Standards…based on aesthetic qualities". This contrasts with the "Primary Constituent Standards" such as selenium which "are based on protection of human health" (IDAPA 58.01.11). Any surface water manganese concentrations from the Project would not be subject to a limit. IDEQ's Point(s) of Compliance requirements (which are not yet fully determined) would determine how and when exceedances of any parameter covered would be "dealt with". IDEQ has determined which existing monitoring wells will be used as compliance (GW-24) and indicator (ES-MW7, GW-27, GW-29, and GW-30) wells. Simplot is required to submit a background groundwater quality analysis for these five wells to IDEQ for review and approval by January 3, 2020 (IDEQ 2020). Reference: IDEQ. 2020. Final Determination Letter from Bruce Olenick, IDEQ, to Lori Lusty, J.R. Simplot Company with enclosed determination. January 7, 2020.
120	According to CTNF data, approximately 27,000 acres of timber harvest has occurred on the CNF since 1964 (BLM and USFS 2007). Timber harvest activities expose the soil resources to erosional factors, as does equipment used to remove and haul timber, and the associated. logging roads. Increased erosion of in-situ soil is a loss of that resource. The USFS conducted a 30-year erosion study on the CTNF by monitoring 25 erosion plots with collection tanks between 1982 and 2012 (USFS 2017b).	CNF erosion plots for timber harvest showed minimal soil loss. No data from that study for livestock allotments, nor discussion of the current state of soil upper horizons which have suffered large losses since livestock grazing began. Verbal comment from Al Winward to John Carter noted several feet lost from the Bear River Range. This is likely true for the Caribou County area as well since livestock have been pervasive since settlement. Also, the changes in flood frequency and forces due to clear cutting and grazing altered soil cover not accounted for.	5-25	The comment is incorrect. The cited study (USFS 2017b) included timber harvest and livestock grazing. The paragraph highlighted by the comment was focused on the former; two paragraphs down on the same page, the study results for the livestock grazing component were described. Changes to flood frequency that result from land management activities are not relevant to this section's discussions on impacts to topsoil. Further, changes to flood frequency due to clear cutting and grazing do not need to be discussed in this EIS.
121	When averaged over the two-decades, erosion rates were all below soil loss tolerances for the respective soil types. The 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.	See above regarding livestock grazing effects. While losses may be below soil loss tolerance, does that tolerance include the reduced upper horizons due to past losses? Perhaps current tolerance limits do not represent what is acceptable to sustain productivity given past losses. Also note that not all the CNF soil and plant communities are not at potential. USDA Forest Service. 1997. A Hierarchical Stratification of Ecosystems on the Caribou National Forest. points out the wide range in productivity with significant areas in low productivity classes, reflecting past livestock grazing impacts.	5-25	It is not appropriate for this EIS to assess the potential limitations of either soil tolerance measures or a USFS study that uses them. It is not unexpected or unusual that in an area as large as the CNF there would be some soil and plant communities that are not at potential, but this is not relevant to this EIS. Downgrading the level of predicted Project impacts to soils or vegetation because the baseline condition is already in a low productivity category is not warranted in most cases.

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122	Section 5.5.5 Cumulative Disturbances	Soils foreseeable future disturbances listed, but not addressing areas and types impacted. As mentioned earlier, three DEIS are out currently as well as the LVE pipeline DEIS. These, combined with past losses from mining, roads and historical livestock grazing and infrastructure, timber sales and erosion need to be combined across the phosphate region, by Subsection, watersheds affected by mining.	5-26	Guidance from 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 in the FEIS Chapter 5 for each specific resource. 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. Including the entire Webster subsection, and the entire phosphate region and their corresponding watersheds for the soils CEA is not justified by the potential cumulative effects of this Project. The cumulative effects for soil resources have been adequately assessed in the EIS for this Project.
123	In accordance with the RFP (USFS 2003a), less than 15 percent of soils in the activity area would be detrimentally disturbed.	Claim compliance that less than 15% of soils in the activity area detrimentally disturbed, yet earlier stated 30% of watershed could be disturbed, basically destroyed. This would include soils. Again need a comprehensive analysis of these cumulative impacts across the region. BMPs relied upon, yet, recall that they may not be effective and more damage occur due to reliance on them. Remember the quote, "the illusion of technique".	5-26	RFP compliance related to soils deals with consistently exceeding 15% detrimentally disturbed soils for a given activity. Because of concurrent reclamation activities, detrimentally disturbed soils are limited to only those areas left unreclaimed which are very minor acreages as described in the EIS. In addition, Section 5.4.5.2 clearly describes that the percentages for the applicable watersheds that are and would be hydrologically disturbed would be less than 30%, especially following reclamation activities. The cumulative effects for soil resources have been adequately assessed in the EIS for this Project. Simplot is required to monitor BMP effectiveness and submit an evaluation to the agencies at least annually.
124	Extensive portions of the soil resource CEA are located on lands administered by the CTNF. Activities in these areas are subject to management goals and standards provided in the CNF RFP (USFS 2003b). BMPs and EPMs would be designed and/or implemented to contain sediment derived from mining disturbance. Because soil loss would be controlled by installation of water retention ponds, runoff control ditches, and implementation of other BMPs and/or EPMs, soil erosion as a result of the Proposed Action or Alternative 1 is expected to be minimal.	Cite Forest Plan re soil resource and its standards and goals, application of bmps. Claim soil erosion minimal. Perhaps the loss of several hundred acres, (thousands) of natural soils here and elsewhere in the mining region needs to be quantified and the Forest Plan reviewed for summary of soil conditions at the time of publication.	5-27	The requested analysis, both in scope and area covered, is not needed for the potential cumulative effects analysis of this Project to soil resources.

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125	However, structural diversity at the landscape scale has been increased and representative of a natural mixed severity disturbance regime.	Structural diversty at landscape scale has been increased and is representative of mixed severity regime. Recall that mixed conifer old growth discounted in Project Area due to this very regime. This suggests the Forest Plan criteria is biased towards timber harvest as it low grades old growth in this mixed conifer even when old growth trees are present. Maybe this criteria could be met if given time, but time is not allowed in the face of mine development. The definition of old growth trees per acres needs restated lower if this area does not qualify.	5-28	The DEIS appropriately applies old growth criteria and appropriately assesses the Project's potential impacts to it. Redefining old growth for this evaluation would not be appropriate.
126	Ongoing impacts related to vegetation containing selenium at the Smoky Canyon Mine would be expected to continue until remedial action measures are completed. Newer mining and reclamation facilities and operations have incorporated BMPs and cover designs that limit potential for selenium uptake by vegetation, unlike older mine features that were constructed without consideration for the potential of selenium release (IDEQ 2006).	Selenium impacts to vegetation limited due to cover design. But, as pointed out in these notes earlier, trees, sagebrush, rodents and burrowing animals are expected to occur in these areas, so this potential can be realized over time as the cover is degraded by natural forces. Ongoing selenium expected to continue until remedial action completed. This is a Long term impact.	5-28	Please see Comment Response 79 and Comment Response 4.14 in the Appendix 6A Table 1. Reclamation Plan requirements for the existing panels include monitoring plant uptake of selenium and it is expected that this would also be in place for the East Smoky Panel Mine reclamation.
127	There are no predicted impacts to TEPC or sensitive plant species from the Project and none were documented during baseline studies, so there should be no cumulative impacts to those categories of plant species.	4200 acres of CEA impacted by timber harvest and mining disturbance, unsure if roads and ROWs included. Haul roads are wide and destroy vegetation as do the other roads and trails throughout the area. The total area of all this needs to be included in the analysis.	5-29	The disturbed acreage associated with the complete Project, which includes haul roads was included in the analysis.
128	The assessment found that plant uptake of selenium occurs on ODAs where revegetation has been directly into the ODA or where less protective covers were placed, and where overburden seeps saturate nearby soils. Where a more protective cover system was used (e.g., Panel E's Dinwoody cover) selenium concentrations in vegetation are typically lower.	Plant uptake of selenium in ODAs with less protective covers in place but expected to be less in more protective cover systems. Panel E's Dinwoody cover used as an example. However, how long has this been in place? Over the longer term, the cover will degraded due to deeper rooted species establishing, rodents and even insects such as ants.	5-29	Please see the responses to Comment 79 and 126. Reclamation of Panel E was completed in 2003, 2008, and 2013, depending upon the pit within the panel. Various cover types were installed on the various pits in Panel E, with improvements in the newer covers as lessons have been learned at the Smoky Canyon Mine and other Idaho phosphate operations.
129	Thus, reclamation vegetation is not anticipated to accumulate COPCs; therefore, although there would be additional acreage of disturbed vegetation, it would not exacerbate any current issues with selenium in vegetation in the CEA. Future mines would likely incorporate closure practices and BMPs that would minimize selenium uptake as well. Additionally, as historical mine reclamation is remediated through the CERCLA process, the area of the overall acreage of reclamation vegetation with elevated COPCs may decrease.	Veg reclamation not expected to accumulate COPCs, reliance on bmps for future mines and remediation thru CERCLA to reduce vegetation COPCs. Again, bmp effectiveness not validated over the long term and as the mine effects to water, vegetation and soils are expected to occur over tens to thousands of years, who will be here to ensure bmps and effectiveness control these outcomes? Legacy impacts from mining already occur.	5-30	The Agencies require Simplot to monitor BMP effectiveness and submit an evaluation to the Agencies at least annually. Further, Simplot monitors vegetation to track uptake of selenium.

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130	The CEA boundary for wildlife includes species habitat within a 15-mile buffer around the Project Area disturbance boundary (**Figure 5.7-1**). The boundary was developed with the IDT experts and professional judgement. It encompasses 452,993 acres.	Wildlife CEA uses 15 mile buffer around Project Area and includes 452,993 acres. Once again repeat the direct impact mortality in the project area as being temporary, yet animals are projected to be killed or "permanently" displaced. Permanent is not temporary. Again habitats are characterized as "widely available", thus setting the stage without analysis that displaced animals will find habitat or migration routes elsewhere. No short or long term adverse impacts will occur. If you say it enough it becomes a fact and this EIS is full of deflection to other habitat being available without any analysis of its quality, fragmentation. Once again proper buffers need to be placed around all disturbance areas, roads and include noise and other contours that are specific to species such as NTT guidelines for sage grouse. In the CEA major barriers to migration include Hwy 89 (see LVE DEIS) and just outside the CEA, Hwy 30 near Georgetown. Mitigation should include a comprehensive effort to provide crossings for wide ranging species at these locations.	5-30	The comment conflates the two statements. The DEIS clearly states that temporary displacement of wildlife would occur, but there would be some permanent displacement of *individuals* and some mortality, which of course is also permanent to those individuals who die. Further, see DEIS Section 5.7.6 for more discussion on wildlife displacement and mortality.
131	Other impacts that are not quantified have included noise disturbance/displacement from mining, roads, and recreational activities.	Notes that impacts not quantified include disturbance/displacement from mining, roads and recreational activities. Note the Winschell Dugway EIS described noise levels and an impact zone from roads and trails of several thousand feet. As suggested in these notes earlier, sound buffers need to be plotted around all roads, trails and mining disturbance, including power lines and pipelines. Those buffers should be designed to extend outward to a "no impact" zone. Impacts to different species such as elk and security areas, roadless areas and other habitats such as goshawk home range, known raptor nest areas, sage grouse and migrant birds. Livestock impacts occur throughout the area and should be analyzed for impacts due to loss of forage for wildlife, impacts around water developments, water diversion effects on fish and surface water flows.	5-33	The cumulative impacts to wildlife resources within the CEA were adequately analyzed in the EIS.
132	Bald eagles are likely attracted to this area by waterfowl utilizing the ponds and the ponds do provide habitat suitable for bald eagles; however, the tailings ponds do not support suitable fish populations or open water habitat during the winter. Further, the tailings ponds are managed by Simplot as to not attract wildlife by reducing shoreline vegetation and habitat (Newfields 2005, revised 2014).	Bald eagles attracted to tailings ponds for waterfowl. But tailings ponds managed to not attract wildlife by reducing shoreline vegetation. Why? If tailings ponds are innocuous and unpolluted, yet waterfowl allowed, why is it necessary to exclude other wildlife? This certainly deserves quantification as to what factors are at work here that are harmful to some species and not others. As to bald eagles, on the one had the DEIS indicates they don't use the area or winter here, yet they are attracted here. I note that at Kiesha's Preserve we get bald eagles coming in to roost from five to ten miles away on the Bear River/Refuge/Bear Lake.	5-33	Waterfowl is also discouraged from using the area around and in the tailings ponds. Further, limited monitoring is performed to track resident waterfowl numbers and demonstrate that the management actions taken effectively reduce the waterfowl population. These data are reported to the agencies. Also, see Comment Response 54. Regarding bald eagles, DEIS page 3-107 states "*One bald eagle was observed near the tailings ponds (adjacent to the east side of the Study Area) during surveys (Table 3.8-1). However, the tailings ponds do not support suitable fish populations or open water habitat during the winter and nesting or roosting is not expected.*" The occasional bald eagle flying over or foraging in the area is different from wintering, nesting, or roosting there. Last, the presence of bald eagles at Keisha's Preserve is not relevant to the Project.

Comment Number	Highlighted Text	Comment	Page Number	Comment Response
133	Within the CEA, quantified past and present disturbances based on the information from **Table 5.7-1** have resulted from agriculture (cropland and pasture; approximately 16,500 acres); roads, buildings, and other development (approximately 3,500 acres); timber harvests (approximately 1,900 acres); and quarries, mines, gravel pits, and oil wells (approximately 1,500 acres). According to BLM (2017), mining activity in the CEA indicates that even more acres have been disturbed by mining (primarily from historical phosphate mining activity) but, much of this area has been reclaimed and supports grassland and shrubland wildlife habitat.	Acres disturbed also include oil wells some 1500 acres. Buffers need to be placed around these locations and effects analyzed as above for noise and human activity.	5-33	While oil wells are in the CEA, they are not part of the Project and the intent of this EIS is not to analyze them in detail. In addition, the 1,500 acres mentioned includes mainly disturbance from quarries, mines, and gravel pits. Only a small number of oil wells actually occur within the CEA. The wildlife impacts in the CEA were adequately analyzed, including consideration of the disturbed acres due to various activities.
134	BLM phosphate mining regulations at 43 CFR § 3591.1 direct operators to take measures to "avoid, minimize or repair" damage to vegetation, fish, and wildlife habitat.	BLM regs 43CFR3591.1 require operators to take measures to "avoid, minimize or repair" damage to fish and wildlife habitat. We don't see this in this or other project NEPA documents for mining in the area. Mitigation is not necessarily repairing the damage. Dollars for mitigation are not spent in specific ways tied to the on ground impacts, instead delved out to third parties to use. While mitigation needs to happen across the phosphate areas in Bear Lake and Caribou Counties, more site specific measures need to be designed, budgeted and carried out. DSAYS are generic values and do not accomplish these goals. They are more of a convenience to the mining companies to avoid dealing with their own impacts. DSAYS do not take into account the full extent of impacts over space and time.	5-34	The Agencies disagree with the comment and note that there are numerous measures to "avoid, minimize, or repair damage". HEA is one method used in the EIS to quantify wildlife habitat impacts and develop comparisons among alternatives. Further, it is current BLM policy to no longer require compensatory mitigation (IM-2019-018).
135	Disturbance associated with activities in the CEA may limit the attractiveness of the CEA to Canada lynx, wolverine, and gray wolves, which generally prefer extensive tracts of undeveloped land. Impacts to mature forest and the disturbances associated with the Proposed Action or Alternative 1 would further decrease potential linkage habitat for Canada lynx, but this would result in a minor cumulative effect when added to the other past, present, and reasonable foreseeable actions in the CEA because the Project would occur immediately adjacent to active and existing mining operations that are already likely displacing lynx from the area. Further, since disturbance associated with the Proposed Action and Alternative 1, 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.	Disturbance further decreases potential for lynx, wolverine and wolf, but impacts already occurring as project is adjacent to ongoing disturbance. While it is claimed that forested areas are available for reasonable movement around these areas, the overall impact to travel/linkage corridors should be "minimal". This is so generic it is useless as an analysis. The Corridor needs to be mapped as we have noted and all disturbance activities, past, present and future mapped and buffered as noted above to determine the quality of habitat for migrating animals.	5-35	Potential direct, indirect, and cumulative impacts to lynx, wolverine, and wolf are discussed in Chapters 4 and 5 of the EIS. The noted impacts in the Study Area and CEA were adequately analyzed in the EIS. Further, the EIS for the Forest Plan examined impacts to wildlife corridors and that analysis has been referenced in this EIS.
136	Wildlife are affected by livestock grazing as a result of competition for forage and alteration of plant communities. As described in the Canada Lynx Conservation Assessment Strategy (Ruediger et al. 2000), both domestic livestock and wildlife ungulate grazing may change the structure or composition of native plant communities. Proper rotation and stocking rates can minimize these effects. Livestock grazing on the CNF is conducted in compliance with standards and guidelines contained in the CNF RFP (USFS 2003b). Neither alternative would change native rangeland plant communities over the long term because more than 95 percent of the disturbance would be reclaimed within native grass, forb, and	Here the cumulative effects are discussed in general terms, but not quantified as needed and noted in these comments.	5-36	These impacts were adequately analyzed in the EIS. Quantification is not possible and/or required in every instance of impact assessment.

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	shrub species. Once reclaimed, each alternative would allow for grazing similar to baseline conditions.			
137	A donation of this land to BLM in conjunction with an approval of the Dairy Syncline Mine would reduce cumulative impacts to wildlife habitat an unknown amount in the CEA.	Simplot donation of land in conjunction with its Dairy Syncline mine if approved. Caldwell Canyon also mentioned. I recall our work in the oil shale days with BLM in the 70's and 80's. In those days, quantitative data on wildlife and fish numbers and habitats were collected during baselines for future comparison. What is missing here is any quantitative data for wildlife populations and habitat parameters associated with those populations. Current observations in the wildlife Study Area are not quantitatative and provide no comparisons to conditions prior to development of the Smoky Canyon Mine. This is equally applicable to the other mines in existence. They have all escaped accountability by not funding the type of studies and data needed to make valid comparisons and the use of HEA merely assists in this deflection from reality.	5-37	The Agencies approved the study plan for the baseline wildlife and vegetation studies for this EIS, and also approved the technical reports prepared using those study results. It is incorrect to say that there was no quantitative data collected in those baseline studies. Quantitative data from the wildlife study (e.g., counts) was presented in the technical report (Stantec 2016e) and summarized in the DEIS where appropriate. Further, quantitative habitat data for both community type (e.g., acres) and strata evaluation (e.g., # per acre, % species by basal area) were provided in the vegetation technical report (Stantec 2017b) and in the DEIS as appropriate. Baseline studies done for "other mines in existence" are not relevant to this EIS. HEA is one measure used to quantify wildlife habitat impacts and to compare impacts among alternatives, but it is not the only one.
138	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.	Roading for timber harvest if done properly has had little observable effects to stream water quality due to soil erosion and sedimentation. What about all roads, for example in the Winschell Dugway EIS illegal trails have affected streams in that project area due to stream crossings and sedimentation. In this CEA, sediment is an issue, yet impacts from livestock grazing and timber harvests are discounted. Mining is claimed to mitigate this problem with bmps. So, where does the sediment come from? The DEIS indicates some of this comes from water diversions associated with agriculture and mining. Water diversions and developments for livestock can be mitigated by retiring grazing permits in the CEA. Simplot should develop a plan and set aside a fund for accomplishing this purpose.	5-38	Sediment impacts were also discussed on DEIS pages 4-36, 4-37, and 5-18. It is not necessary in this EIS to assess whether or not the Winschell Dugway EIS accurately analyzed sedimentation. Retiring grazing permits is not an appropriate topic for this EIS.
139	Future selenium contributions from the existing Smoky Canyon Mine are unknown, but are likely to be lower than present concentrations as loading from existing mining is expected to be near peak and decreasing by 2050 (**Section 4.5.2.1**). In addition, the WTPP at Hoopes Spring is expected to decrease selenium levels by an unknown amount. However, some of these decreases could be offset by increases from Panels F & G mining (**Section 5.4.1.2**).	No guarantee that selenium concentrations at Hoopes Spring will not increase from panel F and G mining. Also says these future contributions from the existing mine are "unknown". This seems sufficient reason for denying the permit. Past evaluations have obviously failed as the number of CERCLA sites, including Smoky Canyon, attest.	5-39	Please see Comment Response 5.42 (Appendix 6A Table 1). Further, note that the comment misinterprets the statement about potential Panels F and G selenium contributions in the future. The text is not talking about contributions to Hoopes Springs, but instead the lower reaches of Sage Creek and to Crow Creek. Hydrogeological considerations are such that Hoopes Springs is out of the area of potential effects.
140	Figure 5.9-1	Cumulative Effects area for grazing resources.is this arbitrary? What is the basis?	5-41	As stated in Section 5.9.1, the CEA boundary for grazing management is the Pole Draney Allotment because all Project disturbances would be confined to this allotment.

Comment Number	Highlighted Text	Comment	Page Number	Comment Response
141	Table 5.9-1 (Percent of CEA column header)	CEA for land use, grazing, recreation should be the same for the CEA for wildlife with an appropriate analysis by subsection and watershed to analyze and determine effects by and on these attributes. In other projects we have mapped water developments for livestock showing the massive number of these on the Forest. And as our review pointed out, the impacts extend for large distances, concentrate livestock effects on aspen and other upland community types and do not protect streams by "drawing" cattle away to upland troughs. See our Rangelands paper. These affect all other aspects of the land and wildlife, withdraw water from streams, while grazing uplands decreases infiltration and lowers groundwater recharge and baseflow in streams	5-43	The rationale for selection of the CEAs for land use, grazing, and recreation is provided in Chapter 5 and is deemed sufficient for analyzing cumulative impacts from the Project.
142	The transportation CEA contains established transportation routes, including state highways and designated forest roads. Cumulative effects to transportation would be influenced by the roads built and maintained for mining and those that are left in place after closure and reclamation. During mining and reclamation, mining roads would be closed to public access, but some may be opened by surface owners or government agencies over time.	Roads and trails are not defined or mapped in the CEA. Here only designated forest roads and state highways are discussed. Yet as stated before in these notes, illegal roads and trails generated by timber harvest, off road use, combined with those claimed to be "temporary" or otherwise closed, remain as corridors for human intrusion into wildlife habitats. That intrusion is a cause of mortality as it reduces security cover.	5-44	The Project would not result in the creation of any permanent roads within the Project Area. In addition, the Project Area is very difficult to access by the public due to private land that occurs to the east and the active mining areas that occur to the west. Impacts to wildlife and their habitat are thoroughly addressed in the EIS.
143	The CEA boundary for socioeconomics (no figure) includes the six-county area of Bannock, Bear Lake, Bingham, Caribou, and Power counties, Idaho; and Lincoln County, Wyoming. The boundary was developed with the IDT experts and professional judgement.	Social and economic analysis incomplete due to data being withheld by Counties such as Caribou County and no consideration or analysis of the contribution of fish and wildlife to local, regional and state economies. See USFWS National Survey of Fishing, Hunting, and Wildlife Associated Recreation, 2011. AT link: https://www.census.gov/prod/2012pubs/fhw11-nat.pdf There are many other studies on economic value of wildlife by this agency. Also past work on the intrinsic, behest and other values of wildlife and forests by John Loomis, Professor at Colorado State University, formerly with Fish and Wildlife Service has published on this topic and outdoor recreation values. The analysis should provide more detail about the natural resource values potentially present in the phosphate mining region and those as currently exist. Loomis hundreds of economic reports and evaluation on methods and outcomes of resource extraction on fish, wildlife and recreation values can be found at his links: https://dare.agsci.colostate.edu/people/faculty/dr-john-b-loomis/ https://scholar.google.com/citations?hl=en&user=OuP53oUAAAAJ&view_op=list_works&sortby=pubdate There was no data on recreation use, ohv use. Note in Paris Canyon we find over 300 vehicles a day accessing the CNF. Georgetown Canyon is another major ohv and traffic access point. During hunting season there are atvs, trucks and trailers in every available spot in Diamond Fork, Georgetown Canyon and other areas. Note encounter with hunters from Virginia and California who had hunted in Smoky Canyon Mine area for decades and had decided they loved it so much their ashes would be placed here told John Carter this fall, that those ashes would now be gone by the construction of a haul road. All for an activity that produces a small fraction of employment in the	5-54	As described in the EIS, there would be no impact on fishing from the Project and only negligible impacts to recreation activities. The Project Area is very difficult to access by the public due to private land that occurs to the east and the active mining areas that occur to the west, thus limiting recreation activities and cumulative impacts to recreation from the Project. For these reasons, additional socioeconomic analysis was deemed unnecessary for the Project.

Comment Number	Highlighted Text	Comment	Page Number	Comment Response
		counties listed, while creating a Superfund Region, a legacy for the American people of hundreds of years of pollution, loss of topsoil, loss of old growth forests and their wildlife. loss of scenic beauty, loss of recreation opportunities.		
144	Chapter 6 Consultation and Coordination Cover Page	Noise. Note Winschell Dugway DEIS Table 3 uses a 92 - 97 dBC increase in noise level for atvs and at 3200 feet, depending on whether one (69 dB) or two atvs (72 dBA) this declines to these values. Many of the effects of ohvs/atvs are discussed in the Winschell DEIS. Such as dust which can be visible for miles affecting user experience. Note the effects of dust on visual effects. Also, for elk summer habitat, OMRD <0.7 recommended, for hunting at 50% habitat effectiveness, 1.9 mi/sqmi. Basically a fifty percent reduction in habitat at this level. Forest Plan EIS Vol IV shows in Map 4 the OMRD per watershed. Need to look at this and update to current levels and add the other roads and trails, closed, temporary, illegal or user created. Then apply buffers, analyze habitat types and prescriptions against the buffered roads and other disturbances such as mining, power lines, pipelines. Map 3 shows by Mountain Range Block. Analysis should also compare by Block. The EIS Table 31 notes miles needing to be closed and PD-33 notes that several prescription polygons exceed set OMRD density. EIS Map 1 shows lynx linkage and crossing paths on Hwy 30 and 34. Process for assessing connectivity on D-4. Factors to consider on page D-5. Caribou/Webster/Preuss Subsections comprise the Corridor in the area of interest. Table 35 of the EIS shows departure from PFC with aspen, spruce fir, riparian at high departure, doug fir at moderate departure. No mention of mixed conifer.	Cover page	Although it is unclear what the commenter is referring to with the location of this comment, applicable resource impacts from the Project are thoroughly addressed in the EIS with regard to noise, air quality, wildlife habitat, recreation, and vegetation.
145	There are no known active sage or Columbian sharp-tailed grouse leks within 2 miles of the Study Area, and impacts are not expected to affect the species at the population level. (Table 8)	No known active sage or columbian leks within two miles of the study area..then why are they mapped in a tailings pond?	Appendix 4A-10	See Comment Response 45.

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APPENDIX 6B

SUPPLEMENTAL INFORMATION FOR COMMENT RESPONSES

Introduction

Many of the comments on the East Smoky Draft Environmental Impact Statement (DEIS) (2018) received from EPA and Earthworks focus primarily on requests for inclusion of more recently collected data by the DEIS. The East Smoky (DEIS) included data collected by Simplot through 2016 as noted in section 3.9, together with data from other sources. The J.R. Simplot Company (Simplot) has been monitoring aquatic resource conditions in Hoopes Spring, Sage Creek, and Crow Creek continuously since 2006 under various regulatory and non-regulatory programs and requirements. The availability of data from different locations depends on either programmatic requirements for monitoring, or Simplot's commitment to provide data continuity for certain key locations. Relevant aquatic resource data for the East Smoky EIS potential future impact analyses are provided herein to supplement information already provided in the East Smoky DEIS. Aquatic resource data are provided for the following locations:

- Crow Creek upstream of Sage Creek (CC-75, CC-150, CC-350) Background,
- Hoopes Spring (HS-3),
- Sage Creek (LSV-2C and LSV-4), and
- Crow Creek downstream of Sage Creek (CC-1A and -CC-3A)

EPA Comment 3.27 *- Update the list of references and information in the FEIS to reflect more current data, including: Simplot. 2017. Aquatic Resources and Fisheries Monitoring Report.*

__**Response:**__ Appropriate updates to the references and additional data include the following:
- Formation Environmental. 2018. 2017 Aquatic Resources and Fisheries Monitoring Report.
- Panels F and G - Smoky Canyon Mine. Prepared for the J.R. Simplot Company.
- Formation Environmental. 2019. Unpublished Voluntary monitoring data collected in 2018.
- Formation Environmental. 2017. Proposed Site-Specific Selenium Criterion for Hoopes Spring, Sage Creek, and Crow Creek Near the Smoky Canyon Mine. Prepared for J.R. Simplot Company. Submitted to Idaho Department of Environmental Quality. October 2017.

Earthworks Comment 5.16 *– (Summarized for the aquatic resource issues) The Proposed Action also fails to meet the Revised Forest Plan standards, goals and objectives. The Caribou National Revised Forest Plan (RFP, 2003) provides numerous goals, objectives and standards for mining:*

Goal: Riparian and aquatic ecosystems provide water quality suitable for supporting designated beneficial uses. (RFP p. 4-47).

Standard: "[w]ithin legal authorities," to "ensure that new proposed management activities within watersheds containing 303(d) listed water bodies improve or maintain overall progress toward beneficial use attainment for pollutants which led to listing." (RFP p. 4-50).

Response: Idaho DEQ's 2016 Integrated Report (IDEQ 2018)[1] lists the following stream segments within the study area as impaired in its 303(d) list.

Stream Segment ID	Description	Impairment
ID17040105SK007_02c	Smoky Creek 10.8 MILES	Sedimentation/Siltation
ID17040105SK007_02f	Draney Creek 6.86 MILES	Sedimentation/Siltation
ID17040105SK007_03	Tygee Creek, source to mouth 5.56 MILES	Sedimentation/Siltation
ID17040105SK008_04	Crow Creek - Deer Creek to border 10.44 MILES	Sedimentation/Siltation, Selenium
ID17040105SK009_02	North Fork Sage Creek 12.45 MILES	Selenium downstream of Pole Creek
ID17040105SK009_02c	Sage Creek 1.81 MILES	Combined Biota/Habitat, Bioassessments
ID17040105SK009_02d	Pole Canyon Creek 3.62 MILES	Selenium
ID17040105SK009_02e	South Fork Sage Creek 7.95 MILES	Combined Biota/Habitat Bioassessments, Selenium
ID17040105SK009_03	Sage Creek – confluence with North Fork Sage Creek to mouth 3.22 MILES	Selenium

Smoky, Tygee, and Draney Creek current impairments are noted in the DEIS and management actions for control of future sedimentation and siltation due to implementation of the project are provided. The non-time critical removal action (NTCRA) has been implemented at Pole Canyon. The data indicate that the pipeline diversion has been successful in routing the stream around and over the cross-valley fill. In 2013, Simplot petitioned IDEQ to remove Pole Canyon Creek from the Category 5 303(d) list to the Category 4b list (designation indicates that a TMDL is not needed because other pollution control requirements are expected to result in the attainment of an applicable water quality standard in a reasonable time period). Since 2012, Pole Canyon Creek surface water concentrations have been less than 1 ug/L.

Reductions in available selenium from Pole Canyon Creek to flow into North Fork Sage Creek (NFSC) has reduced overall NFSC selenium concentrations, however, shallow alluvial flows from Pole Canyon Creek that move through legacy sediment concentrations in Sage Valley still contribute selenium to NFSC. The East Smoky Panel is not expected to affect the shallow alluvial flows of Pole Canyon Creek.

South Fork Sage Creek is not expected to be impacted by the proposed project.

[1] IDEQ. 2018. Idaho's 2016 Integrated Report Final. IDEQ Water Quality Division, Boise, ID.

Reductions in selenium in Crow Creek and Sage Creek are primarily contingent on reducing selenium from historic mine sources to Hoopes Spring and to a lesser extent selenium from South Fork Sage Creek Springs. The mining of the East Smoky Panel according to the agency preferred alternative upholds the requirement of the RFP to, “ensure that new proposed management activities within watersheds containing 303(d) listed water bodies improve or maintain overall progress toward beneficial use attainment for pollutants which led to listing.”

Earthworks Comment 5.40 - *The DEIS draws conclusions about “minor” harm to watersheds that are not substantiated. The DEIS states that “the selenium contributions from the East Smoky Panel under the proposed Action and under Alternative 1 would have a minor impact to Sage and Crow Creeks, both of which are already impacted beyond the current chronic aquatic life criterion for selenium.” (DEIS, p. ES-5). The assertion that contributions of selenium to Sage and Crow Creeks will have minor, rather than major impacts, is not supported by the data. At present, the data demonstrates that selenium releases into Sage Creek, via Hoopes Spring, have resulted in substantially worse conditions.*

- *Selenium in water during 2017 for site LSV-4 (Sage Creek) has nearly doubled since the comparison period.*
- *Selenium in trout during 2017 for site LSV-4 (Sage Creek) has more than doubled and is significantly higher than the comparison period.*
- *Selenium concentration in periphyton has gone up substantially above comparison time periods in Sage Creek samples.*
- *Selenium in sediment has gone up substantially in above comparison time periods in lower Crow Creek and Sage Creek samples.*
- *Trout standing crop (biomass/area) has decreased, for the most part, across the board. However, decreases are especially severe in LSV-4 (Sage Creek) where selenium in sediment, periphyton, surface water, and trout were also very high.*

Since Hoopes Spring and Sage Creek below Hoopes Spring already regularly exceed aquatic life criterion for selenium (Stantec 2017(a)) and fish tissue in Sage Creek exceed the recommended criteria by a factor of 5, any addition of selenium can be expected to exacerbate chronic and acute effects. According to Lemly (1999), a foremost expert on selenium, food-chain bioaccumulation and resultant dietary exposure cause the response curve for selenium poisoning in fish to be very steep. For example, a transition from no effect to complete reproductive failure can occur over a range of only a few parts per billion waterborne selenium. Thus, even slight increases can “light the bioaccumulation fuse of the selenium time bomb and push it over the toxic threshold.”9 The Crow Creek ecosystem cannot safely assimilate any more selenium from any source because food-chain and fish tissue concentrations have already reached the toxic threshold at several locations.

<u>Response:</u> The East Smoky DEIS used the term “minor effects” relative to the predicted increases of selenium in surface waters (≤ 1 ug/L) for Hoopes Spring, Sage Creek and Crow Creek downstream of Sage Creek after 80 years. This anticipated increase would not be concurrent with exiting conditions. The comment above is using data from the 2017 Panels F&G Mitigation Monitoring Report to infer that the aquatic resources and biological community in Sage Creek and Crow Creek will not be improved in 80 years; however, this report only presents a snapshot of the available data from 2009 to 2011 and 2014 and 2017. Information presented below provides a complete picture for the aquatic resource conditions in Sage Creek and Crow Creek.

<u>Surface Water - </u>Surface water concentrations of selenium at Hoopes Spring and locations downstream from Hoopes Spring vary annually and from location to location. Figures 1 through 5 show the surface water concentrations of selenium seasonally for each year. These data are provided to set the context for discussion in the comment response concerning aquatic biological resources. Total selenium in surface water at HS-3 has been increasing since 2006; however at the end of 2017 and through 2018 total selenium concentration began to decline due to selenium removal at the pilot water treatment plant. Total selenium in Sage Creek and Crow Creek has also declined during 2018. While total selenium concentrations are still elevated above criteria levels, it is expected that due to the Administrative Order on Consent associated with the CERCLA investigation that total selenium concentrations in surface water will continue to decrease.

Figure 1 Total Selenium at Hoopes Spring (HS-3)

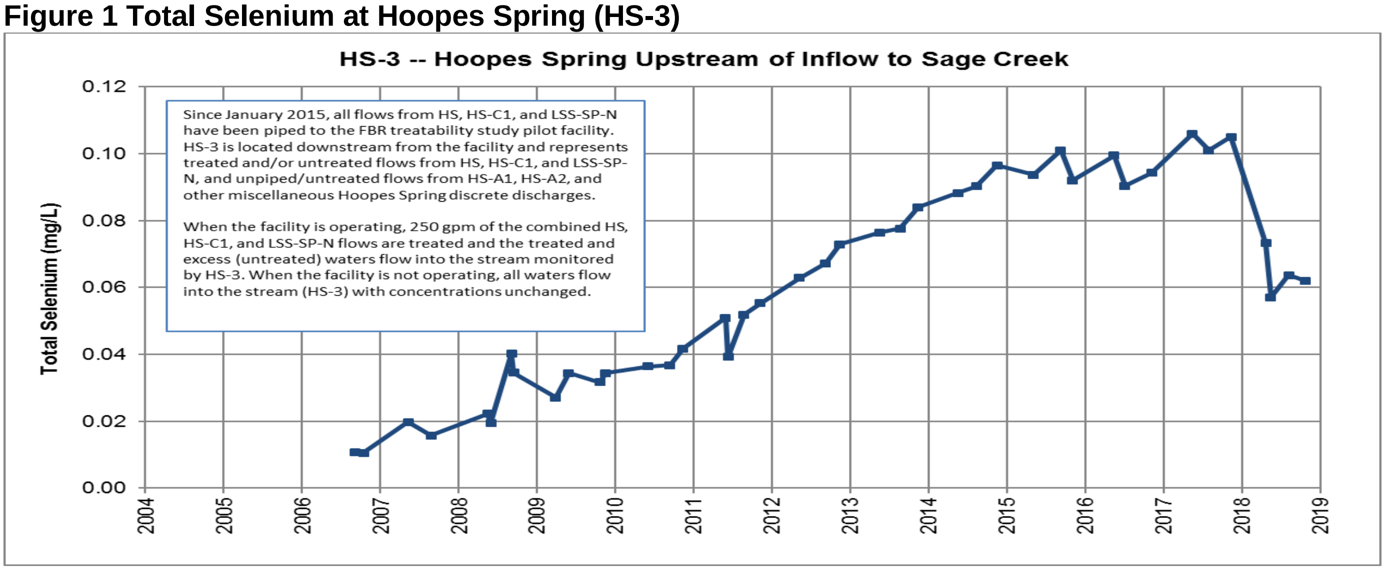


Figure 2 – Total Selenium at Sage Creek (LSV-2 and 2C)

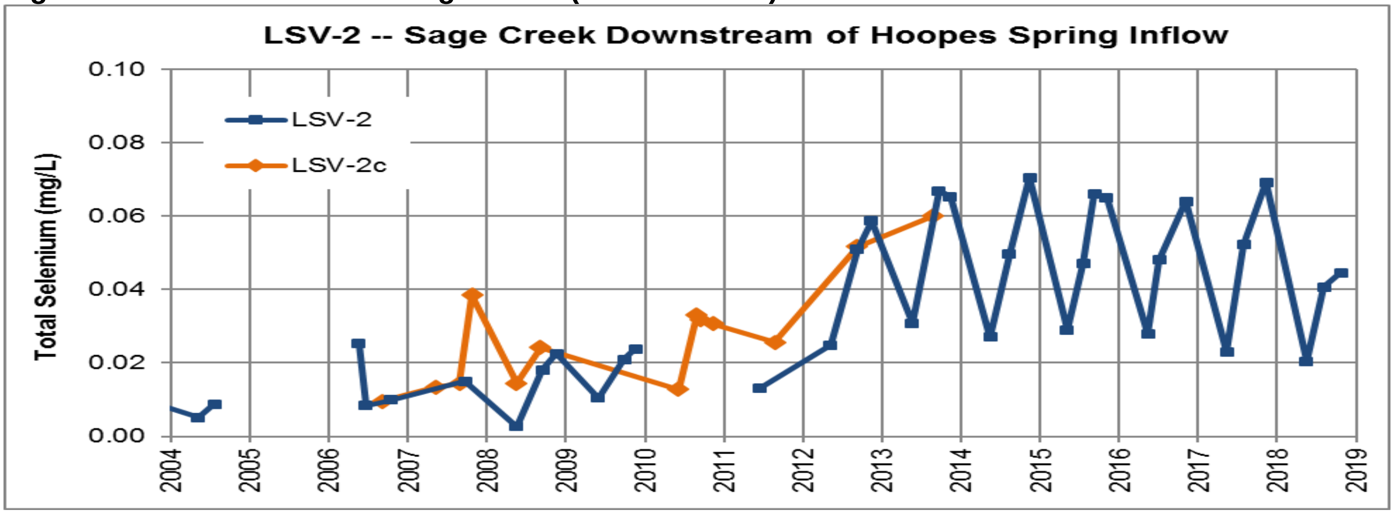


Figure 3 Total Selenium at Sage Creek (LSV-4)

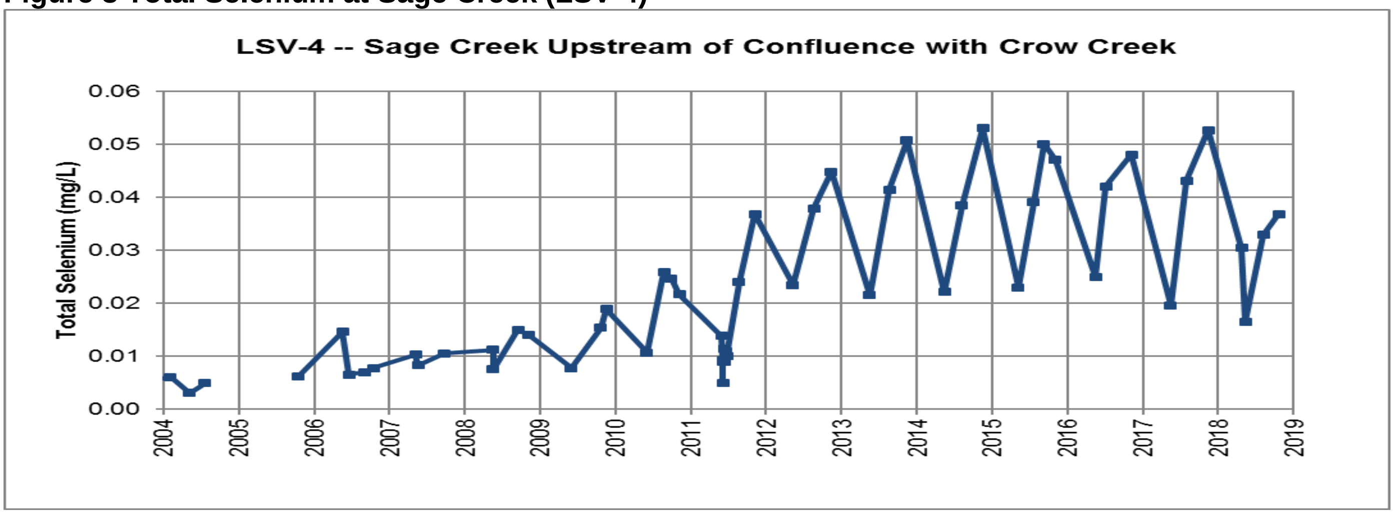


Figure 4 Total Selenium at Crow Creek (CC-1A)

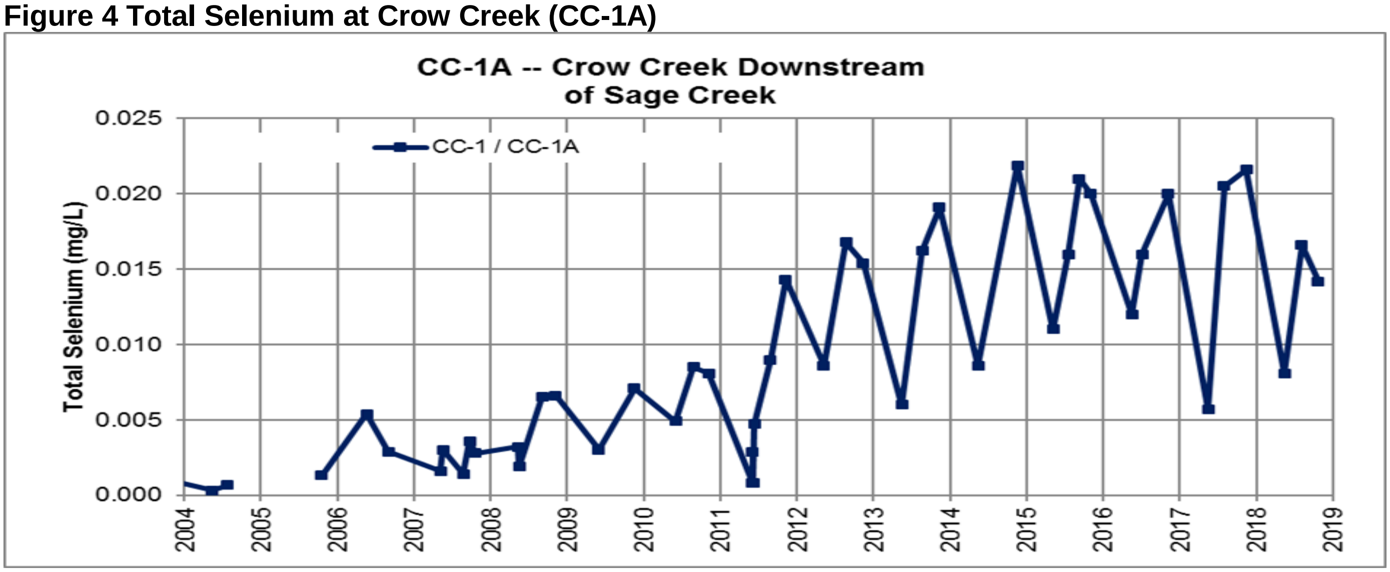
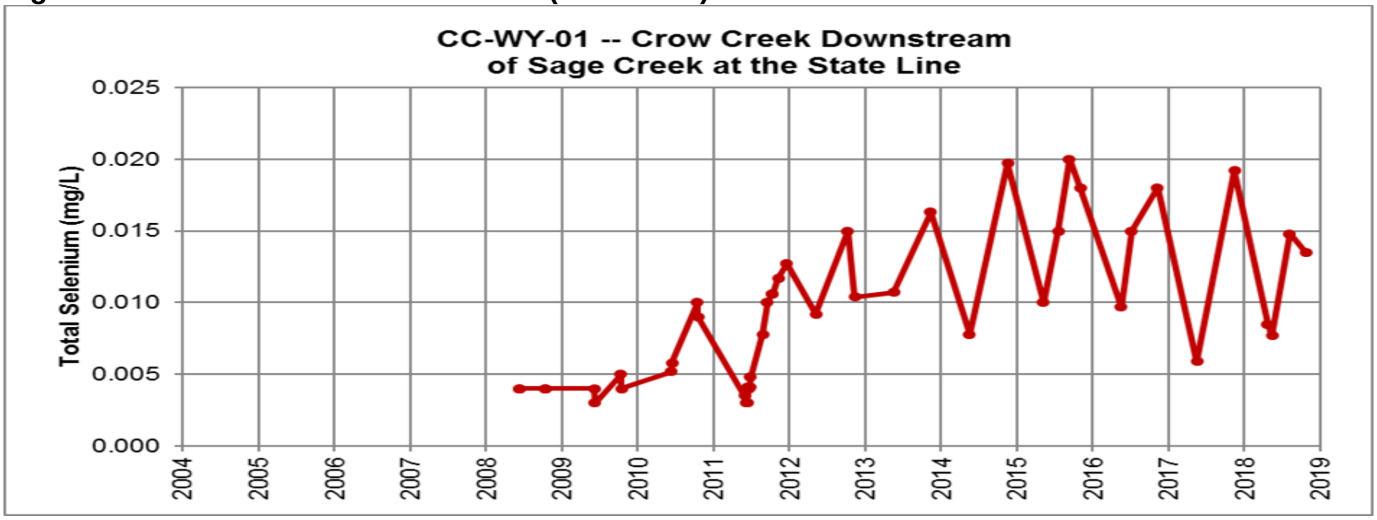


Figure 5 Total Selenium at Crow Creek (CC-WY-01)



Fish Tissues - Selenium in surface water and sediments contributes to the bioaccumulation of selenium in periphyton, benthos, and fish. At low levels, selenium as an essential micro nutrient is taken up, sometimes in excess to maintain essential physiological functions. At higher levels, above physiological requirements, selenium is bioaccumulated and stored. In the case of fish, storage most often occurs in liver and muscle, and to some extent eggs. For salmonids, stored selenium is deposited to the vitellogenin eggs during vitellogenesis, which is the process of forming yolk for eggs, which can occur many months prior to spawning. Fish have been identified as a sensitive aquatic species as compared to benthic macroinvertebrates or algae/periphyton, thus it is logical that selenium effects are best measured in fish, more specifically, in reproductive tissues of fish. Fish tissue is a complete integrator of selenium exposure, and the best indicator of potential effects. And while the reproductive tissues (egg/ovary) provide the best dose response relationships for selenium, those types of data are not frequently collected. The Simplot site-specific criterion proposed for Sage Creek and Hoopes Spring provides for a whole body (WB) tissue criterion of 13.6 mg/kg dw. For Crow Creek downstream of Sage Creek, the criterion is 12.5 mg/kg dw. Data for WB fish tissue concentrations of selenium are presented below for Hoopes Spring, Sage Creek, and Crow Creek to illustrate the historical and existing conditions as of 2018. While the target size and number of trout for tissue collection is 150 mm or less and n = 10, those targets are not always achieved. When fish are difficult to find in that size range, fish up to 200 mm will be sacrificed for tissue analysis, but only after additional electrofishing is done upstream and downstream of the reach to find the target sized fish. Brown trout are collected in preference to Yellowstone cutthroat trout (YCT) because brown trout are more sensitive to selenium than YCT, and Simplot's site-specific criterion for selenium is based on brown trout effects. Further, as a native primary management species, sampling YCT for tissue analysis on a routine basis is simply not responsible.

Fish tissue data for brown trout and sculpins are presented in Figures 6 and 7, respectively. Summary statistics are provided in Attachment 1. As shown in Figure 6 for brown trout, selenium in WB at HS-3 and LSV-2C in 2018 are higher than observed in all previous years, whereas at LSV-4 selenium in WB is lower than 2013 and 2017. At CC-1A and CC-3A brown trout were only slightly higher than concentrations observed in 2013.

Data for selenium in YCT tissues are shown in Attachment 1. YCT are not typically retained for tissue analysis if adequate numbers of brown trout are present in the target size range; therefore, the data record for YCT is incomplete. Occasionally, brown trout and YCT will overlap (i.e., both species are present at a location) and samples from both species will be collected for WB selenium concentrations. Where and when this occurs, tissue concentrations between the two species are similar.

Simplot also monitors sculpin tissues because they are resident to the locations sampled, do not move between locations, and provide a representative concentration of WB fish tissues for invertebrate feeding fish, similar to juvenile trout (Figure 7). These data provide a good check on trout tissue concentrations as there is a significant and strong relationship between sculpin and brown trout WB tissue concentrations (Figure 8, R2 = 0.091). Based on WB sculpin tissues, selenium concentrations at HS-3 were elevated above previous years in 2018, while sculpin at LSV-2C and LSV-4 were lower than 2013. Likewise, CC-1A sculpin tissues were also slightly lower than 2013 tissue concentrations while CC-3A concentrations were slightly higher than 2013 concentrations.

Collectively, the most recent data illustrates WB tissue concentrations at some sites are higher in 2018 than in previous years and that in Hoopes Spring, Sage Creek, and Crow Creek fish tissue concentrations are higher than the proposed site-specific selenium criterion (SSSC). However, increases in surface water and tissues do not always provide corresponding increases in effects as the relationship of selenium in water to selenium in tissues is not linear. Orr et al. (2012) investigated food chain modeling and westslope cutthroat trout tissue concentrations in Elk Valley British Columbia. Data collected there indicated an approximate 10% increase per year in water selenium concentrations up to 44 ug/L. Food web modeling was conducted to derive the relationship between ovary tissue concentrations in trout and water concentrations. Interestingly, the lotic model profile reflected very little increase in ovary concentration with increasing water concentrations between approximately 5 ug/L and 43 ug/L (Orr et al. 2012)[2]. Brix et al. (2005)[3] showed a similar pattern of relatively constant WB selenium concentrations in fish exposed to water concentrations up to approximately 30 ug/L in lotic areas. Orr et al (2012) found that uptake

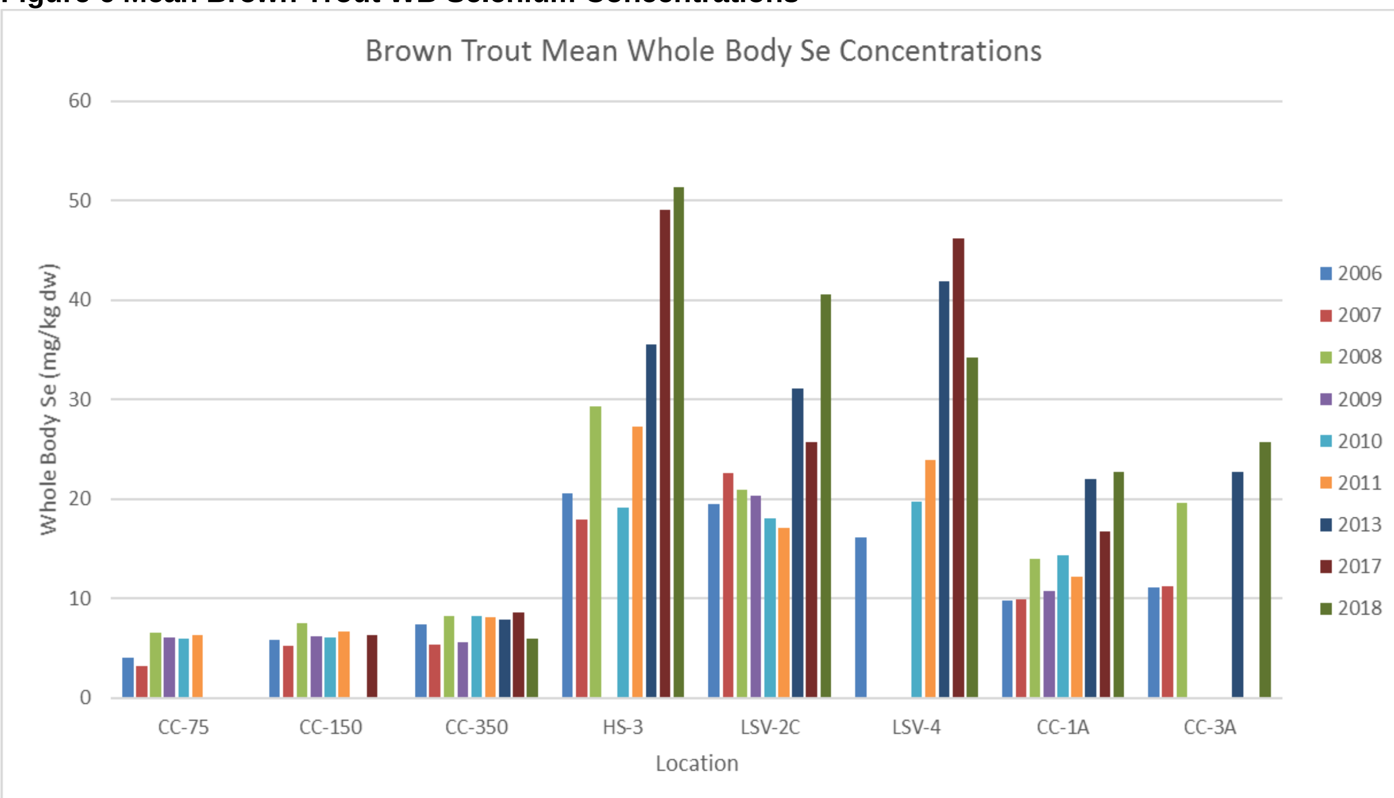
[2] P. L. Orr, C. I. E. Wiremanaden, M. D. Paine, W. Franklin, and C. Fraser. 2012. Food chain model based on field data to predict westslope cutthroat Trout (oncorhynchus clarkii lewisi) ovary selenium concentrations from Water selenium concentrations in the Elk Valley, British Columbia. Environmental Toxicology and Chemistry, Vol. 31, No. 3, pp. 672–680.

[3] Brix KV, Toll JE, Tear LM,DeForest DK, Adams WJ. 2005. Setting site specific water quality standards by using tissue residue thresholds and bioaccumulation data. Part 2. Calculating site-specific selenium water quality standards for protecting fish and birds. Environ Toxicol Chem 24:231–237.

and trophic transfer relationships are not constant across a range of exposures concentrations, that westslope cutthroat trout were able to actively maintain (regulate) ovary selenium concentrations below 20 mg/kg dry weight when dietary levels were ≤10 mg/kg dry weight, and that ovary concentrations increased at higher dietary levels. The same pattern of ovary selenium regulation at dietary levels of approximately 10 mg/kg dry weight or less was reported by Hardy et al. (2010)[4] following controlled dietary exposures of cutthroat trout in the laboratory.

Simplot is working towards achieving the SSSC and protection of the aquatic resources. Concentrations of selenium in WB brown trout, YCT and sculpin are for some sites, above the thresholds and those cited above, but the scientific research indicates that fish are much more resilient than the criteria values assigned to protect them. Continued monitoring will be conducted to track the changes in water chemistry, and biological media as well as the fish population conditions. This practice is consistent with adaptive management approaches and good science.

Figure 6 Mean Brown Trout WB Selenium Concentrations



[4] Hardy RW, Oram LL, Moller G. 2010. Effects of dietary selenomethionine on cutthroat trout (Oncorhynchus clarki bouvieri) growth and reproductive performance over a life cycle. Arch Environ Contam Toxicol 58:237–245. (Erratum in Arch Environ Contam Toxicol 58:256.)

Figure 7 Mean Sculpin WB Selenium Concentrations

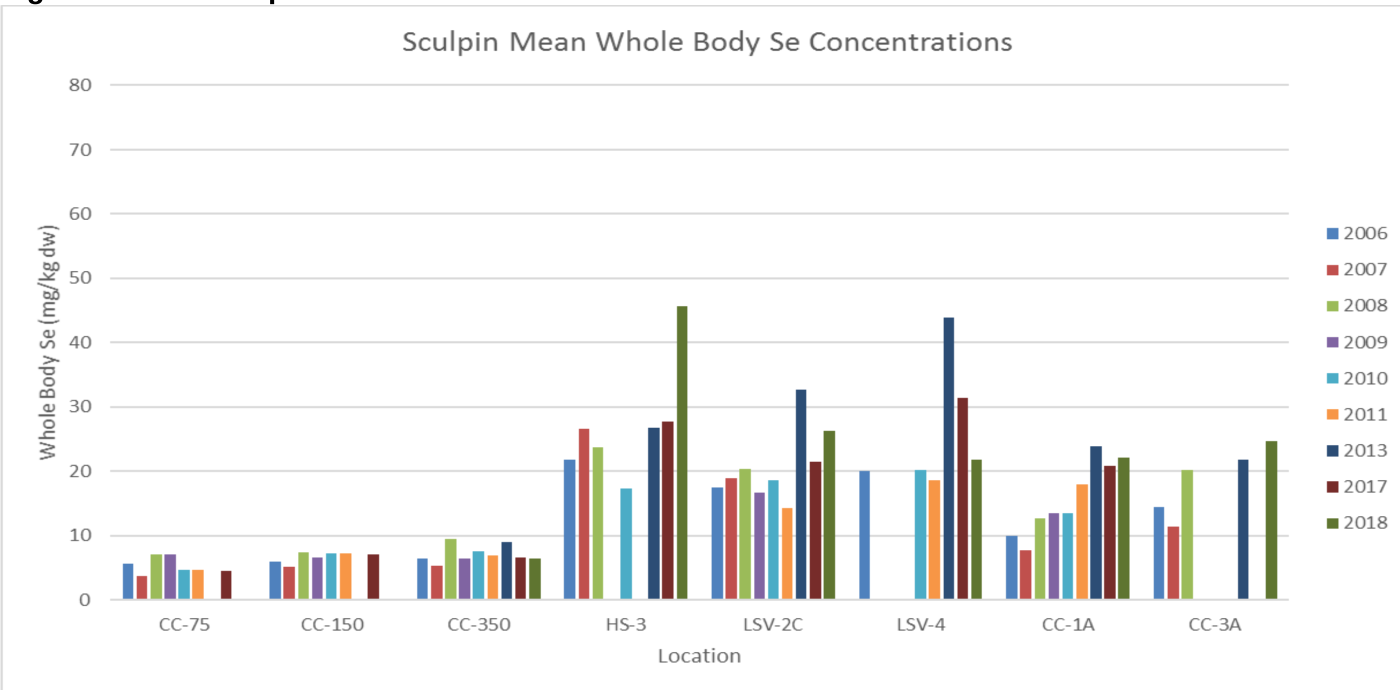
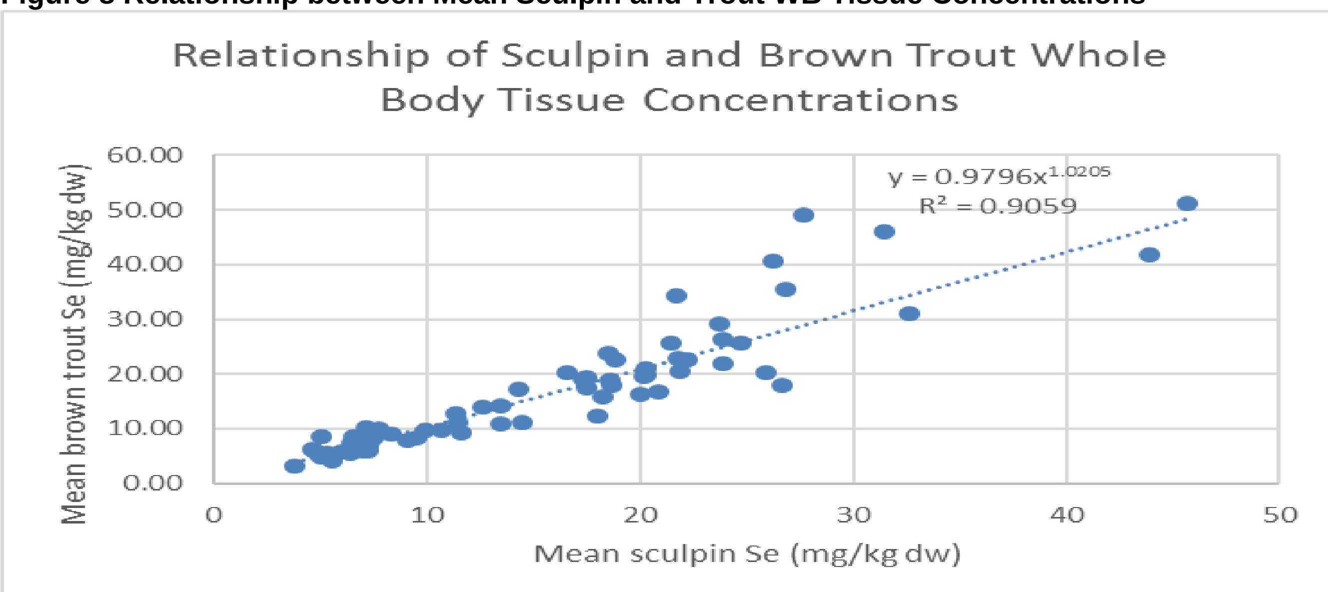


Figure 8 Relationship between Mean Sculpin and Trout WB Tissue Concentrations



Fish Populations - It is inaccurate to infer that addition of 1 ug/L selenium in 80 years, would have negative consequences to conditions in the existing aquatic community particularly trout populations. Trout and sculpin populations have demonstrated to be highly variable and respond to a variety of physical (habitat quality, quantity, and temperature), biological (food and predator prey interactions) and chemical (selenium) stressors as illustrated in Figures 9, 10, and 11. Monitoring for fish populations is ongoing and the data have been compiled from 2006 to 2018. Simplot maintains population statistics for brown trout, YCT, and sculpins as these three species are found at nearly every location.

Over the 13-year span, brown trout populations, reported as standing crop (kg/Ha) have fluctuated widely both temporally and spatially. On Crow Creek, upstream (CC-75, CC-150, and CC-350) and downstream of Sage Creek (CC-1A and CC-3A), brown trout standing crop does not show any apparent trend until about 2016 when brown trout standing crop begins to be consistently lower in Crow Creek locations downstream of Sage Creek. This occurs from 2016 to 2018. Previous to this time, brown trout standing crop was inconsistent and variable between the two Crow Creek reaches. In Crow Creek upstream of Sage Creek brown trout populations have varied widely (3 to 64 kg/Ha) despite negligible changes in total selenium in surface water (consistently less than 2 ug/L at each of these sites) which in turn affects the dietary media that trout feed on (Figure 9). Downstream of Sage Creek brown trout have ranged from 4 to 84 kg/Ha. Perhaps the only consistent brown trout populations have occurred upstream of Sage Creek at CC-350 on Crow Creek (Figure 9). As illustrated, brown trout standing crop has typically been low at CC-350 and not until 2015 were the standing crop estimates from this site higher than those found in Sage Creek or Crow Creek downstream of Sage Creek.

At Hoopes Spring, brown trout standing crop has been variable, but lowest from 2015 to 2018. Brown trout populations at HS-3 have ranged from 9 to 194 kg/Ha. This site experiences the highest selenium exposure, yet from 2006 to 2012, brown trout populations were the second highest populations measured behind Sage Creek. In Sage Creek, brown trout standing crop has been the highest of the four areas monitored (range from 24 to 406 kg/Ha) but decreased below 150 kg/Ha in 2013 and has been consistently low since that time. As shown in the water quality graphics earlier, Hoopes Spring, Sage Creek and Crow Creek downstream of Sage Creek, selenium concentrations have exceeded the upstream background site selenium concentrations, the criterion, and threshold effects derived for the Site-specific selenium criterion proposed to Idaho for these streams. Many factors are influencing these populations, including selenium, but a total collapse of the brown trout population has not occurred. Reductions in brown trout populations do appear in 2013 relative to previous year's monitoring data although the 2018 data do hint at a rebound in brown trout populations in Sage Creek and Crow Creek downstream of Sage Creek.

Population data for YCT show a much different trend than brown trout (Figure 10). While Deer Creek is considered a YCT stronghold, these data are not included as there are no anticipated effects of the East Smoky mine expansion on Deer Creek. Upstream of Sage Creek YCT populations ranged from 3.4 to 40 kg/Ha. Similar to brown trout populations in Crow Creek upstream of Sage Creek, YCT populations are low, even where there is little selenium present. In Hoopes Spring YCT populations have varied widely particularly when large populations of brown trout were present, ranging from 0 to 44 kg/Ha. YCT populations in Sage Creek have also varied widely but have shown to have some of the strongest populations from 2012 to 2018, likely due to decreased brown trout presence and being less sensitive to selenium than brown trout. Crow Creek downstream of Sage Creek YCT populations have varied through time and the population estimates from 2013 to present (14 to 44 kg/Ha) resemble those from 2006 to 2012 (10 to 77 kg/Ha). Although an unintended consequence, reductions in brown trout, particularly in Sage Creek have resulted in higher populations of YCT.

Sculpin populations in Crow Creek upstream of Sage Creek ranged from 4 to 24 kg/Ha, with lower populations occurring about 2012 to 2018 (Figure 11). Hoopes Spring sculpin populations have for the most part continually increased through time ranging from 17 to 119 kg/Ha. Sculpins in Sage Creek have not shown large fluctuations through time as populations have ranged from 9.4 to 24 mg/Ha. In Crow Creek downstream of Sage Creek, sculpin populations have been historically low, ranging from 0.1 to 7 kg/Ha, but the habitat shift there is evident as other species such as redside shiner and more abundant speckled data appear.

Figure 9 Brown Trout Population Summary – Annual Mean Standing Crop

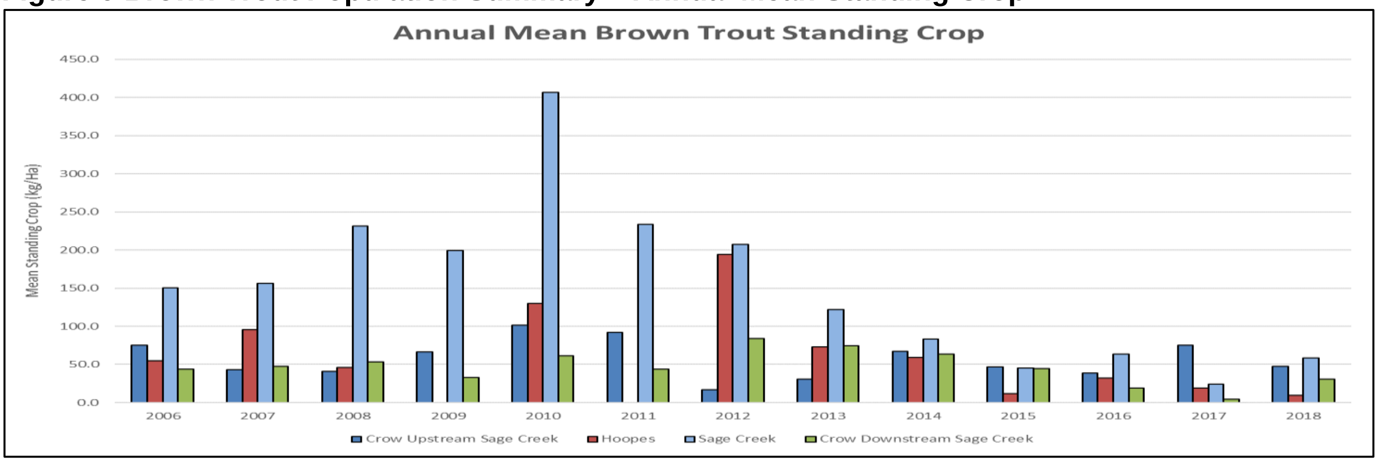


Figure 10 YCT Population Summary – Annual Mean Standing Crop

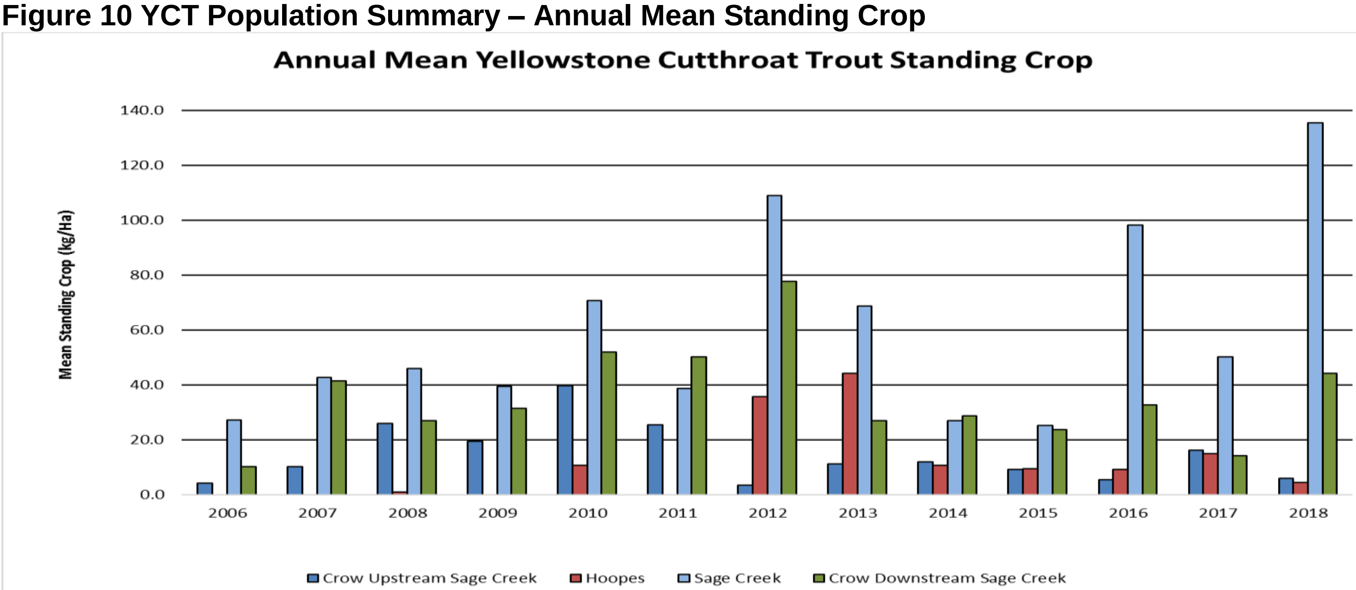
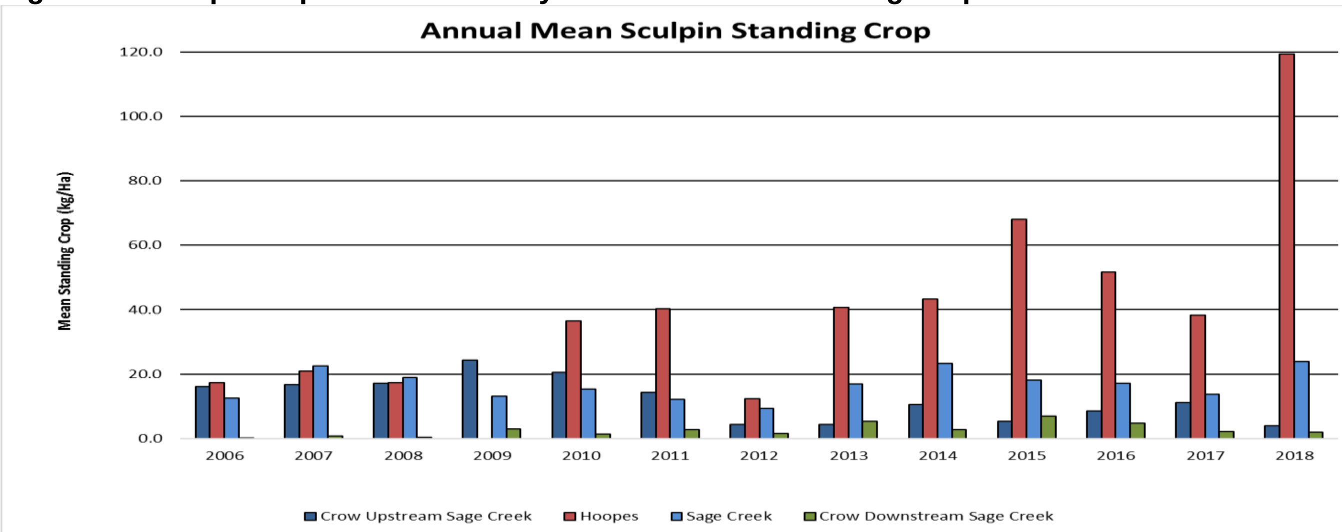


Figure 11 Sculpin Population Summary – Annual Mean Standing Crop



Earthworks comment 5.41 – There is nothing in the toxicological profile of selenium that leads to the conclusion that increased selenium above aquatic life standards will have minor effects. The agencies cannot simply ignore that this is the same mine, operated by the same company, adding more pollution to a watershed that is already overwhelmed by selenium contamination that it generated.

Response: The toxicological profile for selenium indicates that responses to selenium are species specific and habitat specific (lentic vs lotic). As noted in the EPA's 2016 National Criterion (USEPA 2016)[5], different species have different response levels and thus different EC10s. For example, the National Criterion derived a WB tissue threshold of 8.5 mg/kg dw based on all the species used to derive the criterion. Simplot's site-specific criterion derived a value of 13.6 mg/kg dw based on brown trout, which is protective based on the site-specific data. EPA concluded in the 2016 National Criterion that the EC10 for brown trout was 13.2 mg/kg dw based on a slightly different analysis. For YCT, EPA concluded that while no dose response was evident from their analyses of the survival data, the no observed effect concentrations (NOEC) for YCT was estimated to be greater than 30 mg/kg dw in eggs. Simplot as part of its site-specific criterion proposal (Formation 2017) reanalyzed the YCT data using the combined endpoint of surviving and normal, incorporating both survival and deformity data, and derived an EC10 of 28.4 mg/kg dw in eggs which translates to 14.5 mg/kg dw in WB. This EC10 is consistent with those derived for other cutthroat trout species reported in USEPA (2016).

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[5] USEPA. 2016. Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016. U.S. Environmental Protection Agency, Office of Water and Office of Science and Technology, Washington, D.C., EPA 822-R-16-006.

There are additional numerous instances of the species-specific thresholds to selenium cited in USEPA (2016) showing low to no effects thresholds that are greater than the National Criterion, ranging from 20.6 to 56.2 mg/kg dw. The EC10 values for responses of different species to selenium form a wide range of potential effects thresholds, most of which are higher than the National Criterion.

Earthworks comment 5.44 - Furthermore, according to the cumulative impact analysis in the DEIS (p. 5-23) "Within and downstream of Sage Creek within Crow Creek, selenium concentrations may continue to be greater than the standard at CC-1A, regardless of the East Smoky Panel activities." The RI/FS report predicted a peak selenium concentration (not including any loading from the East Smoky Panel) during the low flow season at CC-WY-01 of about 0.02 mg/l in about 2015 dropping to about 0.005 mg/l by 2050. But water quality monitoring to date does not demonstrate a decline in selenium concentrations at that monitoring point. Selenium concentrations continue to be measured at 0.02 mg/l in 2016 and 2017.11 As such, it is inappropriate to rely on any selenium reductions that haven't been measured or documented. Based on the most recent data, selenium concentrations in fish tissue in Sage Creek and Crow Creek have continued to increase and already exceed concentrations (that are predicted to cause major harm to trout populations, as calculated by Van Kirk and Hill (2006).12 Formation Environmental (2018) also documents a dramatic increase in selenium in fish tissue in Sage Creek, with concentrations far surpassing the EPA criteria.

__**Response:**__ Concentrations of selenium in surface water at CC-1A and CC-WY-01 have declined as shown in Figures 4 and 5 following the first full year of treatment. In late 2017, total selenium was measured at 21.6 ug/L whereas in late 2018, total selenium was measured at 14.2 ug/L. At the state line, total selenium measured in late 2017 was 19.2 ug/L while in late 2018 total selenium was measured at 13.5 ug/L. For 2014 to 2017, surface water concentrations at these two locations had been consistently higher than those measured in 2018. Reductions in surface water total selenium concentrations are being realized after one year of treatment plant operation and selenium removal.

The Van Kirk and Hill (2006)[6] model was a first attempt to model long term cutthroat trout population responses relative to individual level selenium toxicity. The model made several assumptions that were not supported by the available literature, including: underestimating the egg mortality of cutthroat trout, underestimates the survival rate at Age 1, using a shortened life span for adult fish, and using a lower spawning population sex ratio than indicated by the literature (Parametrix and Cramer Fish Sciences 2007)[7]. Reviewers indicated that, "Although there also are questions concerning the model equations, the assumptions used by the authors appear to have over-estimated the potential effects of selenium" due to the assumption utilized. Use of

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[6] Van Kirk, Robert W and Sheryl L. Hill, "Demographic model predicts trout population response to selenium based on individual-level toxicity," Ecological Modelling 206 (2007) p. 407-420.

[7] Parametrix and Cramer Fish Sciences. 2007. Technical Review of Van Kirk and Hill's December 11, 2006 Manuscript: "Modeling Predicts Trout Population Response to Selenium Based on Individual-Level Toxicity".

conclusions from this model about trout population responses to selenium should be done with extreme caution.

Earthworks Comment 5.45 - Even if improvements in selenium concentrations in fish tissue have been realized, which they have not, there is no data or analysis to indicate when conditions in those stream reaches will be able to meet beneficial uses. As stated in the DEIS, organisms in aquatic environments exposed to selenium accumulate it primarily through their diets and not directly through water. At present, sediment, periphyton and macroinvertebrates (Formation Environmental, 2018) contain very high concentrations of selenium, and there is no analysis to demonstrate how long it will take to see habitat conditions improve and fish tissue concentrations decline once selenium inputs to water have been reduced.

The Forest Service and BLM have an obligation under the Organic Act and FLPMA, respectively, to protect water quality and fish populations, and cannot ignore these responsibilities by deferring to some future undocumented, unproven, actions by another agency.

Response: Two Non-Time-Critical Removal Actions (NTCRAs) have been implemented at the Pole Canyon Overburden Disposal Area (ODA); to isolate the ODA from Pole Canyon Creek (2006) and to reduce infiltration into the ODA by installation of a cover (2013). Together these actions have reduced the release of selenium to the environment. The majority of the selenium released before the NTCRAs were implemented was to Wells Formation groundwater. This groundwater flows south and discharges to surface water at Hoopes Spring. The travel time for groundwater is in the range of 20 years. Therefore, reductions in selenium loading at Hoopes Spring due to the Pole Canyon NTCRAs are predicted to begin around the 2026 time period and will exert full effect by 2040. Simplot began operation of a 250 gpm treatment system to remove selenium from Hoopes Spring water in 2015. This system has been expanded to treat up 2,000 gpm and has been operating at or near that volume since 2018. Currently the treatment plant has averaged 85% removal of selenium from the influent collected from Hoopes Spring and South Fork Sage Creek.

The combined effect of reducing infiltration to the Wells Formation from the Pole Canyon NTRCA and selenium removal at the treatment plant has resulted in reduced selenium concentrations in Hoopes Spring, Sage Creek and Crow Creek surface waters. These reductions will increase as the concentrations of selenium in Wells Formation aquifer waters decrease.

Reduction in selenium exposure will ultimately lead to reduced selenium in the food chain and less selenium bioaccumulation in fish. The time frame for those reduction is a function of multiple processes and like population level responses, recovery times are equally difficult to detect. Janz et al, (2010)[8] notes the following:

> "However, reductions in environmental Se concentrations or persistent residual contamination in tissues do not necessarily indicate biological recovery or the lack thereof. Differing recovery trajectories have been demonstrated for different ecosystem components in the reservoir studies. In both Belews Lake and Hyco Lake, recovery was relatively fast (~2 to 3 years) for overall fish assemblage biomass as well as recolonization by fish species that were previously extirpated from the reservoir. However, the relative composition of the fish assemblages was markedly different from that pre-exposure or reference areas (Lemly 1997b; Crutchfield 2000). Some 20 years after major reductions in Se loading were implemented in Belews Lake, the fish community composition was largely stabilized, approaching a new equilibrium (Finley and Garrett 2007). This emphasizes the general challenge of defining recovery and the limitations of the concept of ecosystem "equilibrium.""

Selenium contamination in Thompson Creek Idaho in the late 1990s resulting in trout WB tissue concentrations ranging from 4 to 14 mg/kg dw and sculpin WB tissues ranging from 9 to 18 mg/kg dw, yet no clear evidence of population failure was evident between mine impacted sites and sites upstream of the mine influence. More importantly, these population data showed highly variable densities annually both prior to and after increases in selenium were realized.

Two important considerations in evaluating the recovery time from elevated selenium concentrations, among others, include: (1) the rate at which bioaccumulated selenium is depurated after reducing exposures, and (2) whether the form of selenium present (selenate vs. selenite).

Hardy et al. (2009)[9] examined selenium depuration from cutthroat trout fed a range of selenium diets, then converted the feeding regime to the basal low selenium diet. Fish were fed diets with selenium concentrations of 5.2, 7.2, 9.2, and 11.2 ug/g selenium for 44 weeks, then switched to a control diet (1.2 ug/g) for 32 weeks. WB selenium concentrations for the highest-concentration diet reached approximately 12.5 ug/g dw, which is similar to the WB selenium concentrations being proposed in the proposed SSSC. The depuration half-life values corresponding to the dietary treatments were 73.56, 18.73, 14.75, and 11.51 weeks, respectively. These data show that fish with WB selenium concentrations similar to the proposed criterion will depurate to concentrations below the criterion within 3 months after dietary selenium concentration is reduced

[8] Janz, D.M., D.K. DeForest, M.L. Brooks, P.M. Chapman, G. Gilron, D.Hoff, W.A. Hopkins, D.O. McIntyre, C.A. Mebane, V.P. Palace, J.P. Skorupa, and M. Wayland. 2010. Selenium Toxicity to Aquatic Organisms. In P.M Chapman, W.J. Adams, M.L. Brooks, C.G. Delos, S.N. Luoma, W.A Maher, H.M. Ohlendorf, T.S. Presser and D.P. Shaw (eds). 2010. Ecological Assessment of Selenium in the Aquatic Environment. SETAC Press, Pensacola, FL, USA.

[9] Hardy R.W., L.L. Oram, and G. Moller. 2009. Effects of Dietary Selenomethionine on Cutthroat Trout *(Oncorhynchus clarki bouvien)* Growth and Reproductive Performance Over a Life Cycle. Arch Environ Contam Toxicol.

to low levels. Because these are controlled laboratory data, that do not include existing selenium cycling in the natural environment, the 3-month time frame is expected to be longer.

Habitat is important because it affects selenium geochemistry and cycling. Lotic habitats, like those at the Site, tend to recover quicker than lentic systems after selenium concentrations are reduced because lotic systems are typically dominated by selenate. Lentic systems, like the Belews and Hyco sites, retain selenium because of lower in and out flows and selenium cycling between sediment, water, and food web elements. They tend to be dominated by selenite, which is much more bioavailable. In lotic systems, selenium in the water column is typically in the selenate form, which is less bioavailable. Selenium cycling in lotic free flowing waters is open to dilution from upstream flows of lower selenium water, scouring of selenium from bed sediments, and highly aerated waters which help top maintain selenium in the selenate form.

Estimating the recovery period is challenging and contingent on a host of factors. It is outside the scope of this DEIS to take on that challenge. However, the available data collected to this point indicate that selenium concentrations being released to the environment at Hoopes Spring are being reduced. Those reductions will be accompanied by reductions in the biological media depending on selenium cycling in the environment that will be affected by runoff flows and continued reductions from source areas.

Earthworks Comment 5.71 - The DEIS fails to provide adequate data to characterize existing conditions. It appears that the most recent aquatic resources and fish population data has not been incorporated into the DEIS, as described in the 2017 Aquatic Resources and Fisheries Monitoring Report. This section should include the most current data on the full range (maximum, minimum and mean) concentrations in sediment, macroinvertebrates, fish tissue, periphyton, etc.

Response: Sediment, periphyton, and macroinvertebrate chemistry data are shown below for 2006 to 2008 and 2009 to 2017. Blank cells occur when no data were collected for a site/time period. Fish tissue data are provided in Attachment 1 for a previous comment response.

Sediment Selenium Concentrations

Location	Units	2006 Fall	2007 Spring	2007 Fall	2008 Spring	2008 Fall	2009 Fall	2010 Fall	2011 Fall	2017 Fall
CC-75	mg/kg dw	0.61	0.6	0.34	0.54	0.48	0.6	0.6	0.4	0.53
CC-150	mg/kg dw	0.88	0.43	0.54	0.63	0.81	0.5	0.5	0.5	0.53
CC-350	mg/kg dw	1.3	0.52	0.55	0.7	0.81	1.0	0.6	1.0	1.13
CC-1A	mg/kg dw	1.8	1.1	0.67	1.2	1.7	2.8	1.5	1.7	5.36
CC-3A	mg/kg dw	1.3	0.73	0.93	0.66	1.3				
LS	mg/kg dw							0.7		
HS	mg/kg dw	2.3	5.9	1.1	1.8	4.4				
HS-3	mg/kg dw	7	6.2	7.5	2.1	8.1				
LSV-2C	mg/kg dw	4.6	4.5	5.4	1.1	5.7	11.9	7.0	5.5	10.3
LSV-4	mg/kg dw	3.3	3.9					4.7	2.0	9.71
LSS	mg/kg dw						1.6	1.2	1.9	3.66

Periphyton Selenium Concentrations

Location	Units	2006 Fall	2007 Spring	2007 Fall	2008 Spring	2008 Fall	2009 Fall	2010 Fall	2011 Fall	2017 Fall
CC-75	mg/kg dw	1.01	0.68	1.1	2.7	0.55	1.30	1.28	0.90	2.11
CC-150	mg/kg dw	1.2	1.37	0.77	2.4	0.65	2.76	1.58	0.79	2.91
CC-350	mg/kg dw	1.5	3.3	0.77	3.4	0.59	2.31	1.55	3.18	1.68
CC-1A	mg/kg dw	3.64	3.39	3.2	7.1	5.86	5.93	7.58	4.89	7.82
CC-3A	mg/kg dw	3.1	1.89	3.8	14.9	1.67				
LS	mg/kg dw									
HS	mg/kg dw	2.2	12	3.9	15	35.2				
HS-3	mg/kg dw	6.5	12	6.2	28.5	24.2				
LSV-2C	mg/kg dw	2.6	8.09	18.5	11.6	4.38	13.00	13.30	8.54	32.1
LSV-4	mg/kg dw	7.42	11.7					10.50	17.20	25.3
LSS	mg/kg dw						6.59	4.73	7.60	12.3

Benthic Macroinvertebrates Selenium Concentrations

Location	Units	2006 Fall	2007 Spring	2007 Fall	2008 Spring	2008 Fall	2009 Fall	2010 Fall	2011 Fall	2017 Fall
CC-75	mg/kg dw	3.11	**	**	4.45	3.49	2.10	3.38	3.61	3.04
CC-150	mg/kg dw	4.94	4.46	1.90	7.03	21.60	5.66	5.61	6.46	3.26
CC-350	mg/kg dw	2.11	4.20	**	10.60	12.30	4.39	2.93	4.24	6.51
CC-1A	mg/kg dw	3.53	12.90	12.24	15.50	11.60	32.10	8.87	16.70	23.5
CC-3A	mg/kg dw	5.48	5.41	**	17.80	11.20				
LS	mg/kg dw									
HS	mg/kg dw	1.00	15.70	**	21.70	33.90				
HS-3	mg/kg dw	12.47	11.40	15.41	28.40	24.70				
LSV-2C	mg/kg dw	22.62	8.26	31.74	30.00	23.90	25.50	53.40	12.70	15.6
LSV-4	mg/kg dw	10.00	9.08					24.10	17.60	14.7
LSS	mg/kg dw						10.90	9.65	12.60	15

** - Insufficient sample for re-analysis

Earthworks Comment 5.74 - Habitat conditions for Smoky Creek and Tygee Creek (DEIS p. 3-137 to 139) are from 2001, far too outdated to be used for a 2018 DEIS. The DEIS should provide current information for these parameters. Without that data, it is impossible to have an accurate analysis of the potential impacts of new operations. Furthermore, habitat conditions for Sage Creek, South Fork Sage Creek and Crow Creek are from 2004, once again too dated for this DEIS.

Response: There are no additional habitat data for Smoky and Tygee Creek that we are aware of past the 2010 data collected by Formation which are referenced in the East Smoky DEIS. All the pertinent habitat data for Hoopes Spring, Sage Creek, South Fork Sage Creek, and Crow Creek are provided in Attachment 2 as the tables of information are large. Further, because there are no predicted impacts from the East Smoky Panel to Smoky and Tygee Creeks, this comments seems irrelevant.

Earthworks Comment 5.75 - Macroinvertebrate data for Hoopes Spring, Roberts Creek, North Fork Sage Creek are also dated (DEIS, p. 3-149). Given the potential change in selenium concentrations in Hoopes Spring and the change in flows at Roberts Creek, the DEIS should include current and accurate data to characterize existing conditions.

Response: Summary data for Macroinvertebrate Communities are provided in Attachment 3 as the tables of information are large.

Earthworks Comment 5.77 - At present, selenium concentrations in trout in lower Sage Creek are nearly 5 times the EPA criteria. The cumulative effects section should consider the possibility that the trout population may crash in the near future. At these concentrations, it is a reasonably foreseeable outcome.

Response: The SSSC proposed WB criterion of 13.6 mg/kg dw is based on the egg toxicity threshold and corresponding WB concentrations for the most sensitive species at the site (e.g., brown trout). To examine this further, WB tissue data and recruitment data for brown trout (numbers of approximate age 1 fish ≤ 150 mm length) were assembled to examine potential in situ population level effects. The numbers of age 1 fish for recruitment represent the previous year's reproduction. Excessive selenium bioaccumulation and resulting toxicity that affects development and survival of young trout should be reflected in lower recruitment. This is consistent with Janz et al. (2010) who suggests, that for selenium, detecting an effect requires monitoring for recruitment failure, which is the logical population-level consequence of reproductive impairment.

This analysis is possible for the Site because of Simplot's multi-year efforts (2006 to present) to monitor and track fish populations and aquatic habitat at several key sites. From 2006 to 2011, Simplot collected WB tissue data at most sites, and did so again in 2013, 2017, and 2018 at several sites. Brown trout WB tissue data were collected according to the Idaho Fish Tissue Protocol Workgroup recommendations to target fish (~≤150 mm) when possible. Fish of this size represent resident exposure for a site. Previous analyses by Simplot and Idaho Fish and Game have found no significant difference in the selenium tissue concentrations found in juvenile fish versus larger adult fish found at a similar site. These juvenile fish therefore provide a reasonable representation of WB tissue selenium for exposure to resident adults or transient adults that spend enough time at a site to bioaccumulate selenium consistent with the levels found at the Site.

For selenium in WB brown trout, EPA's (2016) National Criterion suggests that concentrations exceeding 13.2 mg/kg dw may cause effects at the individual fish level. Simplot's SSSC proposal suggests that concentrations at the EC_{10} for effects on individual fish will be protective of the overall brown trout population and the fish community overall. Figure 8 shows the available data with respect to mean brown trout WB tissue data for a site and respective recruitment data, in this case numbers of fish ≤150mm, from mine influenced and background and reference areas at the Site. These data span from 2006 to 2018 at the following locations:

- Reference sites in two separate Spring Creek drainages – SPC-4 and SPRC-1,
- Upgradient background sites on Crow Creek - CC-75, CC-150, and CC-350,
- Mine influenced sites at Hoopes Spring - HS, HS-3, Sage Creek - LSV-2C, LSV-4, South Fork Sage Creek – LSS[10]

Because of the amount of data represented in Figure 12, Figures 13 and 14 shows the same data broken into reference and background sites (Figure 9) and mine influenced sites (Figure 10). At the reference and background sites, recruitment varies widely (1 to 28 fish) and appears to have no relationship to WB selenium concentrations which are typically less than 10 mg/kg dw selenium in WB (Figure 9). At the mine influenced sites (Figure 10), recruitment also varies widely (up to 39 fish) and occurs over a much wider range of WB tissue selenium (about 10 to 60 mg/kg dw). At the mine influenced sites, peak recruitment occurs when WB concentrations are well above the proposed WB criterion. These data also appear to show that above a critical WB concentration, real effects on populations are observed. For these sites, the critical WB concentration appears to be greater than 30 mg/kg dw, as recruitment appears to decline above this WB concentration.

[10] Crow Creek downstream of Sage Creek was excluded from this analysis because it is subject to a different WB criterion than the Hoopes, Sage, and South Fork Sage Creek streams.

Figure 12 Brown trout WB tissue concentrations relative to recruitment (# of age 1 fish) at reference, background and mine influenced sites.

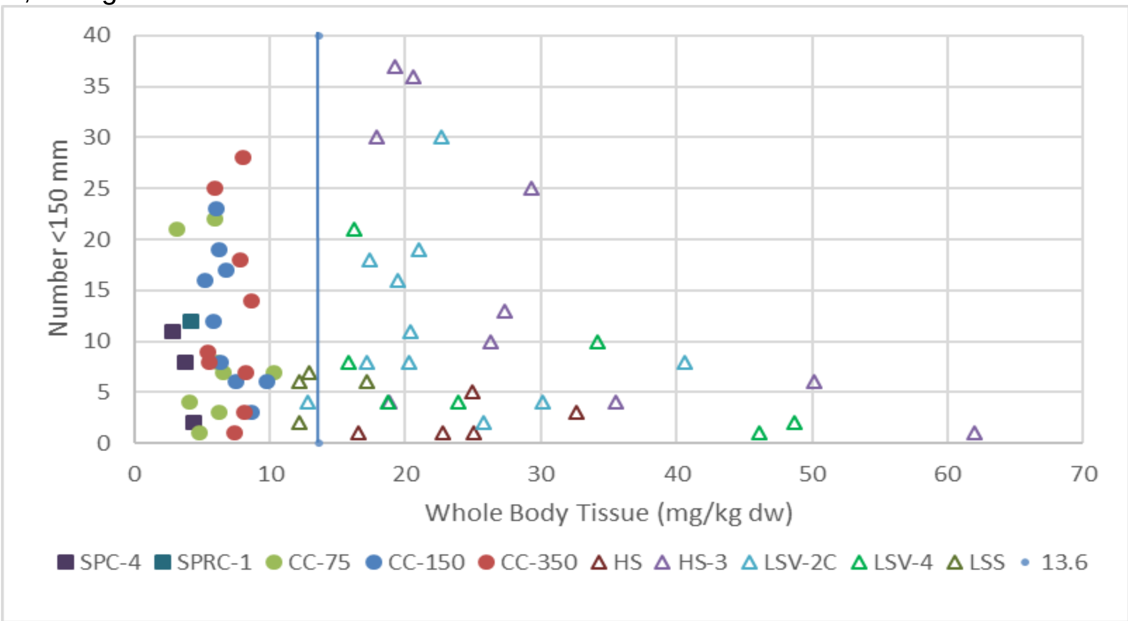


Figure 13 Brown trout WB tissue concentrations relative to recruitment (# of age 1 fish) at reference and background sites.

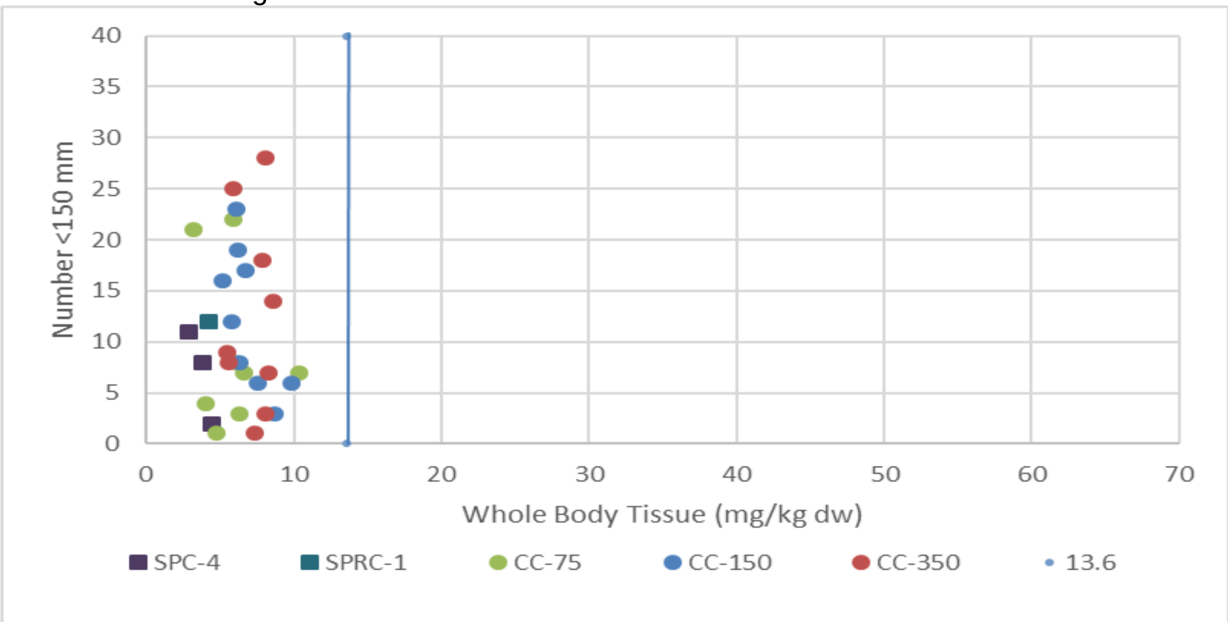
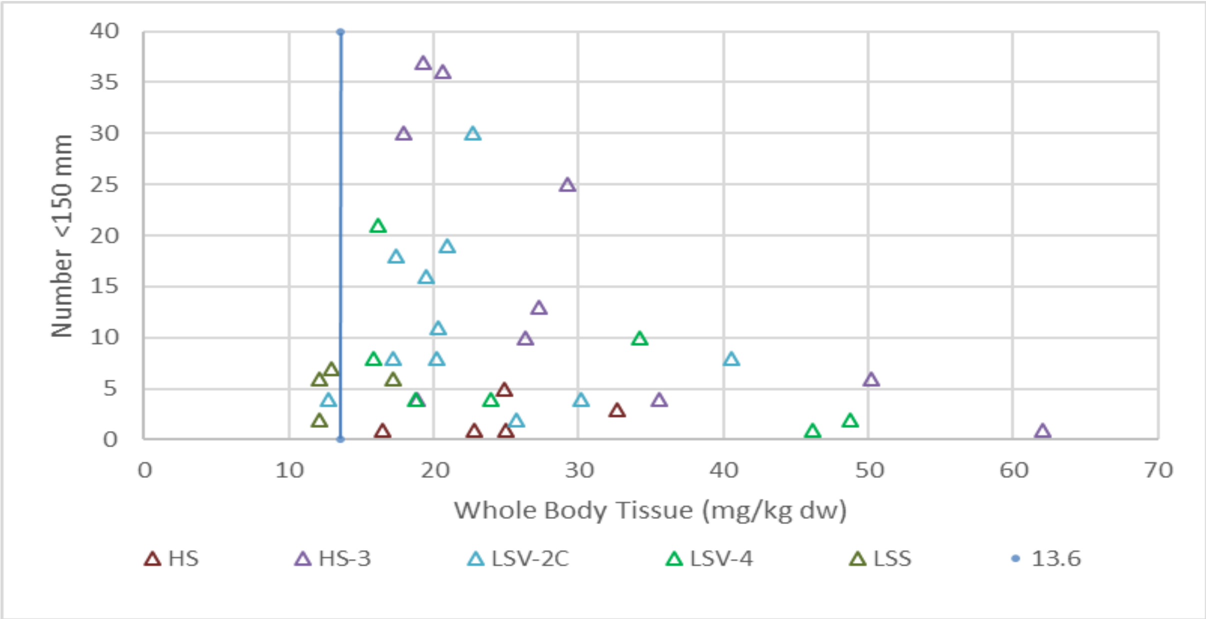


Figure 14 Brown trout WB tissue concentrations relative to recruitment (# of age 1 fish) at mine influenced sites.



The potential impacts on populations may also be observed in annual population monitoring data on age 1 fish abundance. Recruitment declines at about 2013 for the mine influenced sites (HS-3, LSV-2C and LSV-4) (Figure 15). This coincides with an increase in WB selenium concentrations that occurred between about 2011 and 2013 to concentrations above 30 mg/kg dw (Figure 16).

Figure 15 Recruitment (# of age 1 fish) during annual population surveys at background and mine influenced sites.

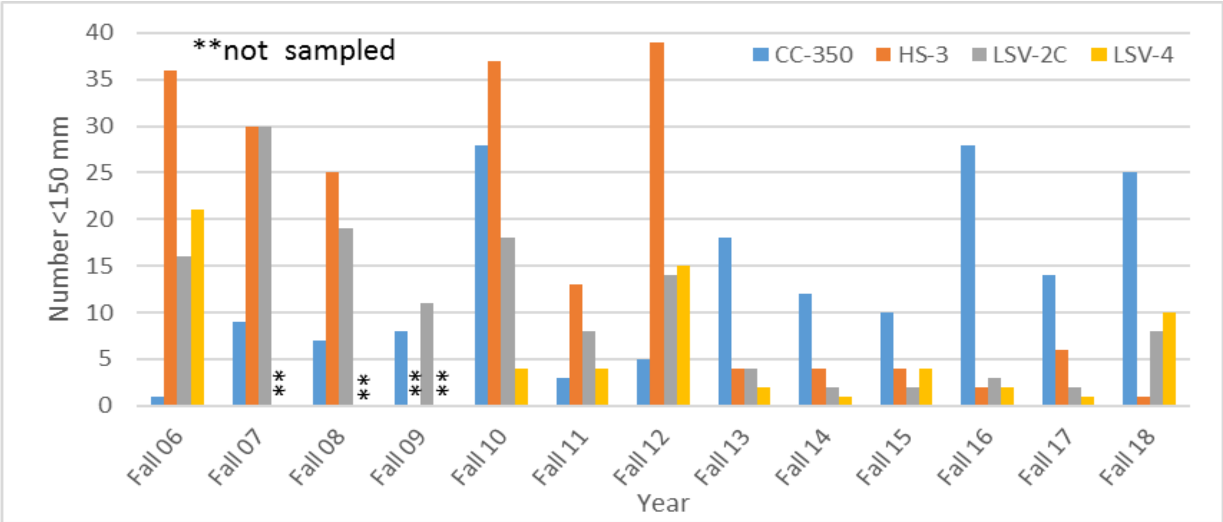
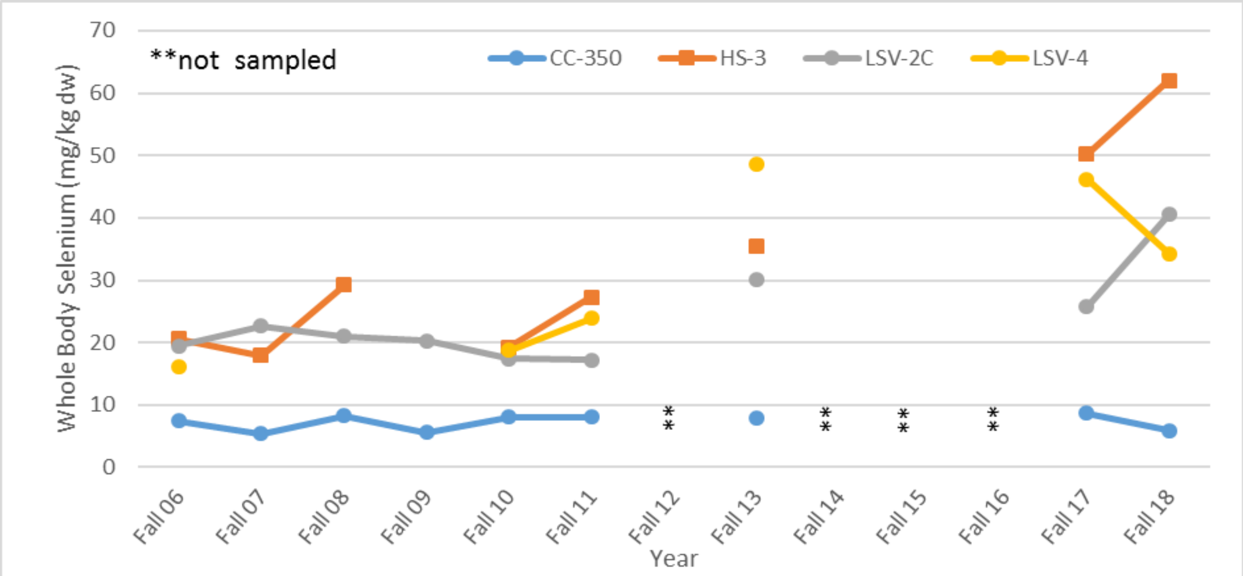


Figure 16 Seasonal WB selenium concentrations in brown trout from background and mine influenced sites.



In 2018, Sage Creek recruitment improved while Hoopes Spring did not. This may reflect significantly reduced concentrations of selenium in surface water during the first full year of Simplot's selenium water treatment plant in 2017. Why a similar improvement was not observed in Hoopes Spring is unclear. The persistent recruitment failure from 2013 to 2017 coupled with measured WB tissue concentrations indicates that concentrations of selenium in WB tissues of brown trout must be much higher than 13.6 mg/kg dw for population level effects to occur.

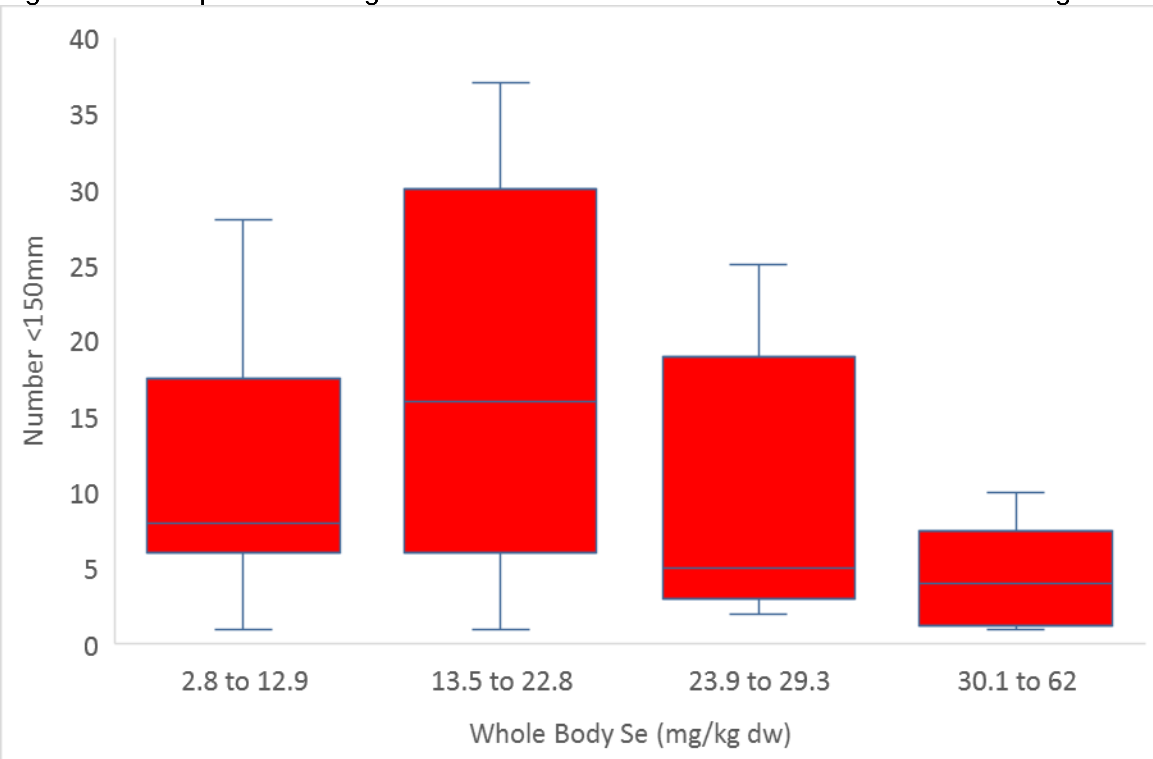
Using the available data, Figure 17 compiles the WB tissue data into key ranges to examine potential recruitment as a function of WB tissue concentrations[11]. Recruitment in the four WB tissue ranges is statistically significantly different (Kruskal Wallis non-parametric ANOVA, $p = 0.04$, $\alpha = 0.05$). Based on the Kruskal-Wallis multiple comparison Z-value (Bonferroni Test) recruitment in the 30.1 to 60.2 mg/kg WB range is statistically significantly lower than the other three ranges ($z = 2.81$). While not statistically significantly different, the median recruitment in the 13.5 to 22.8 mg/kg dw WB tissue range is higher than the 2.8 to 12.9 mg/kg dw WB range. Above 30 mg/kg dw, there is a statistically significant reduction in recruitment, which is consistent with the observations of the annual data showing a significant and consistent loss of age 1 fish in Sage Creek and Hoopes Spring sites from 2013 to 2017. Further, prior to 2013, peak fish counts were

[11] Data from sites included are as follows:

- Reference sites in two separate Spring Creek drainages – SPC-4 and SPRC-1,
- Upgradient background sites on Crow Creek - CC-75, CC-150, and CC-350,
- Mine influenced sites at Hoopes Spring - HS, HS-3, Sage Creek - LSV-2C, LSV-4, South Fork Sage Creek – LSS

observed at mine influenced sites where WB selenium concentrations were much greater than 13.6 mg/kg dw.

Figure 17 Box plot for a range of WB selenium concentrations versus counts of age 1 fish.



Summary - As noted above, selenium toxicity should result in reduced survival of young fish. In the field, this loss likely does not correspond to the laboratory EC_{10}, simply because fish produce hundreds if not thousands of eggs, yet only a small to moderate percentage of those eggs survive. However, if the number of young consistently surviving is diminished when selenium concentrations exceed toxic levels, then it is likely that selenium toxicity is a causal factor in the reduced recruitment of the next year class of fish (Janz et al. 2010). While the population metrics are somewhat "coarse" metrics, one would expect to see lower recruitment if WB selenium in tissues exceeds some critical threshold.

Based on the population recruitment data, at WB concentrations up to about 30 mg/kg dw, mine influenced sites show a similar wide range in recruitment compared to those data from background and reference sites where WB tissue concentrations were <10 mg/kg dw. Peak recruitment occurs between WB tissue concentrations that range from 13.5 to 22.8 mg/kg dw, well above the SSSC proposed value of 13.6 mg/kg dw. Above 30 mg/kg dw, recruitment of age 1 fish declines in a dose dependent manner. This analysis does not indicate population failure but does indicate significantly reduced recruitment at WB selenium above 30 mg/kg dw.

Earthworks Comment 5.81 - The DEIS fails to analyze the direct, indirect and cumulative effects on Yellowstone cutthroat, and other fish species. A biological evaluation was conducted by the Forest Service to consider the potential adverse effects of proposed mining activities at Panels F & G on sensitive species in the project area, including Yellowstone cutthroat trout (YCT), and to avoid or minimize effects. The recent population studies conducted by Formation Environmental are part of the monitoring requirements. The stated objective of this monitoring is to compare current conditions to "premining conditions" and thereby evaluate effectiveness of protection measures. Based on monitoring data, conditions have seriously worsened for aquatic species, including Yellowstone cutthroat trout. Selenium in trout during 2017 for site LSV-4 (Sage Creek) has more than doubled and is significantly higher than the comparison period.

- Trout standing crop (biomass/area) has decreased, for the most part, across the board. However, decreases are especially severe in LSV-4 (Sage Creek) where selenium in sediment, periphyton, surface water, and trout were also very high.

It's clear from the monitoring data that the mitigation measures associated with Smoky Canyon have not been sufficient to protect important aquatic resources.

Response: **See response to Comment 5.40.** The comment above is referencing the 2017 Panels F&G Report and "premining" conditions for that program relate to those specific Panels. The long-term population data for brown trout, YCT, and sculpins are provided in response to Comment 5.40.

Earthworks Comment 5.86 - The DEIS should also provide graphs to illustrate age or size class trends over time, given selenium's reproductive impacts.

Response: An analysis of brown trout recruitment is provided in response to comment 5.77. Attachment 4 includes multiple figures for two age classes of brown trout and YCT. Brown trout age classes are based on reproductive maturity (i.e., < 230 mm and > 230 mm) where approximate age 1 and 2 fish (not reproductively mature) comprise the <230 mm class and age 3 and older fish (reproductively mature) comprise the > 230 mm class. For YCT, approximate age 1 and 2 fish (not reproductively mature) comprise the <200 mm class and >200 mm class comprise the approximate age 3 and older fish (reproductively mature).

Earthworks Comment 5.87 - The DEIS needs to characterize the existing conditions and take a hard look at the potential impacts of the proposed actions and alternatives. Yet, there is insufficient information in the DEIS to understand the impacts of increased selenium concentrations on the fish populations in Sage Creek and Crow Creek.

Response: Response to Comment 5.44 provides available data for fish populations in Sage and Crow Creeks and considers the potential impacts of a ≤ 1 ug/L increase in selenium due to the proposed action.

Earthworks Comment 5.88 - In its analysis of the data, Formation Environment dismisses the role of selenium contamination as a factor in reduced trout densities, stating that it is premature to make that determination. This is inappropriate. If there is insufficient data to conduct that analysis, more frequent population data must be collected. It is troubling that despite the fact that several measures in Sage Creek are quite high above the comparison period, that the next mandated fish population sampling event won't take place until 2020, and the next fish tissue selenium sampling isn't scheduled until 2023 (Table 5-1). Based on the data in these two tables, that is clearly too infrequent to identify the major changes that are occurring in these drainages. More importantly, age class and size class data need to be analyzed to better understand impacts to fish populations.

Response: This comment is not on the East Smoky DEIS, but rather the Formation Environmental (2018) Panels F&G Report. The report does not dismiss selenium as a factor in reduced trout densities, rather it attributes a number of factors to the observations for changes in trout density. Section 4.1.2 states, "This widespread reduction in trout standing crop across most locations suggests related factors influencing trout production, such as flows and temperatures. In Sage Creek and Crow Creek downstream of Sage Creek, selenium concentrations may be a contributing factor as well, but given all the variables, determining how each specific stressor contributes to trout production is premature at this time given the available data."

Trout populations were down across all locations, including reference sites and background sites indicating more than a single causal factor. The F&G work is also considering the data collected from 2009 to 2017, and comparison of two data points to the pre F&G mining does not make much sense. The mitigation and monitoring plan spans for more than 50 years in order to effectively evaluate the long-term implications of mining in Panels F&G. The monitoring schedule cited is also for the F&G mitigation monitoring and is based on a plan put forth in the Biological Opinion from the agencies. That schedule calls for trout population monitoring (and habitat) every third year and a full suite of monitoring every sixth year (i.e., abiotic and biotic chemistry, biological communities, habitats, populations). In the interim, Simplot has conducted voluntary monitoring annually at a smaller subset of locations. Simplot's investment in monitoring the abiotic and biotic conditions of the surrounding streams is extensive and provides a relatively through picture of conditions, past and present.

Earthworks Comment 5.89 - The DEIS must take a hard look at the past, present and future activities on fish populations and sensitive species, including Yellowstone cutthroat.

Response: See comment response to previous comments. Available data have been provided for the DEIS authors to assess these conditions.

Earthworks Comment 5.91 - The DEIS should also evaluate the potential impacts to fish from selenium in areas of the streams, such as Lower Sage Creek, that are dominated by beaver ponds, and may more closely resemble "lentic" conditions rather than "lotic" conditions. What are the increased biological hazardous associated with these conditions?

Response: Lower Sage Creek is not dominated by beaver ponds. On occasion, there has been beaver activity that has disrupted flow conditions at LSV-4 and caused pooling upstream as well as filling of one of the larger pools with sediment. However, those disruptions have been regularly cleared as they were built in front of the road culverts.

Earthworks Comment 5.92 - The DEIS states that while the fish tissue data from NGOs is similar to that presented in the report, it is uncertain whether the data is directly comparable in this report. It defers to a memo from a consulting firm, Covington (2017). Covington states that he was unable to ascertain whether the information was similar, when in fact, he made no effort to ascertain that information since no inquiry was made to the associated organizations. We include this data for the administrative record.

Response: Section 3.9.5.2 of the East Smoky DEIS discusses the NGO data. There was no memo produced as alluded to in the comment. Formation neither suggested that the DEIS authors use or not use the NGO data, but simply pointed out some of the issues that have been observed with some of the older data. Simplot and Formation are fully aware of these data as they both participate annually in the Idaho Fish Tissue Protocol Workgroup and have had access to all of these data. The issues pointed out are real and do not make them any more or less useful, just different and thus may not be as comparable to the Formation data set.

Earthworks Comment 5.94 - The DEIS does not adequately analyze the impacts to fish from reductions in stream flows, groundwater recharge and/or loss of runoff. The EIS makes very general statements about these issues but fails to take a hard look as required by NEPA. The EIS makes general statements about Yellowstone Cutthroat Trout in Tygee Creek but fails to substantiate it with any data. The EIS should provide baseline data that confirms whether there are resident YCT present in the upper reaches, whether redds are located in this reach, and analyze the potential impacts of dewatering on this population. The EIS should provide an analysis of how much habitat will be lost from dewatering, and whether there are mitigation measures to offset these impacts

Response: There are no predicted selenium impacts to Tygee Creek as a result of the East Smoky Panel. There is no predicted impacts to habitat from the small amount of pit dewatering that might be necessary in the last phase of mining the East Smoky Panel. However, the East Smoky EIS provided all the data Simplot is aware of for Tygee Creek fisheries. Formation's sampling of Tygee Creek did not encounter any redds, but sampling was conducted in the later summer/fall, thus no YCT redds would be expected during that time. The Blakney (2010)[12] thesis, which focused on Northern leatherside chub, was examined to assess if any additional fishery data were reported. Three locations on Tygee Creek were sampled in 2010. The species encountered were reported, including redside shiner, longnose dace, sculpin, YCT, speckled dace, Utah sucker, and brown trout. The number of fishes collected was not reported. YCT were encountered at each of the three sites that are approximately located just upstream of LT-5 near where Smoky Creek discharges to Tygee Creek, near the Draney Creek confluence, and upstream of Hatchery Road.

[12] Blakney, J.R. Historical connectivity and contemporary isolation: population genetic structure of a rare high-desert minnow, the northern leatherside chub (Lepidomeda copei). Master's Thesis, Idaho State University.

Attachment 1
Brown trout, YCT, and sculpin summary statistics for selenium in WB tissues

Stream	Location	Date	Brown Trout (mg/kg dw)				Yellowstone Cutthroat Trout (mg/kg dw)				Sculpin (mg/kg dw)			
			Count	Mean	Min	Max	Count	Mean	Min	Max	Count	Mean	Min	Max
Upstream of Sage Creek														
Crow Creek	CC-75	9/2/06	3	4.07	3.54	4.55	1	4.01	4.01	4.01	4	5.58	4.38	6.95
		5/8/07	1	4.80	4.80	4.80	1	5.90	5.90	5.90	6	5.03	4.10	5.70
		8/23/07	11	3.18	2.60	4.10	0				6	3.77	2.20	5.30
		5/13/08	5	10.32	5.26	13.20	0				6	7.19	5.16	9.05
		9/3/08	8	6.59	4.27	9.38	2	6.65	5.71	7.59	6	7.08	4.91	11.90
		9/9/09	7	6.11	3.97	8.47	1	5.77	5.77	5.77	6	7.01	4.39	10.30
		8/24/10	4	5.93	3.94	8.33	6	5.34	3.47	8.23	10	4.72	3.09	8.33
		8/23/11	4	6.27	4.95	7.17	4	7.25	5.18	8.66	10	4.62	3.68	5.52
		8/27/17	0				0				10	4.60	1.46	9.49
	CC-150	9/3/06	4	5.83	4.75	7.71	0				4	6.01	5.32	6.69
		5/9/07	3	8.67	8.00	10.00	0				5	5.04	4.40	5.80
		8/24/07	2	5.20	4.30	6.10	0				5	5.14	3.40	7.70
		5/13/08	3	9.82	8.61	11.80	2	10.63	9.05	12.20	6	10.73	8.25	14.70
		9/3/08	5	7.55	5.14	9.92	5	8.11	2.52	13.50	6	7.35	5.11	10.50
		9/9/09	10	6.23	5.50	7.60	-				6	6.58	5.42	8.08
		8/24/10	13	6.07	3.24	8.96	1	8.02	8.02	8.02	10	7.25	3.38	13.80
		8/23/11	10	6.74	5.09	10.10	-				10	7.21	4.41	8.67
		8/27/17	10	6.32	3.24	7.99	0				10	7.14	6.16	7.81
	CC-350	8/31/06	1	7.40	7.40	7.40	2	5.71	4.60	6.83	4	6.47	5.21	7.56
		5/8/07	0		-	-	3	8.53	7.40	9.70	6	7.12	6.30	8.20
		8/23/07	3	5.43	4.60	6.00	1	6.80	6.80	6.80	6	5.28	4.10	6.70
		5/13/08	0		-	-	2	11.50	10.90	12.10	6	10.03	9.23	11.30
		9/4/08	6	8.26	5.03	10.60	4	7.48	4.97	8.85	6	9.53	7.26	11.00
		9/10/09	2	5.58	5.21	5.94	7	5.92	4.58	7.91	6	6.44	5.14	7.59
		8/25/10	1	8.24	8.24	8.24	9	7.39	6.10	9.20	10	7.49	3.20	10.50
		8/24/11	3	8.09	7.02	8.77	7	8.43	5.41	13.10	10	6.92	4.45	10.20
		8/22/13	9	7.84	6.26	8.90	1	7.63	7.63	7.63	6	9.08	6.37	12.80
		8/28/17	10	8.64	5.40	16.20	0				10	6.56	4.70	12.00
		9/12/18	10	5.95	4.52	7.04					10	6.45	4.40	11.70
Hoopes Spring and Sage Creek														
Hoopes Spring	HS-3	9/6/06	4	20.60	17.52	25.61	0				4	21.85	17.74	24.87
		5/12/07	4	18.83	14.70	22.00	0				6	18.57	13.00	26.20
		8/28/07	11	17.89	12.20	24.40	0				6	26.63	18.70	35.20
		5/16/08	1	26.30	26.30	26.30	5	23.16	17.80	31.30	6	23.93	21.80	26.90
		9/5/08	9	29.27	24.30	38.50	1	26.30	26.30	26.30	6	23.68	20.90	25.50
		8/28/10	10	19.13	11.90	25.20	1	23.20	23.20	23.20	10	17.35	14.40	20.30
		8/26/11	4	27.30	21.00	35.90	1	11.40	11.40	11.40	0		-	-
		8/23/13	3	35.53	35.40	35.80	5	38.86	29.30	52.60	6	26.80	23.70	30.10
		8/30/17	4	49.10	44.60	51.90	2	51.10	46.10	56.10	10	27.68	19.60	49.30
		9/13/18	2	51.30	49.80	52.80	6	45.75	32.10	62.10	10	45.69	32.30	57.10
Sage Creek	LSV-2C	9/6/06	6	19.45	16.00	22.82	0				4	17.47	14.14	22.84
		5/12/07	4	12.78	8.50	22.20	0				6	11.38	9.40	13.50
		8/28/07	9	22.67	10.80	33.30	0				6	18.85	15.50	21.00
		5/16/08	6	20.25	11.40	29.60	1	15.20	15.20	15.20	6	25.95	14.80	36.00
		9/5/08	11	20.96	17.40	25.00	0				6	20.32	18.60	23.30
		9/12/09	10	20.32	11.90	28.10	0				6	16.61	8.18	26.30
		8/28/10	8	18.01	16.30	21.20	2	9.87	2.33	17.40	10	18.66	13.30	26.90
		8/26/11	5	17.16	14.20	23.60	0				11	14.29	9.65	18.70
		8/30/17	4	25.73	21.8	31.90	0				10	21.42	13.90	29.70
		9/10/18	6	40.57	29.7	52.80	4	49.3	40.4	59.20	10	26.27	17.60	41.80
	LSV-4	9/5/06	4	16.20	15.07	18.91	0	-	-	-	4	20.01	14.57	24.44
		5/9/07	1	15.80	15.80	15.80	3	14.97	11.70	17.80	6	18.28	11.40	31.70
		8/25/10	11	19.76	12.80	28.30	-				11	20.25	14.80	28.00
		8/24/11	4	23.90	16.90	30.90	1	16.50	16.50	16.50	10	18.55	10.90	29.70
		8/22/13	2	41.90	35.10	48.70	2	35.55	34.80	36.30	6	43.87	32.70	58.80
		8/25/17	2	46.15	39.50	52.80	0				10	31.49	15.70	46.20
		9/12/18	10	34.22	23.80	47.70					10	21.74	14.80	36.60
Downstream of Sage Creek														
Crow Creek	CC-1A	9/1/06	3	9.76	8.15	11.86	1	12.74	12.74	12.74	4	9.94	8.92	11.73
		5/10/07	2	9.05	7.40	10.70	1	9.90	9.90	9.90	5	8.34	7.40	10.80
		8/25/07	11	9.95	6.30	14.80	0				6	7.78	5.50	12.50
		5/14/08	5	17.54	16.40	18.30	1	13.40	13.40	13.40	3	17.47	16.20	19.80
		9/6/08	10	14.03	8.04	23.00	0				3	12.63	10.50	14.10
		9/10/09	9	10.81	7.43	13.70	1	8.54	8.54	8.54	6	13.50	10.90	15.10
		8/30/10	10	14.30	11.60	16.80	-				10	13.49	10.30	16.20
		8/27/11	10	12.24	7.52	15.50	-				10	18.04	13.50	23.20
		8/24/13	14	22.02	16.70	29.90	-				6	23.92	18.80	29.20
		8/24/17	6	16.80	9.10	40.20	1	15.9			10	20.89	13.30	42.60
		9/10/18	10	22.70	16.80	27.60	0				10	22.18	13.40	45.40
	CC-3A	9/4/06	3	11.15	9.14	14.34	1	8.31	8.31	8.31	3	14.45	11.34	16.55
		5/11/07	4	9.20	7.50	12.70	0				4	11.65	8.80	15.00
		8/26/07	13	11.25	7.80	15.60	0				3	11.47	8.00	14.20
		5/15/08	4	15.38	15.00	15.80	0				0		-	-
		9/7/08	8	19.68	16.30	23.20	0				1	20.20	20.20	20.20
		8/25/13	8	22.78	20.5	26.40	0				6	21.82	17.90	29.40
		9/11/18	5	25.74	23.2	28.40					10	24.77	17.30	40.70

Attachment 2
Hoopes Spring, Sage Creek, South Fork Sage Creek, and Crow Creek Habitat Data

Manual Discharge Measurements, 2006 - 2018

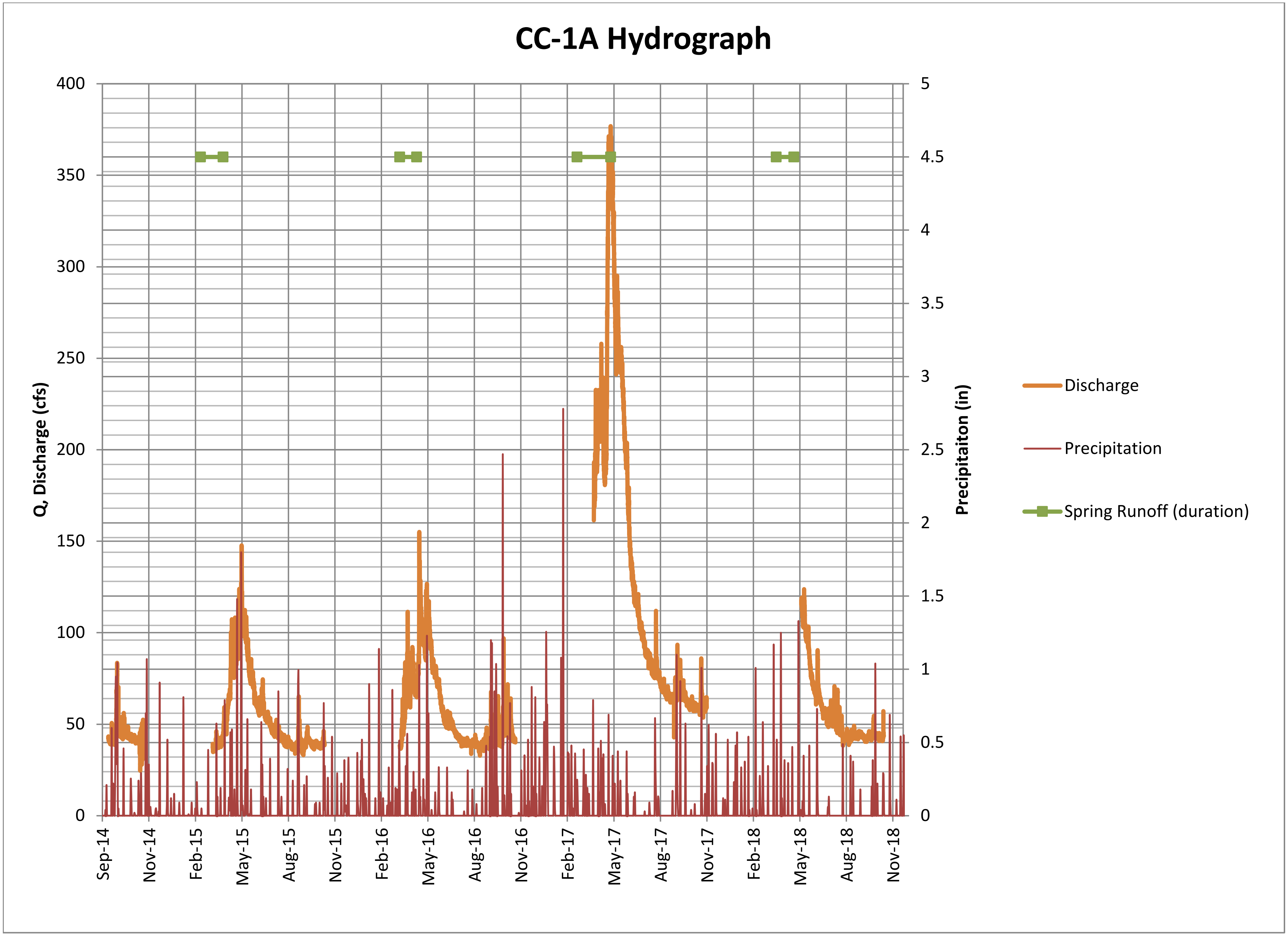
Location	Date	Flow (cfs)
Crow Creek		
CC-350	9/1/2006	16.896654
	5/8/2007	28.947
	5/21/2007	26.993
	8/23/2007	16.445
	9/24/2007	17.955
	5/13/2008	36
	5/18/2008	55.434
	9/4/2008	24.22575
	9/17/2008	19.08
	11/9/2008	23.671
	6/3/2009	58.5204
	9/10/2009	25.12
	11/18/2009	20.455
	6/4/2010	47.578
	8/25/2010	18.067
	11/9/2010	20.786
	8/24/2011	31.9
	11/9/2011	30.114
	5/10/2012	34.865
	8/22/2012	16.05
	11/14/2012	18.361
	5/19/2013	33.38
	8/22/2013	13.4
	11/14/2013	19.6
	5/18/2014	52.84
	11/20/2014	19.226
	5/9/2015	46.07995
	11/5/2015	22.98185
	5/18/2016	57.3982
	11/9/2016	22.6
	5/17/2017	163.0615
	8/2/2017	34.1838
	8/28/2017	33.22
	11/15/2017	27.03095
	5/17/2018	60.866
	9/12/2018	22.6
	10/24/2018	23.328
CC-1A	9/1/2006	32.264765
	5/10/2007	41.119
	5/21/2007	47.891
	8/25/2007	21.58
	9/24/2007	16.748
	5/14/2008	61
	5/18/2008	102.701
	9/6/2008	37.4906
	11/9/2008	46.761
	6/3/2009	110.6694
	9/10/2009	46.08
	11/18/2009	44.348
	8/29/2010	37.142
	11/9/2010	41.58
	6/6/2011	254.23
	6/7/2011	286.07
	6/9/2011	286.4
	8/27/2011	69.3
	11/10/2011	49.148
	5/10/2012	66.521
	8/24/2012	30.43
	11/14/2012	38.499
	5/19/2013	71.413
	8/24/2013	37.62
	11/14/2013	31.4
	5/18/2014	109.14
	11/20/2014	37.164
	5/9/2015	91.325125
	7/22/2015	50.34625
	9/11/2015	36.7321
	11/5/2015	39.152
	5/18/2016	88.4607
	7/8/2016	57.0784
	11/9/2016	42.9
	8/2/2017	83.2164
	8/24/2017	78.702
	11/15/2017	50.438125
	5/17/2018	113.655
	8/7/2018	41.158
	9/10/2018	51
	10/24/2018	45.819

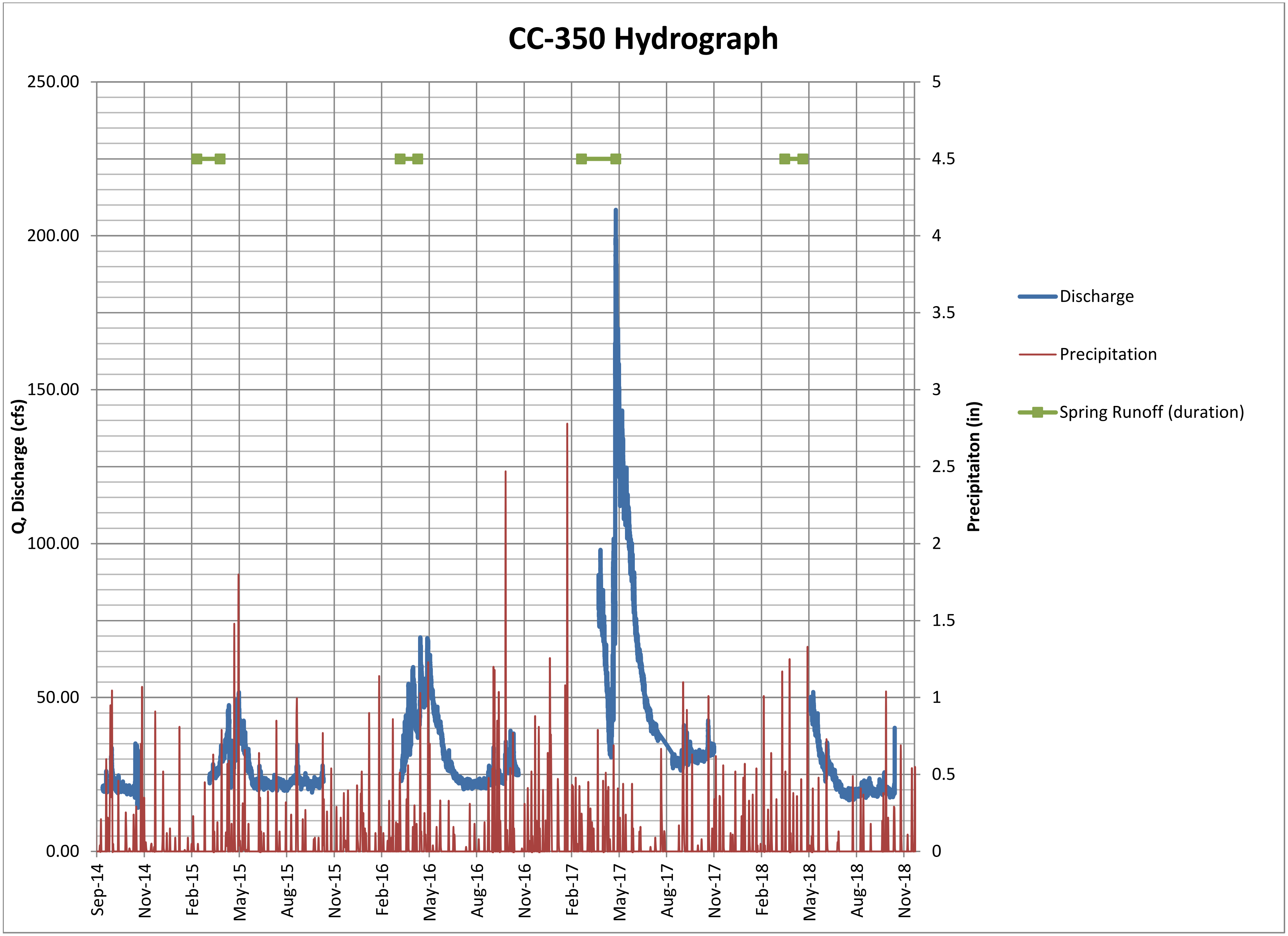
Location	Date	Flow (cfs)
Crow Creek		
CC-3A	9/4/2006	35.74575
	5/11/2007	47.015
	8/26/2007	25.092
	5/15/2008	65.2
	9/7/2008	42.66455
	8/29/2010	40.447
	8/25/2012	31.27
	8/25/2013	38.01
	8/7/2018	42.748
	9/11/2018	50
CC-WY-01	6/9/2008	109.87
	6/12/2008	102
	10/13/2008	41.4
	10/16/2008	44.62
	6/8/2009	126.35
	6/11/2009	143.02
	10/12/2009	48.84
	10/15/2009	53.88
	6/14/2010	104.81
	6/17/2010	81.34
	10/18/2010	43.03
	10/21/2010	44.53
	6/30/2011	215.2
	10/10/2011	61
	10/10/2011	60.56
	10/13/2011	62
	10/13/2011	62.47
	11/10/2011	39.831
	5/10/2012	71.447
	11/14/2012	34.205
	5/19/2013	74.132
	11/14/2013	31.8
	11/20/2014	41.961
	5/9/2015	92.89
	7/22/2015	48.159475
	9/11/2015	37.2548
	11/5/2015	40.09
	5/17/2016	97.4142
	7/8/2016	59.3612
	11/9/2016	47.6
	5/17/2017	315.8219
	11/15/2017	57.0333
	5/17/2018	118.705
	8/8/2018	41.733
	10/24/2018	47.291

Location	Date	Flow (cfs)
Hoopes Spring		
HS	10/2/1979	6
	5/15/1997	4.5
	6/15/1997	5.28
	7/15/1997	5.28
	8/15/1997	5.35
	9/15/1997	4.75
	10/15/1997	4.31
	6/3/1998	4.62
	7/1/1998	4.62
	8/4/1998	5.28
	9/1/1998	4.45
	10/12/1998	4.62
	11/5/1998	4.62
	6/21/2000	3.85
	9/26/2000	2.37
	5/16/2002	1.712
	10/17/2002	2.32
	5/20/2003	1.35
	10/28/2003	1.65
	2/5/2004	1.36
	5/7/2004	1.38
	7/21/2004	1.48
	9/28/2004	2.03
	11/9/2004	1.25
	5/19/2005	1.97
	9/19/2005	3.74
	5/22/2006	3.394
	9/8/2006	2.296825
	10/16/2006	2.152
	5/14/2007	2.017
	5/15/2007	1.855725
	5/22/2007	1.632
	8/24/2007	2.166
	9/25/2007	3.785
	5/17/2008	1.6
	5/19/2008	1.827
	9/4/2008	2.529575
	11/20/2008	2.511
	5/31/2009	2.97465
	11/20/2009	2.121
	6/3/2010	2.402
	11/13/2010	2.658
	6/15/2011	4.233
	11/10/2011	2.368
	5/9/2012	2.112
	11/13/2012	3.518
	5/20/2013	2.193
	11/13/2013	1.7
	5/19/2014	2.33
	8/8/2014	2.19
	11/17/2014	2.086
	8/9/2018	2.87
	10/25/2018	2.6736
HS-3	10/17/2002	4.6
	5/22/2003	7.37
	10/27/2003	6.0882
	5/7/2004	6.69
	7/21/2004	5.96
	9/6/2006	5.178595
	10/17/2006	4.852
	5/12/2007	5.408
	8/28/2007	5.891
	5/17/2008	6.8
	9/5/2008	5.11435
	9/17/2008	5.33528
	5/31/2009	9.97074
	11/20/2009	6.818
	6/6/2010	7.94
	8/28/2010	9.636
	9/14/2010	8.546
	11/13/2010	6.898
	6/14/2011	12.694
	11/10/2011	8.759
	5/10/2012	8.38
	8/23/2012	6.47
	11/15/2012	7.055
	5/20/2013	8.331
	8/23/2013	7.3
	11/14/2013	6.3
	5/19/2014	8.66
	8/13/2014	8.8835
	11/17/2014	8.028
	7/22/2015	9.8831
	9/10/2015	8.4151
	11/4/2015	7.937
	5/17/2016	9.5755
	7/7/2016	9.214825
	11/8/2016	7.1
	5/16/2017	15.14005
	8/1/2017	12.7641
	8/30/2017	11.434
	11/14/2017	9.85405
	5/16/2018	7.08835
	8/8/2018	9.637
	9/13/2018	9.5
	10/24/2018	7.855

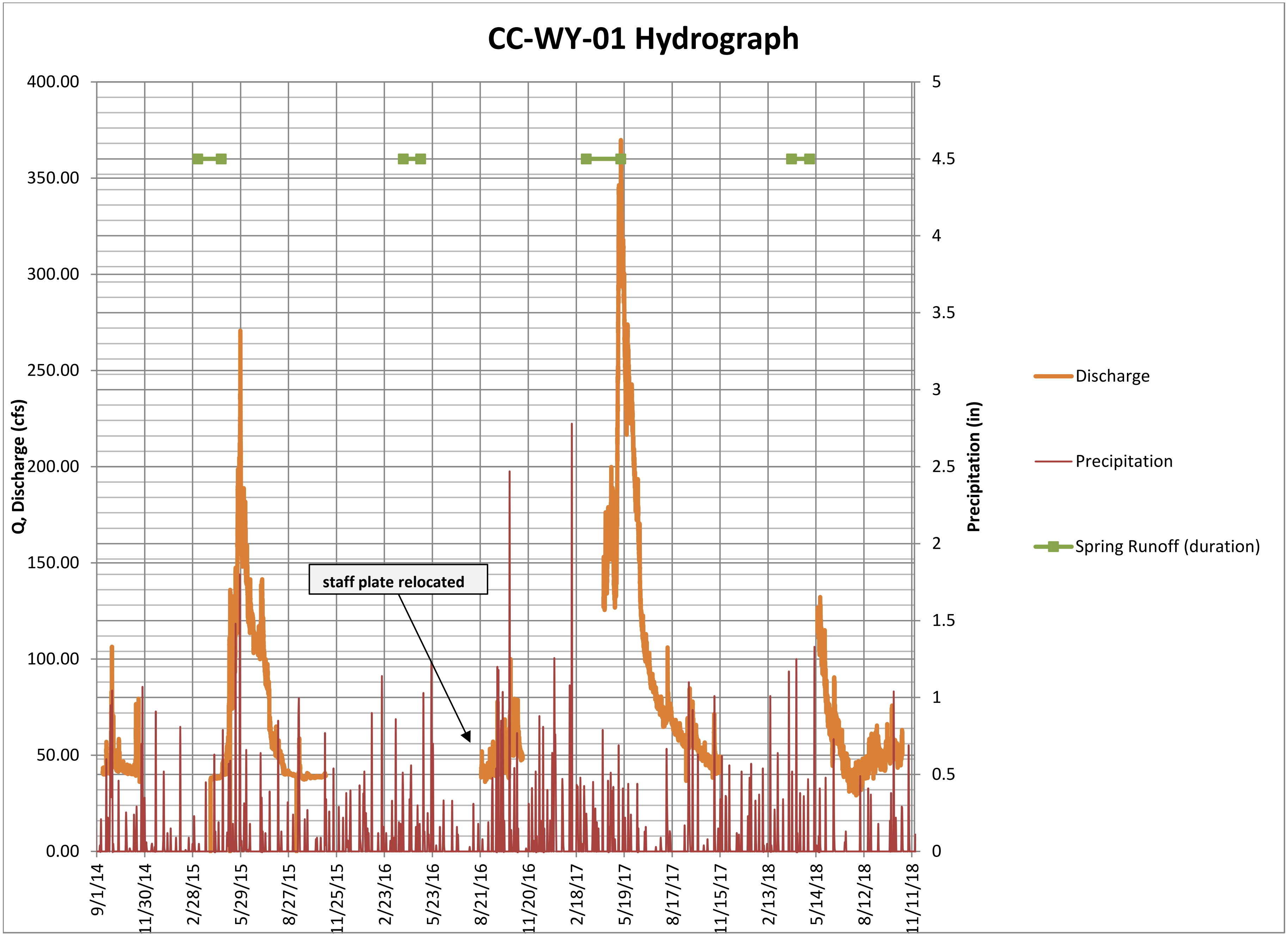
Location	Date	Flow (cfs)
South Fork Sage Creek		
LSS	10/2/1979	8
	5/15/1997	30.9
	10/15/1997	9.19
	10/12/1998	14.5
	6/21/2000	6.97
	9/26/2000	6.33
	5/15/2002	6.963
	10/17/2002	6.46
	5/21/2003	7.76
	8/12/2003	5.78
	10/26/2003	4.4409625
	2/5/2004	4.72
	5/7/2004	5.82
	5/18/2004	5
	6/22/2004	6.74
	7/20/2004	5.37
	9/28/2004	4.58
	5/19/2005	14.275
	9/19/2005	8.18
	5/22/2006	23.596
	10/16/2006	11.85
	5/15/2007	5.953
	5/22/2007	6.967
	9/25/2007	3.335
	5/19/2008	17
	7/27/2008	8.12285
	9/17/2008	7.64
	11/20/2008	8.679
	5/31/2009	16.041708
	9/13/2009	7.54
	11/20/2009	6.684
	6/3/2010	14.482
	8/26/2010	7.062
	11/10/2010	3.899
	6/15/2011	42.332
	7/19/2011	12.923
	8/28/2011	10.5
	8/29/2011	11.586
	9/19/2011	8.912
	11/7/2011	7.798
	12/19/2011	6.35
	1/31/2012	6.016
	2/22/2012	5.57
	3/23/2012	6.0156407
	4/25/2012	7.7980527
	5/9/2012	8.355
	6/21/2012	7.575
	7/30/2012	7.13
	8/28/2012	6.68
	9/12/2012	6.238
	10/29/2012	5.5700377
	11/13/2012	5.57
	12/19/2012	6.016
	2/25/2013	4.679
	3/27/2013	4.902
	4/25/2013	4.902
	5/20/2013	10.026
	6/27/2013	5.57
	8/23/2013	5.124
	11/13/2013	4.5
	3/12/2014	4.456
	5/19/2014	12.03
	8/8/2014	6.68
	11/17/2014	6.112
	3/10/2015	5.57
	5/7/2015	9.019
	7/22/2015	6.1123
	9/10/2015	5.6763
	11/4/2015	5.3922
	5/17/2016	9.7357
	7/7/2016	8.7946
	11/8/2016	5.16
	3/21/2017	5.748
	5/16/2017	24.5629
	8/1/2017	12
	8/25/2017	10.187
	11/14/2017	8.6689
	5/16/2018	12.315
	8/8/2018	6.6102
	10/24/2018	6.6102

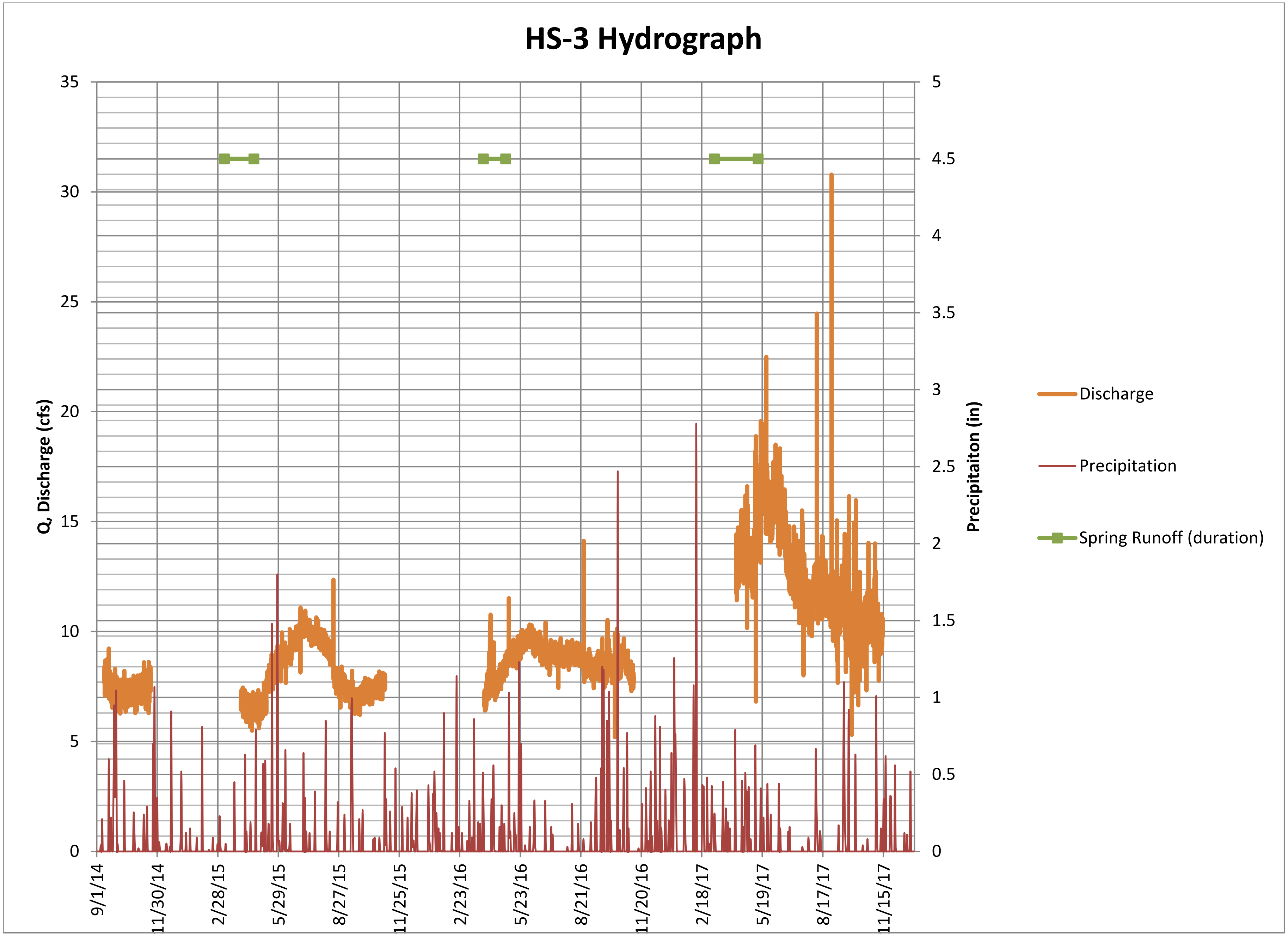
Location	Date	Flow (cfs)
Sage Creek		
LSV-2c	9/6/2006	7.955
	5/12/2007	7.665
	8/28/2007	6.582
	5/17/2008	12.4
	9/5/2008	15.1358
	9/12/2009	15.09
	6/6/2010	29.164
	8/28/2010	11.453
	9/14/2010	9.657
	11/13/2010	11.687
	8/28/2011	26.4
	11/10/2011	16.47
	8/23/2012	9.88
	8/23/2013	10.11
	5/7/2015	28.29
	7/22/2015	15.972
	9/10/2015	12.37975
	11/4/2015	9.965475
	5/17/2016	29.44565
	7/7/2016	18.3407
	11/8/2016	11.5
	5/16/2017	67.4397
	8/1/2017	25.3505
	8/30/2017	20.825
	11/14/2017	15.22265
	5/17/2018	35.861
	8/8/2018	14.436
	9/10/2018	12.6
	10/24/2018	12.065
LSV-4	5/15/2002	14.469
	5/16/2002	15.381
	10/17/2002	14.32
	5/22/2003	16.33
	10/27/2003	10.259
	2/7/2004	10.92
	5/8/2004	13.45
	7/21/2004	11.65
	9/5/2006	15.331025
	10/16/2006	17.861
	5/9/2007	12.294
	9/26/2007	13.715
	5/18/2008	21.992
	9/17/2008	20.58
	11/9/2008	21.255
	11/18/2009	16.882
	6/4/2010	37.06
	8/25/2010	16.098
	11/9/2010	17.117
	6/6/2011	69.04
	6/7/2011	80.41
	6/9/2011	114.5
	6/14/2011	99.346
	8/24/2011	34.6
	11/10/2011	26.93
	5/10/2012	25.613
	8/22/2012	15.65
	11/14/2012	16.505
	5/19/2013	34.905
	8/22/2013	17.2
	11/14/2013	14
	5/18/2014	41.61
	8/8/2014	21.9
	11/20/2014	15.44
	5/9/2015	45.50325
	7/22/2015	21.4055
	9/11/2015	15.6269
	11/4/2015	16.18185
	5/17/2016	40.0137
	7/7/2016	21.446875
	11/8/2016	16.4
	5/16/2017	87.8741
	8/1/2017	36.7035
	8/25/2017	32.138
	11/14/2017	22.7422
	5/16/2018	47.78
	8/8/2018	19.436
	9/12/2018	21
	10/24/2018	18.591


CC-1A Hydrograph
Q, Discharge (cfs)
400
350
300
250
200
150
100
50
0
Precipitaiton (in)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Sep-14
Nov-14
Feb-15
May-15
Aug-15
Nov-15
Feb-16
May-16
Aug-16
Nov-16
Feb-17
May-17
Aug-17
Nov-17
Feb-18
May-18
Aug-18
Nov-18
Discharge
Precipitation
Spring Runoff (duration)

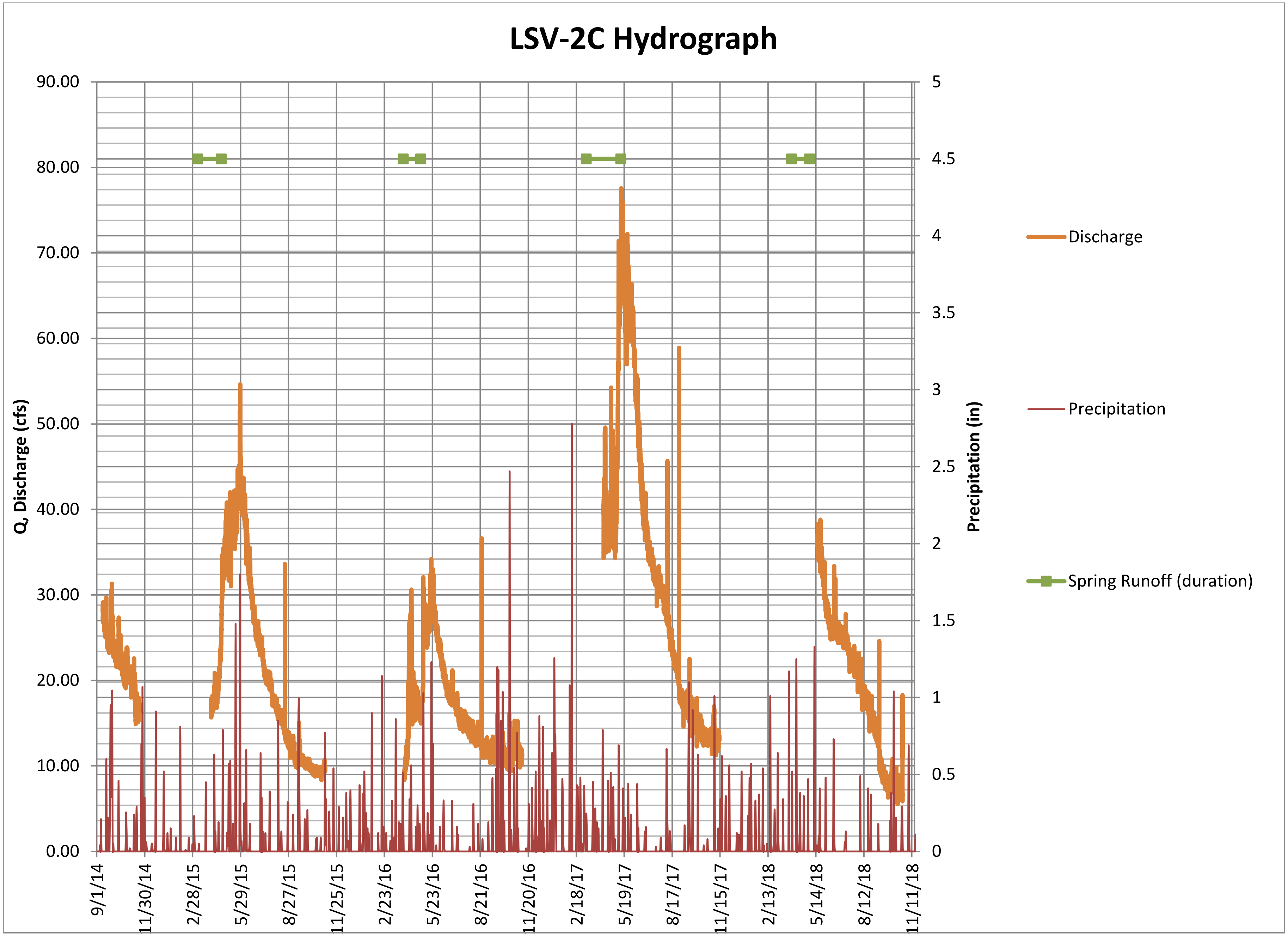


CC-350 Hydrograph
Q, Discharge (cfs)
Precipitaiton (in)
250.00
200.00
150.00
100.00
50.00
0.00
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Sep-14
Nov-14
Feb-15
May-15
Aug-15
Nov-15
Feb-16
May-16
Aug-16
Nov-16
Feb-17
May-17
Aug-17
Nov-17
Feb-18
May-18
Aug-18
Nov-18
Discharge
Precipitation
Spring Runoff (duration)

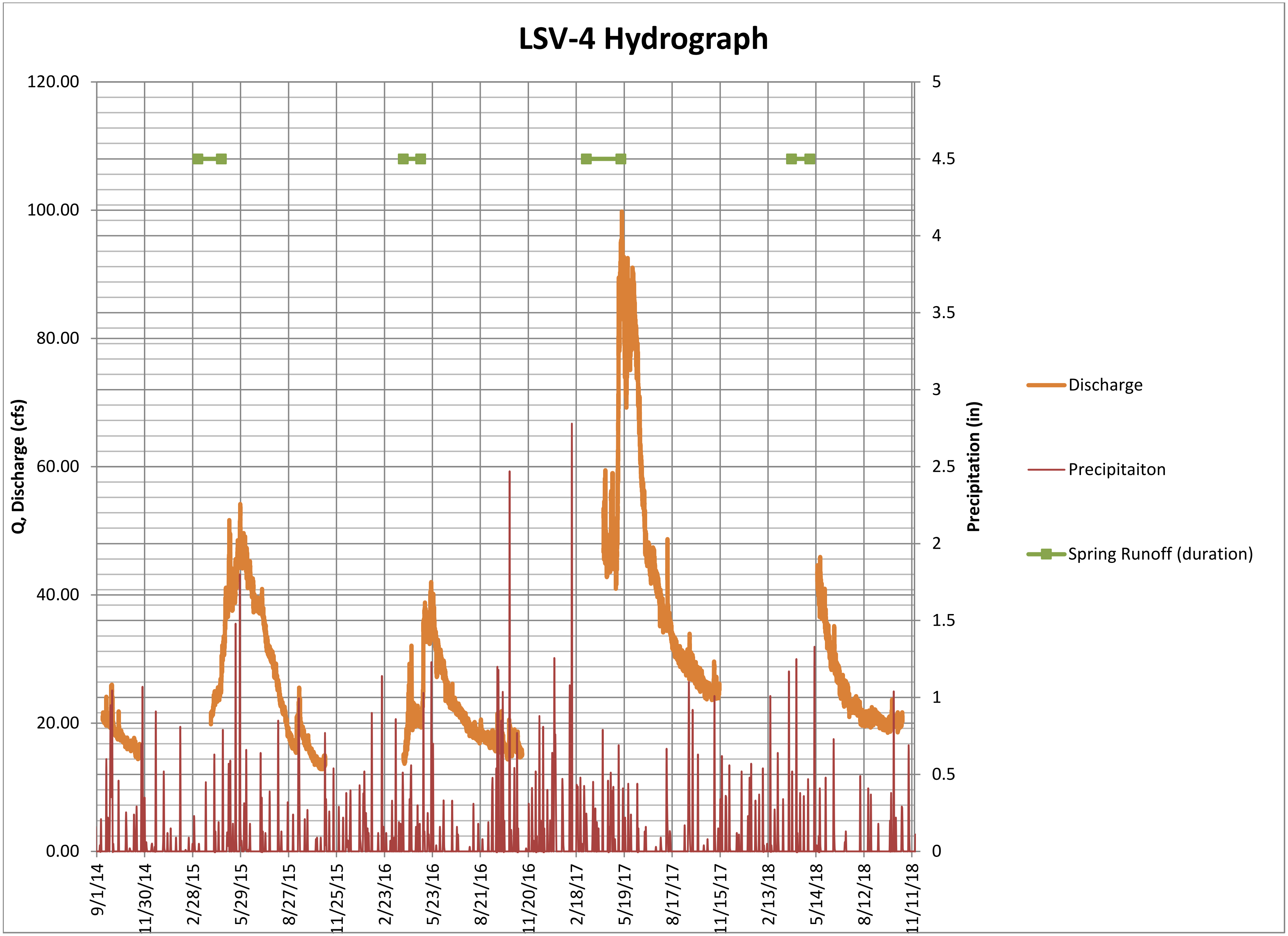

CC-WY-01 Hydrograph
Q, Discharge (cfs)
Precipitation (in)
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
9/1/14
11/30/14
2/28/15
5/29/15
8/27/15
11/25/15
2/23/16
5/23/16
8/21/16
11/20/16
2/18/17
5/19/17
8/17/17
11/15/17
2/13/18
5/14/18
8/12/18
11/11/18
staff plate relocated
Discharge
Precipitation
Spring Runoff (duration)



HS-3 Hydrograph
Q, Discharge (cfs)
Precipitaiton (in)
Discharge
Precipitation
Spring Runoff (duration)
0
5
10
15
20
25
30
35
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
9/1/14
11/30/14
2/28/15
5/29/15
8/27/15
11/25/15
2/23/16
5/23/16
8/21/16
11/20/16
2/18/17
5/19/17
8/17/17
11/15/17



LSV-2C Hydrograph
Q, Discharge (cfs)
Precipitation (in)
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
9/1/14
11/30/14
2/28/15
5/29/15
8/27/15
11/25/15
2/23/16
5/23/16
8/21/16
11/20/16
2/18/17
5/19/17
8/17/17
11/15/17
2/13/18
5/14/18
8/12/18
11/11/18
Discharge
Precipitation
Spring Runoff (duration)



LSV-4 Hydrograph
Q, Discharge (cfs)
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Precipitation (in)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
9/1/14
11/30/14
2/28/15
5/29/15
8/27/15
11/25/15
2/23/16
5/23/16
8/21/16
11/20/16
2/18/17
5/19/17
8/17/17
11/15/17
2/13/18
5/14/18
8/12/18
11/11/18
Discharge
Precipitaiton
Spring Runoff (duration)

IDEQ SHI Scores

CC150

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017
1	Percent Instream Cover		4	7	9	8	8	8		9
2	# Large Organic Debris		1	0	0	0	1	0		1
3	Percent Fines		6	6	6	7	7	5		8
4	Embeddedness		4	5	8	6	6	9		9
5	# Wolman Classes		6	8	6	6	6	6		6
6	Channel Shape		3	5	5	6	7	7		8
7	Percent Bank Vegetation		10	10	9	10	10	10		10
8	Percent Canopy Cover		0	0	3	1	5	1		6
9	Disruptive Pressure		7	7	8	8	8	7		8
10	Zone of Influence		6	8	7	7	7	7		7
11	Total Score		47	56	61	59	65	60		72
12	Condition Category		1	1	2	2	2	2		3

CC1A

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017	2018
1	Percent Instream Cover		6	8	8	7	7	8	8	7	7
2	# Large Organic Debris		1	1	1	1	1	1	1	0	0
3	Percent Fines		5	4	6	6	6	9	8	6	6
4	Embeddedness		4	3	5	4	5	5	5	5	4
5	# Wolman Classes		6	6	7	7	7	5	6	7	6
6	Channel Shape		7	6	6	7	7	8	8	6	8
7	Percent Bank Vegetation		10	10	10	9	10	10	9	9	8
8	Percent Canopy Cover		0	0	4	5	5	5	6	6	5
9	Disruptive Pressure		7	7	8	1	7	8	9	8	8
10	Zone of Influence		4	6	5	5	5	6	6	7	6
11	Total Score		50	51	60	52	60	65	66	61	58
12	Condition Category		1	1	2	1	2	2	3	2	2

CC350

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017	2018
1	Percent Instream Cover		3	6	7	6	6	4	8	7	8
2	# Large Organic Debris		0	0	1	0	0	1	0	1	0
3	Percent Fines		7	6	8	7	8	10	8	9	10
4	Embeddedness		7	3	7	6	8	7	9	9	9
5	# Wolman Classes		8	8	7	8	8	7	7	7	6
6	Channel Shape		4	3	8	7	8	8	4	3	5
7	Percent Bank Vegetation		8	5	8	5	5	9	8	9	8
8	Percent Canopy Cover		0	0	3	1	3	1	3	6	6
9	Disruptive Pressure		6	4	4	3	5	6	7	8	8
10	Zone of Influence		4	4	5	3	4	5	6	7	7
11	Total Score		47	39	58	46	55	58	60	66	67
12	Condition Category		1	1	2	1	1	2	2	3	3

CC3A

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017
1	Percent Instream Cover		4	8						
2	# Large Organic Debris		0	0						
3	Percent Fines		8	6						
4	Embeddedness		4	7						
5	# Wolman Classes		6	5						
6	Channel Shape		7	6						
7	Percent Bank Vegetation		6	5						
8	Percent Canopy Cover		0	0						
9	Disruptive Pressure		7	7						
10	Zone of Influence		2	7						
11	Total Score		44	51						
12	Condition Category		1	1						

CC75

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017
1	Percent Instream Cover		4	7	7	7	8	7		8
2	# Large Organic Debris		0	0	0	0	1	1		3
3	Percent Fines		7	6	6	7	9	6		7
4	Embeddedness		6	7	2	3	6	7		8
5	# Wolman Classes		6	8	9	6	8	7		8
6	Channel Shape		9	8	8	8	9	8		8
7	Percent Bank Vegetation		9	10	10	9	9	9		10
8	Percent Canopy Cover		0	0	4	3	5	4		6
9	Disruptive Pressure		4	5	6	6	8	5		7
10	Zone of Influence		5	5	6	6	7	6		5
11	Total Score		50	56	58	55	70	60		70
12	Condition Category		1	1	2	1	3	2		3

HS3

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017	2018
1	Percent Instream Cover		1	4					8		9
2	# Large Organic Debris		0	0					1		0
3	Percent Fines		4	3					4		0
4	Embeddedness		7	7					9		3
5	# Wolman Classes		7	9					7		7
6	Channel Shape		1	2					9		6
7	Percent Bank Vegetation		8	9					9		5
8	Percent Canopy Cover		0	0					5		2
9	Disruptive Pressure		2	5					7		7
10	Zone of Influence		2	6					7		7
11	Total Score		32	45					66		46
12	Condition Category		1	1					3		1

LS

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017
1	Percent Instream Cover				7	7	6	8		7
2	# Large Organic Debris				1	0	0	1		2
3	Percent Fines				6	9	9	10		9
4	Embeddedness				8	8	9	9		9
5	# Wolman Classes				6	7	5	6		6
6	Channel Shape				5	5	6	5		6
7	Percent Bank Vegetation				10	9	9	10		9
8	Percent Canopy Cover				4	1	5	4		4
9	Disruptive Pressure				7	7	5	6		5
10	Zone of Influence				5	5	3	5		4
11	Total Score				59	58	57	64		61
12	Condition Category				2	2	1	2		2

LSS

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017
1	Percent Instream Cover				6	8	7	8		9
2	# Large Organic Debris				1	0	2	0		0
3	Percent Fines				6	6	6	5		8
4	Embeddedness				9	9	9	7		10
5	# Wolman Classes				6	6	7	6		7
6	Channel Shape				8	6	5	7		8
7	Percent Bank Vegetation				9	10	10	10		10
8	Percent Canopy Cover				0	0	0	3		5
9	Disruptive Pressure				5	5	5	4		8
10	Zone of Influence				3	3	3	4		5
11	Total Score				53	53	54	54		70
12	Condition Category				1	1	1	1		3

LSV2C

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017	2018
1	Percent Instream Cover		7	8	8	9	8	8	7	9	9
2	# Large Organic Debris		0	0	0	0	0	0	0	1	1
3	Percent Fines		4	8	3	0	5	0	6	5	0
4	Embeddedness		7	7	7	3	6	4	7	8	5
5	# Wolman Classes		7	7	8	7	7	6	8	7	7
6	Channel Shape		2	4	6	6	7	6	8	6	8
7	Percent Bank Vegetation		10	10	10	10	10	10	10	10	10
8	Percent Canopy Cover		0	0	0	1	2	5	4	6	7
9	Disruptive Pressure		2	5	5	5	5	5	8	7	7
10	Zone of Influence		2	6	3	3	3	3	7	7	7
11	Total Score		41	55	50	44	53	47	65	66	61
12	Condition Category		1	1	1	1	1	1	2	3	2

LSV4

#	Habitat_Measure	2006	2007	2008	2009	2010	2011	2014	2016	2017	2018
1	Percent Instream Cover					7	8	8	7	8	8
2	# Large Organic Debris					1	1	0	0	0	0
3	Percent Fines					8	10	3	8	8	7
4	Embeddedness					8	8	7	4	7	8
5	# Wolman Classes					7	6	6	6	6	5
6	Channel Shape					7	6	6	8	6	8
7	Percent Bank Vegetation					9	10	10	9	9	9
8	Percent Canopy Cover					3	6	5	6	5	6
9	Disruptive Pressure					6	7	7	7	7	8
10	Zone of Influence					6	6	6	7	7	7
11	Total Score					62	68	58	62	63	66
12	Condition Category					2	3	2	2	2	3

[1] % Cover, embeddedness, disruptive pressure and zone of influence were scored in the field using IDEQ criteria.

[2] Maximum possible score is 100, 10 for each habitat measure.

[3] Condition Categories are for the Northern and Middle Rockies Ecoregion scoring criteria.

1 <58 = <10th percentile of reference

2 58 - 65 = 10th-25th percentile of reference

3 >66 = >25th percentile of reference

2017 Stream Reach Inventory and Channel Stability Index Ratings

		Summer 2017							
Attribute		CC-350	CC-1A	LSV-2C	LSV-4	LSS	LS	CC-150	CC-75
Upper Banks									
1	Landform Sl	2	2	3	2	2	2	2	3
2	Mass Wastin	3	3	3	3	3	3	3	4
3	Debris Jam	3	3	2	6	2	4	2	3
4	Vegetation C	5	3	4	3	3	8	3	5
	Upper Bank Score:	**13**	**11**	**12**	**14**	**10**	**17**	**10**	**15**
Lower Banks									
5	Channel Capacity	3	2	2	2	2	2	2	2
6	Bank Rock Content	8	8	8	8	6	6	8	6
7	Flow Obstructors & Deflectors	3	2	3	4	2	3	3	4
8	Cutting	8	8	4	7	4	10	6	8
9	Deposition	6	4	4	8	4	5	4	5
Lower Bank Score:		**28**	**24**	**21**	**29**	**18**	**26**	**23**	**25**
Channel Bottom									
10	Rock Angula	2	2	2	2	2	1	2	2
11	Brightness	2	2	2	2	3	2	2	2
12	Consolidatio	4	3	4	4	4	3	4	4
13	Bottom Size	6	6	6	8	6	6	6	6
14	Bed Scour and Deposition	8	12	8	9	8	8	9	8
15	Clinging Aquatic Vegetation	3	2	1	3	1	3	1	1
	Score:	**25**	**27**	**23**	**28**	**24**	**23**	**24**	**23**
	Overall Rating:	**66**	**62**	**56**	**71**	**52**	**66**	**57**	**63**
		Good	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**	**Good**

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Fall 2009									
Site Length (ft)	355	500	600	720		325	400	NM	406
Discharge (cfs)	6.1	14.2	25.1	46.1		4.5	15.1		7.5
Mean Bankfull Width (ft)	15.2	18.0	21.6	33.6		9.7	19.5		11.5
Mean Wetted Width (ft)	7.6	11.0	19.5	29.5		7.4	13.2		8.6
Mean Bankfull Height (ft)	2.4	2.0	2.1	2.3		1.4	1.7		1.2
Mean Wetted Depth (ft)	0.77	1.23	0.72	0.97		0.62	0.92		0.51
W/D ratio	19.74	14.63	30.00	34.64		15.65	21.20		22.55
Gradient (%)	0.7	0.5	0.7	0.2		1.3	0.7		1.4
Water Temperature ^{0}F	50	58	50	56		54	55		52
(Time)	1155	1530	1100	1315		1545	1115		1025
Straight Line Distance (ft)	203	332	457	220		234	229		171
Sinuosity ratio	1.7	1.5	1.3	3.3		1.4	1.7		2.4
Sinuosity	Moderate	Moderate	Moderate	High		Moderate	Moderate		High
Mean Width Undercut Bank (ft)	0.37	0.37	0.66	0.48		0.12	0.32		0.45
Habitat Distribution									
% Riffle	25	37	52	27		47	35		87
% Run	36	16	18	33		34	47		0
% Glide	0	8	0	0		0	0		0
% Pool	38	40	30	39		20	19		14
Mean Pool Data									
Count (#)	4	6	5	5		4	3		2
Maximum Depth (ft)	1.74	1.98	2.20	3.10		1.30	2.40		1.55
Tail Out Depth (ft)	0.74	0.81	0.70	1.20		0.60	0.80		0.85
Length (ft)	33.3	31.0	46.5	52.0		16.0	25.0		19.5
Maximum Width (ft)	11.0	12.0	16.3	26.0		7.8	18.3		16.0
Predominant Substrate (mm)	49	47	47	<2		65	54		49
Overhead Cover (%)	39	39	23	10		38	10		15
Undercut Banks (%)	50	48	34	20		14	35		5
Submerged Cover (%)	43	24	11	13		6	17		15

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Fall 2010									
Site Length (ft)	350	496	626	720		325	394	420	406
Discharge (cfs)	5.3	9.8	18.0	37.0		3.4	12	16	7.1
Mean Bankfull Width (ft)	12.6	17.4	23.2	27.9		9.8	24.6	25.2	13.1
Mean Wetted Width (ft)	10.2	9.9	19.9	22.7		7.3	15.1	19.5	8.8
Mean Bankfull Height (ft)	1.7	2.5	2.5	3.0		1.6	1.8	1.8	1.5
Mean Wetted Depth (ft)	0.62	0.82	0.73	1.05		0.49	0.81	0.48	0.33
*W/D Ratio	20.32	21.22	31.78	26.57		20.00	30.37	52.50	39.70
Gradient (%)	0.7	0.5	0.7	0.2		1.3	0.7	0.6	1.4
Water Temperature ^{0}F	48	61	51	50		52	62	64	56
(Time)	1025	1350	1035	1115		1100	1440	1340	1420
***Sinuosity Ratio	1.7	1.5	1.3	3.3		1.4	1.7		2.4
**Sinuosity	Moderate	Moderate	Moderate	High		Moderate	Moderate	Moderate	High
Mean Width Undercut Bank (ft)	0.23	0.27	0.35	0.43		0.07	0.33	0.46	0.27
Habitat Distribution									
% Riffle	33	51	50	29		56	23	56	82
% Run	33	11	28	36		26	40	0	0
% Glide	0	0	0	0		0	0	0	0
% Pool	34	38	22	35		18	37	44	18
Mean Pool Data									
Count (#)	4	6	4	5		4	3	5	3
Maximum Depth (ft)	1.58	1.93	2.10	2.76		1.11	2.50	2.45	1.63
Tail Out Depth (ft)	0.60	0.56	0.78	1.10		0.35	0.83	0.68	0.75
Length (ft)	29.5	33.5	34.5	56.0		14.5	48.0	34.8	24.3
Maximum Width (ft)	9.8	13.0	14.0	26.0		7.0	18.7	13.5	8.0
Predominant Substrate (mm)	<2	15	103	<2		85	<2	50	57
Overhead Cover (%)	24	13	6	15		35	3	11	70
Undercut Banks (%)	43	45	35	30		25	42	45	17
Submerged Cover (%)	50	11	11	3		15	37	10	18

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Fall 2011									
Site Length (ft)	350	496	626	720		325	394	420	406
Discharge (cfs)	11	22	32	69.0		11	26	35	10
Mean Bankfull Width (ft)	11.7	15.8	25.8	37.1		13.2	18.3	27.0	15.0
Mean Wetted Width (ft)	8.6	11.5	21.7	30.6		9.5	14.3	20.9	10.4
Mean Bankfull Height (ft)	2.3	2.3	2.7	2.8		1.8	1.9	2.0	1.6
Mean Wetted Depth (ft)	1.00	1.09	0.73	1.20		0.67	0.82	0.76	0.53
*W/D Ratio	11.70	14.50	35.34	30.92		19.70	22.32	35.53	28.30
Gradient (%)	0.7	0.5	0.7	0.2		1.3	0.7	0.6	1.4
Water Temperature ^{0}F	51	58	48	52		48	54	58	54
(Time)	850	1220	820	810		1010	810	1230	1312
***Sinuosity Ratio	1.7	1.5	1.3	3.3		1.4	1.7		2.4
**Sinuosity	Moderate	Moderate	Moderate	High		Moderate	Moderate	Moderate	High
Mean Width Undercut Bank (ft)	0.51	0.41	0.28	0.43		0.24	0.27	0.34	0.20
Habitat Distribution									
% Riffle	32	20	43	33		59	64	36	46
% Run	35	34	41	39		22	0	34	47
% Glide	0	0	0	0		0	0	0	0
% Pool	33	46	16	28		19	36	30	7
Mean Pool Data									
Count (#)	3	7	3	5		3	2	3	2
Maximum Depth (ft)	1.92	2.63	3.00	3.20		1.50	2.80	3.50	1.98
Tail Out Depth (ft)	0.77	0.95	1.07	1.43		0.57	1.10	1.20	0.80
Length (ft)	38.7	41.0	34.0	33.5		21.0	71.0	41.0	13.5
Maximum Width (ft)	11.2	16.0	21.3	18.3		9.7	20.0	18.0	14.0
Predominant Substrate	silt	SC	SC	CG		SC	CG	CG	SC
Overhead Cover (%)	15	8	7	8		13	5	8	5
Undercut Banks (%)	55	48	32	10		10	33	50	15
Submerged Cover (%)	12	6	7	3		7	5	5	30

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Fall 2012									
Site Length (ft)	350	496	626	720		325	394	420	406
Discharge (cfs)	NM	NM	16	30.0		NM	10	16	NM
Mean Bankfull Width (ft)			28.0	29.0			13.8	18.9	
Mean Wetted Width (ft)			20.3	26.1			11.9	16.8	
Mean Bankfull Height (ft)			2.4	2.6			1.7	2.3	
Mean Wetted Depth (ft)			0.49	0.76			0.65	0.65	
Bankfull W/D Ratio			11.67	11.15			8.12	8.22	
Wetted W/D Ratio			41.43	34.34			18.31	25.85	
Gradient (%)			0.7	0.2			0.7	0.6	
Water Temperature ^{0}F			48	50			46	60	
(Time)			0845	0825			0850	1300	
***Sinuosity Ratio			1.3	3.3			1.7		
**Sinuosity			Moderate	High			Moderate	Moderate	
Mean Width Undercut Bank (ft)			0.10	0.65			0.45	0.42	
Habitat Distribution									
% Riffle			65	23			51	24	
% Run			15	50			29	35	
% Glide			0	0			0	0	
% Pool			20	27			20	40	
Mean Pool Data									
Count (#)			4	5			3	4	
Maximum Depth (ft)			2.50	3.10			2.20	2.9	
Tail Out Depth (ft)			0.69	0.88			0.68	0.85	
Length (ft)			31.8	34.3			26.0	43.00	
Maximum Width (ft)			12.8	23.3			13.0	15.8	
Predominant Substrate			C	St			St	CG	
Overhead Cover (%)			10	8			2	6	
Undercut Banks (%)			33	25			42	39	
Submerged Cover (%)			25	8			20	3	

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Fall 2013									
Site Length (ft)	350	496	626	720		325	394	420	406
Discharge (cfs)	NM	NM	13	37.6		NM	10.1	17.2	NM
Mean Bankfull Width (ft)			NM	NM			NM	NM	
Mean Wetted Width (ft)			18.2	21.6			11.2	17.3	
Mean Bankfull Height (ft)			NM	NM			NM	NM	
Mean Wetted Depth (ft)			NM	NM			NM	NM	
Bankfull W/D Ratio			NM	NM			NM	NM	
Wetted W/D Ratio			NM	NM			NM	NM	
Gradient (%)			0.7	0.2			0.7	0.6	
Water Temperature ^{0}F			60	54			52	51	
(Time)			1310	0830			0845	0835	
***Sinuosity Ratio			1.3	3.3			1.7		
**Sinuosity			Moderate	High			Moderate	Moderate	
Mean Width Undercut Bank (ft)			NM	NM			NM	NM	
Habitat Distribution									
% Riffle			NM	NM			NM	NM	
% Run			NM	NM			NM	NM	
% Glide			NM	NM			NM	NM	
% Pool			NM	NM			NM	NM	
Mean Pool Data									
Count (#)			NM	NM			NM	NM	
Maximum Depth (ft)									
Tail Out Depth (ft)									
Length (ft)									
Maximum Width (ft)									
Predominant Substrate									
Overhead Cover (%)									
Undercut Banks (%)									
Submerged Cover (%)									

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Fall 2014									
Site Length (ft)	350	496	626	720		325	394	420	406
Discharge (cfs)	4.7	14.0	20.9	40.0		3.4	12.5	17.2	5.6
Mean Bankfull Width (ft)	10.4	13.9	27.6	31.2		15.2	23.4	22.4	10.8
Mean Wetted Width (ft)	9.2	10.2	19.4	28.1		8.9	14.1	18.1	8.9
Mean Bankfull Height (ft)	2.1	2.0	2.4	2.4		1.9	2.0	2.1	1.5
Mean Wetted Depth (ft)	0.76	0.96	0.62	0.96		0.57	0.76	0.77	0.47
*W/D Ratio	13.68	14.48	44.52	32.50		26.67	30.79	29.09	22.98
Gradient (%)	0.7	0.5	0.7	0.2		1.3	0.7	0.6	5.0
Water Temperature ^{0}F	46	53	42	44		48	46	56	72
(Time)	835	1225	835	810		1242	815	1345	1400
***Sinuosity Ratio	1.7	1.5	1.3	3.3		1.4	1.7		2.4
**Sinuosity	Moderate	Moderate	Moderate	High		Moderate	Moderate	Moderate	High
Mean Width Undercut Bank (ft)	0.44	0.40	0.33	0.71		0.23	0.28	0.46	0.18
Habitat Distribution									
% Riffle	43	40	42	24		60	14	33	75
% Run	31	6	46	46		30	60	29	16
% Glide									
% Pool	26	54	12	30		10	26	38	9
Mean Pool Data									
Count (#)	4	6	2	6		3	4	4	2
Maximum Depth (ft)	1.58	2.40	2.80	2.70		1.32	2.20	3.30	1.60
Tail Out Depth (ft)	0.78	0.93	1.05	0.99		0.42	0.90	0.93	0.85
Length (ft)	22.8	31.8	39.0	35.0		11.0	25.8	40.0	19.0
Maximum Width (ft)	10.0	14.0	15.5	16.0		7.3	13.0	15.7	11.0
Predominant Substrate	sand/FG	C/gravel	C/gravel	gravel/silt		gravel/C	silt/gravel	gravel	C
Overhead Cover (%)	25	21	20	10		28	16	29	10
Undercut Banks (%)	38	43	35	15		12	43	35	25
Submerged Cover (%)	35	58	15	18		0	59	25	50

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Summer 2015									
Site Length (ft)			626	720			394	420	
Discharge (cfs)			16.0	43.0			14.0	20.0	
Mean Bankfull Width (ft)									
Mean Wetted Width (ft)			18.4	27.2			12.9	14.6	
Mean Bankfull Height (ft)									
Mean Wetted Depth (ft)									
*W/D Ratio									
Gradient (%)			0.7	0.2			0.7	0.6	
Water Temperature ^{0}F			45	48			56	54	
(Time)			840	910			1340	1230	
***Sinuosity Ratio			1.3	3.3			1.7		
**Sinuosity			Moderate	High			Moderate	Moderate	
Mean Width Undercut Bank (ft)			0.28	0.52			0.28	0.35	
Habitat Distribution									
% Riffle									
% Run									
% Glide									
% Pool									
Mean Pool Data									
Count (#)									
Maximum Depth (ft)									
Tail Out Depth (ft)									
Length (ft)									
Maximum Width (ft)									
Predominant Substrate									
Overhead Cover (%)									
Undercut Banks (%)									
Submerged Cover (%)									

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Summer 2016									
Site Length (ft)			626	720	360		394	420	
Discharge (cfs)			21.0	40.0	9.1		13.0	17.0	
Mean Bankfull Width (ft)									
Mean Wetted Width (ft)			19.2	28.4	12.7		13.6	17.4	
Mean Bankfull Height (ft)									
Mean Wetted Depth (ft)									
*W/D Ratio									
Gradient (%)			0.7	0.2			0.7	0.6	
Water Temperature ^{0}F			43	45	47		57	60	
(Time)			850	820	900		1455	1440	
***Sinuosity Ratio			1.3	3.3			1.7		
**Sinuosity			Moderate	High	Moderate		Moderate	Moderate	
Mean Width Undercut Bank (ft)			0.23	0.52	0.57		0.33	0.32	
Habitat Distribution									
% Riffle									
% Run									
% Glide									
% Pool									
Mean Pool Data									
Count (#)									
Maximum Depth (ft)									
Tail Out Depth (ft)									
Length (ft)									
Maximum Width (ft)									
Predominant Substrate									
Overhead Cover (%)									
Undercut Banks (%)									
Submerged Cover (%)									

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Summer 2017									
Site Length (ft)	350	496	626	720	360	325	394	420	406
Discharge (cfs)	8.7	21.2	33.2	78.7	11.4	8.7	20.8	32.1	10.2
Mean Bankfull Width (ft)	14.7	17.0	32.0	34.7		11.6	21.5	33.5	15.1
Mean Wetted Width (ft)	10.6	12.6	18.9	29.0	12.7	7.0	13.3	16.3	10.2
Mean Bankfull Height (ft)	1.3	1.1	1.3	1.7		0.9	0.8	1.3	0.9
Mean Wetted Depth (ft)	0.67	0.90	0.87	1.08		0.72	0.89	0.82	0.63
*W/D Ratio	21.94	18.89	36.78	32.13		16.11	24.16	40.85	23.97
Gradient (%)									
Water Temperature ^{0}F	48	54	46	48	54	52	48	47	52
(Time)	820	1240	940	818	1230	1442	825	825	1350
Air Temperature ^{0}F	42	82	68	44		78	52	43	78
***Sinuosity Ratio									
**Sinuosity	Moderate	Moderate	Moderate	High		Moderate	Moderate	High	High
Mean Width Undercut Bank (ft)	0.27	0.50	0.20	0.27		0.27	0.70	0.38	0.58
Habitat Distribution									
% Riffle	24	31	56	41		58	58	30	59
% Run	33	13	11	13		15	7		28
% Glide									
% Pool	43	56	33	46		27	35	70	13
Mean Pool Data									
Count (#)	5	6	5	6		5	4	8	2
Maximum Depth (ft)	1.89	2.48	3.00	3.50		1.50	2.40	3.08	1.80
Tail Out Depth (ft)	0.93	1.03	1.20	1.65		0.63	1.10	1.10	0.93
Length (ft)	32.8	54.0	43.5	65.5		17.3	34.3	35.3	26.0
Maximum Width (ft)	11.0	15.0	14.5	19.5		7.8	11.0	14.2	14.0
Predominant Substrate	G	G	LC	G		G	SC	G	G
Overhead Cover (%)	21	21	20	9		24	4	10	5
Undercut Banks (%)	39	45	11	34		19	46	43	40
Submerged Cover (%)	11	8	23	5		6	19	4	40

BURP Habitat Data

Habitat Measure	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS
Summer 2018									
Site Length (ft)			626	720	360		394	420	
Discharge (cfs)			22.6	51.0	9.5		12.6	21.0	
Mean Bankfull Width (ft)			NM	NM	NM		NM	NM	
Mean Wetted Width (ft)			18.1	29.8	15.1		14.1	16.4	
Mean Bankfull Height (ft)			NM	NM	NM		NM	NM	
Mean Wetted Depth (ft)			NM	NM	NM		NM	NM	
*W/D Ratio			NM	NM	NM		NM	NM	
Gradient (%)			NM	NM	NM		NM	NM	
Water Temperature ^{0}F			43	50	49		58	52	
(Time)			825	1107	830		1525	1235	
Air Temperature ^{0}F			40	50	45		81	73	
***Sinuosity Ratio			NM	NM	NM		NM	NM	
**Sinuosity			Mod	High	Mod		Mod	Mod	
Mean Width Undercut Bank (ft)			0.35	0.48	0.32		0.43	0.63	
Habitat Distribution									
% Riffle			60	30	50		60	30	
% Run			10	30	50		10	10	
% Glide			0	0	0		0	0	
% Pool			30	40	0		30	60	
Mean Pool Data			NM	NM	NM		NM	NM	
Count (#)									
Maximum Depth (ft)									
Tail Out Depth (ft)									
Length (ft)									
Maximum Width (ft)									
Predominant Substrate									
Overhead Cover (%)									
Undercut Banks (%)									
Submerged Cover (%)									

NM = Not Measured	**Sinuosity 1 to 1.3 = low sinuosity	FG=	Fine gravel
NP = No Pools	1.3 to 1.7 = moderate sinuosity	CG=	Coarse gravel
* Mean Bankfull Width/Mean Wetted Depth	> 1.7 = High sinuosity	C=	Cobble
BD Beaver Dam	*** Stream length/Straight length	SC=	Small cobble

BURP Habitat Data

Habitat Measure									
	CC-75	CC-150	CC-350	CC-1A	HS-3	LS	LSV-2C	LSV-4	LSS

^^ No tail out on beaver dam pools

LC= Large cobble

B= Boulder

Table 16

Habitat Quality Index (HQI) Attribute Ratings and HQI Model II Scores for the Locations Sampled During Fall 2006, Fall 2007 and Fall 2008

#	Attribute	SFTC-1		CC-75			CC-150			CC-350			DC-600		
		Fall 2007	**Fall 2008**	**Fall 2006**	**Fall 2007**	**Fall 2008**	**Fall 2006**	**Fall 2007**	**Fall 2008**	**Fall 2006**	**Fall 2007**	**Fall 2008**	**Fall 2006**	**Fall 2007**	**Fall 2008**
X_1	Late summer stream flow (LSSF)	(2)	(2)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
X_2	Annual stream flow variation (ASFV)	(2)	(2)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
X_3	Temperature in C^o	25.6	21.1	12.8 (1500)	17.2	18.1	16.4 (1505)	24.4	21.6	15.0 (1530)	24.4	21.6	10 (1410)	13.9	17.8
		(1)	(3)	(4)	(4)	(4)	(4)	(1)	(2)	(4)	(1)	(2)	(2)	(4)	(4)
X_4	NO_3N (mg/l)	0.01	0.02	0.07	0.02	0.01	0.07	0.02	0.02	0	0.02	0.01	0.02	0.02	0.00
		(1)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(0)	(1)	(1)	(1)	(1)	(0)
X_{10}	Velocity (ft/sec)	<0.25	0.37	1.14	0.74	1.01	1.33	0.76	1.45	1.89	1.50	1.83	1.50	1.40	1.45
		(0)	(1)	(3)	(2)	(3)	(3)	(2)	(3)	(4)	(4)	(4)	(4)	(3)	(3)
	Fish Food														
X_5	Abundance (#/0.1 m2)	263	324	1375	1348	219	1228	642	356	635	1428	328	140	530	170
		(3)	(3)	(4)	(4)	(2)	(4)	(4)	(3)	(4)	(4)	(3)	(2)	(4)	(2)
X_6	Diversity	5.04		5.876	7.41		4.608	5.924		6.68	6.94		5.448	10.22	
		(4)		(4)	(4)		(4)	(4)		(4)	(4)		(4)	(4)	
X_9	Substrate (based on macro data)	(3)	(3)	(4)	(4)	(2)	(4)	(4)	(3)	(4)	(4)	(3)	(2)	(4)	2
X_7	Cover - Binns (%)	21.8	23.5	30.2	23.0	25.1	28.9	23.5	26.5	14	11.5	12.2	13.1	11.1	15
		(1)	(1)	(2)	(1)	(2)	(2)	(1)	(2)	(1)	(1)	(1)	(1)	(1)	(1)
X_8	Eroding Bank (%)	17.8	2.0	11.0	13.3	29.0	5.3	5.5	5.0	34.5	24.5	46.0	0.0	0.2	0.0
		(3)	(4)	(3)	(3)	(2)	(4)	(4)	(4)	(2)	(3)	(2)	(4)	(4)	(4)
X_{11}	Width (ft)	8.2	7.9	10.1	10.8	10.7	11.8	12.0	13.1	19.3	17.3	18.3	9.8	9.4	9.7
		(2)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(4)	(3)	(4)	(2)	(2)	(2)
F	Food Index = $X_3(X_4)X_9)X(_{10})$	0	9	96	32	24	96	8	18	0	16	24	16	48	0
S	Shelter Index = $X_7(X_8)(X_{11})$	6	8	12	6	8	24	12	24	8	9	8	8	8	8
	HQI (lbs/acre)	**1.7**	**27**	**390**	**176**	**154**	**440**	**27**	**83**	**19**	**39**	**82**	**64**	**237**	**19**
	HQI (kg/ha)	**1.9**	**30.0**	**437**	**197**	**173**	**493**	**30**	**93**	**22**	**44**	**92**	**72**	**265**	**22**
		63	28	101	75	63	140	106	115	2.3	43	49	83	76	127

#	Attribute	HS			HS-3			LSV-2C			LSV-4			CC-1A			CC-3A		
		Fall 2006	**Fall 2007**	**Fall 2008**	**Fall 2006**	**Fall 2007**	**Fall 2008**	**Fall 2006**	**Fall 2007**	**Fall 2008**	**Fall 2006**	**Fall 2007**	**Fall 2008**	**Fall 2006**	**Fall 2007**	**Fall 2008**	**Fall 2006**	**Fall 2007**	**Fall 2008**
X_1	Late summer stream flow (LSSF)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	NS	(4)	(4)	(4)	(4)	(4)	(4)
X_2	Annual stream flow variation (ASFV)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)		(4)	(4)	(4)	(4)	(4)	(4)
X_3	Temperature in C^o	11.1 (1745)	12.8	12.2	16.7 (1230)	23.9	24.2	17.8 (1500)	25.6	24.1	13.9 (1425)	23.3		13.4 (1445)	23.3	21.8	15.6 (1515)	23.3	21.4
		(3)	(4)	(3)	(4)	(2)	(2)	(4)	(1)	(2)	(4)	(2)		(4)	(2)	(2)	(4)	(2)	(2)
X_4	NO_3N (mg/l)	0.05	0.01	0.11	0.03	0.02	0.03	0.01	0.03	0.03	0.04	-		0.04	0.01	0	0.01	0.01	0.01
		(2)	(1)	(3)	(1)	(1)	(1)	(1)	(1)	(1)	(1)			(1)	(1)	(0)	(1)	(1)	(1)
X_{10}	Velocity (ft/sec)	2.06	0.85	2.3	1.80	1.96	1.84	1.80	1.47	2.08	1.69	-		2.09	1.53	1.84	1.81	1.57	1.9
		(4)	(2)	(4)	(4)	(4)	(4)	(4)	(3)	(4)	(4)	-		(4)	(4)	(4)	(4)	(4)	(4)
	Fish Food																		
X_5	Abundance (#/0.1 m2)	332	460	30	1588	521	93	721	709	185	1186	-		649	602	309	620	670	333
		(3)	(3)	(1)	(4)	(4)	(1)	(4)	(4)	(2)	(4)			(4)	(4)	(3)	(4)	(4)	(3)
X_6	Diversity	13.662	14.67		4.024	6.10		7.458	10.09		6.208			6.166	10.57		5.096	11.04	
		(4)	(4)		(4)	(4)		(4)	(4)		(4)			(4)	(4)		(4)	(4)	
X_9	Substrate (based on macro data)	(3)	(3)	(1)	(4)	(4)	(1)	(4)	(4)	(2)	(4)			(4)	(4)	(3)	(4)	(4)	(3)
X_7	Cover - Binns (%)	74.2	74.2	74.2	20.5	2.8	6.6	42.4	41.2	47.4	5.7			33.7	35.6	29.6	21.7	21.3	20.9
		(4)	(4)	(4)	(1)	(0)	(0)	(3)	(3)	(3)	(0)			(2)	(2)	(2)	(1)	(1)	(1)
X_8	Eroding Bank (%)	5.7	1.1	0.0	25.3	28.2	61.0	4.6	8.0	50.0	14.9			9.0	8.5	14.0	45.8	25.1	50.0
		(4)	(4)	(4)	(2)	(2)	(1)	(4)	(4)	(1)	(3)			(4)	(4)	(3)	(2)	(2)	(1)
X_{11}	Width (ft)	3.4	3.6	4.5	11.0	14.2	12.1	13.9	13.6	12.3	17.2	18.1		27.0	28.5	28.8	23.7	23.1	23.5
		(1)	(1)	(1)	(2)	(3)	(3)	(3)	(3)	(3)	(3)	(4)		(3)	(3)	(3)	(3)	(3)	(3)
F	Food Index = $X_3(X_4)X_9)X(_{10})$	72	24	36	64	32	8	64	12	16	64			64	32	0	64	32	24
S	Shelter Index = $X_7(X_8)(X_{11})$	16	16	16	4	0	0	36	36	9	0			24	24	18	6	6	3
	HQI (lbs/acre)	**260**	**174**	**169**	**254**	**65**	**28**	**366**	**42**	**65**	**189**			**341**	**118**	**11**	**270**	**93**	**70**
	HQI (kg/ha)	**291**	**195**	**189**	**285**	**73**	**32**	**411**	**47**	**73**	**212**			**382**	**132**	**13**	**303**	**105**	**79**
		117	49	26	55	95	47	278	197	277	115			35	69	73	83	119	88

Values in parentheses are the HQI rating value based on the parameter value. When no specific parameter value is given, the rating was estimated based on available data

Parameter ratings are provided in Table 4-6 of the May 8, Work Plan; HQI model II derivaiton procedures is identified in Table 4-8 of the Work Plan

Food Index verified using maroinvertebrate abundance and diversity data

NS = Not sampled

Table 25

Relative Weighted Usable Area (ft^2/1,000 ft) for Brown and Cutthroat Trout at the Simplot Monitoring Locations at the Average Fall and Spring Monitoring Flows

Location	Avg Fall Q (cfs)	Avg Spring Q (cfs)	Average Fall WUA (ft^2/1000' linear)			Average Spring WUA (ft^2/1000' linear)	
			Brown Adult	Brown Juv	Spawning	Brown Adult	Brown Juv
SFTC	0.5	19.2	-	-	-	-	-
CC-75	3.5	11.5	1482	2293	920	1963	2885
CC-150	7.7	21.7	3665	4827	3277	3608	4312
CC-350	19.2	32.5	2766	3900	6036	3131	3897
DC-600	2.6	13.4	-	-	-	-	-
HS-3	5.4	6.1	64	795	2185	99	875
LSV-2C	9.9	10	1940	2774	3498	1938	2766
LSV-4	15.3	12.3	2998	3812	4325	3253	4211
CC-1A	30.5	51	9605	12717	12294	9642	12037
CC-3A	34.5	56.1	8281	10044	11350	8833	9827

Location	Avg Fall Q (cfs)	Avg Spring Q (cfs)	Average Fall WUA (ft^2/1000' linear)		Average Spring WUA (ft^2/1000' linear)		
			Cutthroat Adult	Cutthroat Juv	Cutthroat Adult	Cutthroat Juv	Spawning
SFTC	0.5	19.2	410	766	2190	2226	918
CC-75	3.5	11.5	771	3556	1962	3845	4621
CC-150	7.7	21.7	2240	5500	4043	3972	6889
CC-350	19.2	32.5	2711	5158	3873	3928	8555
DC-600	2.6	13.4	307	2157	1085	2335	3140
HS-3	5.4	6.1	-	-	-	-	2594
LSV-2C	9.9	10	1473	3788	1478	3769	3525
LSV-4	15.3	12.3	2208	3325	2169	3988	4417
CC-1A	30.5	51	7833	14654	11520	11923	18189
CC-3A	34.5	56.1	8624	9814	10458	8291	12855

- species not present

Table 26

Actual Weighted Usable Area (ft^2) for Brown and Cutthroat Trout at the Simplot Monitoring Locations at the Average Fall and Spring Monitoring Flows

Location	Avg Fall Q (cfs)	Avg Spring Q (cfs)	Average Fall WUA (ft^2)			Average Spring WUA (ft^2)	
			Brown Adult	Brown Juv	Spawning	Brown Adult	Brown Juv
SFTC-1	0.5	19.2	-	-	-	-	-
CC-75	3.5	11.5	526	814	327	697	1024
CC-150	7.7	21.7	1832	2414	1638	1804	2156
CC-350	19.2	32.5	1660	2340	3622	1879	2338
DC-600	2.6	13.4	-	-	-	-	-
HS-3	5.4	6.1	23	286	787	36	315
LSV-2C	9.9	10	776	1110	1399	775	1106
LSV-4	15.3	12.3	1244	1582	1795	1350	1748
CC-1A	30.5	51	6916	9156	8852	6942	8667
CC-3A	34.5	56.1	6708	8136	9194	7155	7960

Location	Avg Fall Q (cfs)	Avg Spring Q (cfs)	Average Fall WUA (ft^2)		Average Spring WUA (ft^2)		
			Cutthroat Adult	Cutthroat Juv	Cutthroat Adult	Cutthroat Juv	Spawning
SFTC-1	0.5	19.2	193	360	1029	1046	431
CC-75	3.5	11.5	274	1262	697	1363	1640
CC-150	7.7	21.7	1120	2750	2022	1986	3444
CC-350	19.2	32.5	1627	3095	2324	2357	5133
DC-600	2.6	13.4	97	679	342	736	989
HS-3	5.4	6.1	-	-	-	-	934
LSV-2C	9.9	10	589	1515	591	1508	1410
LSV-4	15.3	12.3	916	1380	900	1655	1833
CC-1A	30.5	51	5640	10551	8294	8585	13096
CC-3A	34.5	56.1	6985	7949	8471	6716	10413

- species not present

Table 27

Ratio of Weighted Usable Area (ft^2) to Total Wetted Surface Area (ft^2) for Brown and Cutthroat Trout at Each of the Simplot Monitoring Locations at the Average Fall and Spring Monitoring Flows

Location	Event	Brown Trout		Cutthroat Trout		Spawning
		Adult	Juvenile	Adult	Juvenile	
SFTC-1	Fall	-	-	0.05	0.10	0.00
	Spring	-	-	0.19	0.19	0.08
CC-75	Fall	0.14	0.21	0.07	0.33	0.09
	Spring	0.17	0.26	0.17	0.34	0.41
CC-150	Fall	0.28	0.37	0.17	0.42	0.25
	Spring	0.25	0.30	0.28	0.27	0.47
CC-350	Fall	0.15	0.21	0.14	0.27	0.32
	Spring	0.15	0.18	0.18	0.19	0.41
DC-600	Fall	-	-	0.03	0.24	0.09
	Spring	-	-	0.09	0.20	0.27
HS-3	Fall	<0.01	0.06	-	-	0.16
	Spring	0.01	0.06	-	-	0.18
LSV-2C	Fall	0.14	0.20	0.11	0.28	0.25
	Spring	0.14	0.20	0.11	0.27	0.26
LSV-4	Fall	0.19	0.24	0.12	0.23	0.25
	Spring	0.17	0.22	0.13	0.19	0.26
CC-1A	Fall	0.34	0.45	0.28	0.52	0.44
	Spring	0.34	0.42	0.40	0.42	0.63
CC-3A	Fall	0.35	0.42	0.36	0.42	0.48
	Spring	0.36	0.40	0.42	0.34	0.52

- species not present

Table 24
Summary of PHABSIM Monitoring Locations and Sampling Information

Stream Name	Location	Date	PHABSIM Flows (cfs)	Reach Length (ft)	# Transects	Reach Slope (%)
*South Fork Tincup	SFTC-1	6/6/2007	5.6	470	11	1.48
		7/13/2007	0.4			
Crow Creek	CC-75	6/1/2007	5.0	355	14	0.68
		7/10/2007	2.9			
		5/12/2008	15.7			
	CC-150	6/2/2007	4.6	500	18	0.51
		9/3/2007	3.0			
		5/19/2008	20.0			
	CC-350	6/6/2007	14.0	600	10	0.73
		9/3/2007	13.0			
		6/30/2008	34.0			
Deer Creek	DC-600	6/5/2007	5.1	315	10	2.03
		7/12/2007	2.6			
		6/28/2008	15.8			
Hoopes Spring	HS-3	5/31/2007	4.4	360	9	1.58
		7/9/2007	6.3			
		6/29/2008	8.7			
Lower Sage Valley	LSV-2C	5/30/2007	9.4	400	14	0.7
		7/9/2007	8.6			
		6/29/2008	24.0			
	LSV-4	6/3/2007	12.3	415	11	0.59
		7/10/2007	14.7			
Crow Creek	CC-1A	6/3/2007	25.5	720	11	0.22
		7/10/2007	27.8			
		6/30/2008	65.0			
	CC-3A	6/4/2007	31.2	810	14	0.32
		9/2/2007	27.1			
		7/1/2008	65.0			

*Only two samplings

Attachment A

HSI Component and Overall Scores for Cutthroat Trout at the ten Simplot study sites where fish populations were sampled.

HSI Component Score	SFTC-1	CC-75	CC-150	CC-350	DC-600	HS	HS-3	LSV-2C	CC-1A	CC-3A
C_{Adult}	0.90	0.89	0.90	0.83	0.78	0.67	0.30	0.87	0.91	0.91
$C_{Juvenile}$	0.83	0.86	0.87	0.85	0.75	0.72	0.30	0.77	0.86	0.87
C_{Fry}	0.95	0.94	0.80	0.94	0.81	0.60	0.30	0.74	0.63	0.66
C_{Embryo}	-	-	-	-	-	-	-	-	0.60	0.58
C_{Other}	0.75	0.91	0.76	0.70	0.88	0.77	0.58	0.74	0.65	0.62
HSI (4 Equal Components)	0.85	0.90	0.83	0.83	0.80	0.69	0.35	0.78	0.75	0.75
HSI (5 Equal Components)	-	-	-	-	-	-	-	-	0.72	0.72

HSI Habitat Variables for Cutthroat Trout at the ten Simplot study sites where fish populations were sampled.

HSI Habitat Variable	**SFTC-1**	**CC-75**	**CC-150**	**CC-350**	**DC-600**	**HS**	**HS-3**	**LSV-2C**	**CC-1A**	**CC-3A**
V_1 - Average maximum temperature °C	21 ***0.22***	17 ***0.88***	20 ***0.46***	20 ***0.46***	16 ***0.97***	12 ***1.0***	21 ***0.22***	20 ***0.46***	20 ***0.46***	20 ***0.46***
V_2 - Average maximum temperature for embryos - °C	11.5 ***1.0***	13.0 ***0.95***	15.3 ***0.6***	17.0 ***0.3***	11.3 ***1.0***	13 ***0.95***	17.3 ***0.28***	17.0 ***0.3***	15.3 ***0.6***	14.3 ***0.76***
V_3 - Average minimum DO - mg/l	9.6 ***1.0***	8.2 ***0.95***	9.3 ***1.0***	9.0 ***1.0***	8.3 ***0.95***	5.2 ***0.1***	7.2 ***0.77***	6.7 ***0.64***	9.1 ***1.0***	8.9 ***0.99***
V_4 - Average thalweg depth - cm	29.9 ***1.0***	23.6 ***0.93***	24.1 ***0.94***	40.1 ***0.96***	22.6 ***0.88***	15.0 ***0.52***	16.9 ***0.65***	34.8 ***1.0***	48.9 ***1.0***	56.3 ***1.0***
V_5 - Average velocity at redds - cm/s	ND	ND	ND	ND	ND	ND	ND	ND	59.1 ***1.0***	59.1 ***1.0***
V_6 - % Cover	23.5 ***1.0 A & J***	25.1 ***1.0 A & J***	26.5 ***1.0 A & J***	12.2 ***0.77A*** ***0.97J***	15.0 ***0.84A*** ***1.0 J***	74.2 ***1.0 A & J***	6.6 ***0.53A*** ***0.73J***	47.4 ***1.0 A & J***	29.6 ***1.0 A & J***	20.9 ***0.97A*** ***1.0 J***
V_7 - Average spawning substrate size - cm	ND	ND	ND	ND	ND	ND	ND	ND	3.0 ***1.0***	3.0 ***1.0***
V_8 - % substrate 10-40cm	40 ***1.0***	8 ***0.83***	4 ***0.4***	8 ***0.83***	14 ***1.0***	4 ***0.4***	8 ***0.83***	6 ***0.6***	2 ***0.2***	2 ***0.2***
V_9 - Dominant riffle substrate type	A ***1.0***	B ***0.6***	B ***0.6***	B ***0.6***	B ***0.6***	A ***1.0***	C ***0.3***	B ***0.6***	C ***0.3***	C ***0.3***
V_{10} - % Pools	25 ***0.9***	32 ***0.97***	45 ***1.0***	33 ***0.98***	13 ***0.66***	10 ***0.57***	0 ***0.3***	15 ***0.7***	32 ***0.97***	69 ***1.0***
V_{11} - Average % Vegetation	183.0 ***1.0***	145.5 ***1.0***	147.9 ***1.0***	126.0 ***0.93***	170.0 ***1.0***	150.0 ***1.0***	135.9 ***1.0***	143.8 ***1.0***	153.1 ***1.0***	125.5 ***0.93***
V_{12} - Average % stable bank	90.1 ***1.0***	82.2 ***1.0***	94.7 ***1.0***	65.0 ***0.95***	99.9 ***1.0***	97.7 ***1.0***	61.8 ***0.93***	79.1 ***1.0***	89.5 ***1.0***	59.7 ***0.90***
V_{13} - Max or Min pH	8.52 ***0.84***	8.29 ***0.92***	8.58 ***0.81***	8.89 ***0.52***	8.24 ***0.94***	7.60 ***1.0***	8.46 ***0.88***	8.56 ***0.82***	8.44 ***0.89***	8.47 ***0.87***
V_{14} - Base Flow Regime % ADF	20 ***0.4***	55 ***1.0***	55 ***1.0***	55 ***1.0***	55 ***1.0***	55 ***1.0***	55 ***1.0***	55 ***1.0***	55 ***1.0***	55 ***1.0***
V_{15} - Pool Class Rating	***0.6***	***0.6***	***0.6***	***0.6***	***0.6***	***0.6***	***0.3***	***0.6***	***0.6***	***0.6***
V_{16A} - % Fines in redds	ND	ND	ND	ND	ND	ND	ND	ND	27 ***0.25***	35 ***0.19***
V_{16B} - % Fines in riffles	4.7 ***1.0***	12.5 ***0.99***	12.2 ***1.0***	12.9 ***0.98***	4.3 ***1.0***	8.9 ***1.0***	28.8 ***0.72***	5.9 ***1.0***	22.6 ***0.85***	13.8 ***0.97***
V_{17} - % Shaded	60 ***1.0***	10 ***0.45***	10 ***0.45***	10 ***0.45***	50 ***1.0***	10 ***0.45***	10 ***0.45***	10 ***0.45***	10 ***0.45***	10 ***0.45***

Bold and italized are HSI scores

Attachment 3
Macroinvertebrate Community Data

Summary of Benthic Macroinvertebrate Community Data

Crow Creek	CC-75								CC-150								CC-350							
Year	2006	2007	2008	2009	2010	2011	2014	2017	2006	2007	2008	2009	2010	2011	2014	2017	2006	2007	2008	2009	2010	2011	2014	2017
Percent Subsampled	12.5	12.5	66.6	25	33.3	33.3	25	33.3	12.5	25	50	50	25	50	25	25	25	25	50	33	50	87.5	50	50
Relative Abundance	516	506	494	358	294	339	983	387	465	482	534	585	434	664	412	508	487	452	463	541	425	460	602	378
Total Taxa	27	25	22	30	20	18	23	20	26	24	16	26	20	18	19	17	20	18	22	23	20	19	21	18
Total Abundance	4128.0	4048.0	741.7	1432.0	882.9	1018.0	3932.0	1162.2	3720	1928	1068	1170	1736	1328	1648	2032.0	1948	1808	926	1639.4	850	525.7	1204	756.0
Density (#/1m^2)	14848.9	14561.2	2668.1	5138.0	3167.8	3652.6	14107.9	4169.8	13381.3	6935.3	3841.7	4197.9	6228.7	4764.8	5913.0	7290.8	7007.2	6503.6	3330.9	5882.1	3049.8	1886.2	4319.9	2712.5
Shannon-Weiner	2.2	2.1	2.1	2.4	2.32	1.99	1.69	2.31	2.2	2.0	2.0	2.17	1.95	1.81	1.82	1.98	2.3	2.1	2.1	2.41	2.37	2.18	2.5	2.28
Eveness	0.4	0.3	0.3	0.4	0.41	0.34	0.25	0.39	0.4	0.3	0.3	0.34	0.32	0.28	0.3	0.32	0.4	0.3	0.3	0.38	0.39	0.36	0.39	0.38

Crow Creek	CC-1A								CC-3A							
Year	2006	2007	2008	2009	2010	2011	2014	2017	2006	2007	2008	2009	2010	2011	2014	2017
Percent Subsampled	25	25	50	50	50	100	50	75	25	25	50	NS	NS	NS	33.3	NS
Relative Abundance	487	452	463	619	326	674	680	322	465	503	500				411	
Total Taxa	20	18	22	27	16	19	16	14	30	20	15				15	
Total Abundance	1948.0	1808.0	926.0	1238	652	674	1360	429.3	1860	2012	1000				1234	
Density (#/1m^2)	7007.2	6503.6	3330.9	4441.9	2339.4	2418.3	4879.6	1540.4	6690.6	7237.4	3597.1				4428.4	
Shannon-Weiner	2.0	2.3	1.8	2.07	1.66	1.97	1.6	2.28	2.5	2.4	2.0				1.69	
Eveness	0.3	0.4	0.3	0.32	0.29	0.3	0.25	0.40	0.4	0.4	0.3				0.28	

Hoopes Spring	HS					HS-3						
Year	2002	2004	2006	2007	2008	2006	2007	2008	2010	2015	2016	2018
Percent Subsampled	100	100	50	33.3	100	12.5	33.3	100	50	75	50	100
Relative Abundance	700	987	498	415	91	596	470	280	363	411	382	252
Total Taxa	14	19	15	13	14	21	22	14	19	15	18	18
Total Abundance	700	987	996	1246	91	4768	1411	280	726	548	764	252
Density (#/1m^2)	2518	3550	3582.7	4482.9	327.3	17151.1	5077.0	1007.2	2612	1966.2	2741.2	904.2
Shannon-Weiner	0.99	1.43	2.13	1.77	2.21	1.02	1.93	2.05	1.84	2.06	2.32	2.04
Eveness	0.15	0.21	0.34	0.29	0.39	0.16	0.32	0.45	0.31	0.34	0.39	0.37

Sage Creek	LS					LSS					LSV-2C								LSV-4					
Year	2009	2010	2011	2014	2017	2009	2010	2011	2014	2017	2006	2007	2008	2009	2010	2011	2014	2017	2006	2009	2010	2011	2014	2017
Percent Subsampled	NS	100	100	100	100	50	100	100	100	100	25	25	75	100	100	100	75	75	12.5	NS	50	50	75	33.3
Relative Abundance		2028	2169	874	1,257	313	1862	2049	549	581	541	532	445	642	313	565	558	579	445		669	495	478	448
Total Taxa		23	22	22	16	18	26	24	33	18	23	21	17	18	19	17	15	21	21		21	14	17	18
Total Abundance		2028	2169	874	1257	626	1862	2049	549	581	2164	2128	593.3	642	313	565	744	772	3560		1338	990	637	1345
Density (#/1m^2)		7276.4	7782.3	3135.9	4510.1	2246.1	6680.8	7351.8	1969.8	2084.6	7784.2	7654.7	2134.3	2303.5	1123.0	2027.2	2669.5	2769.9	12805.8		4800.7	3552.1	2286.7	4827.1
Shannon-Weiner		2.1	1.82	1.92	1.91	1.68	1.94	1.77	1.65	2.14	1.8	2.2	2.1	2.05	2.35	2.1	1.83	2.07	2.1		2.31	1.82	1.54	2.07
Eveness		0.28	0.24	0.62	0.69	0.29	0.26	0.23	0.47	0.74	0.3	0.4	0.3	0.32	0.41	0.33	0.29	0.33	0.3		0.36	0.29	0.25	0.34

NS = Not Sampled

Stream Macroinvertebrate Index Scores and Condition Ratings

Metrics	Metric Scoring Formulas	CC-75								CC-150							
		2006	2007	2008	2009	2010	2011	2014	2017	2006	2007	2008	2009	2010	2011	2014	2017
Total Taxa	100*(Total Taxa)/95th	73	68	59	81	54	49	62	54	70	65	43	70	54	49	51	46
Ephemeroptera Taxa	100*(Ephemeroptera Taxa)/95th	30	40	20	30	30	30	40	30	20	30	20	30	30	40	30	30
Plecoptera Taxa	100*(Plecoptera Taxa)/95th	38	38	25	63	50	38	50	50	75	38	25	50	25	13	50	38
Trichoptera Taxa	100*(Trichoptera Taxa)/95th	78	78	67	100	67	56	67	67	67	89	56	78	67	67	89	33
Percent Plecoptera	100*(%Plecoptera)/95th	9	40	19	20	34	11	9	38	10	9	13	13	12	1	12	6
Hilsenhoff Biotic Index (HBI)	100*(10 - HBI)/(10 - 5th)	64	70	68	73	82	73	80	77	71	71	72	75	73	61	96	69
Percent 5 Dominant Taxa	100*(100 -%5dom)/(100 - 5th)	43	48	47	66	67	41	24	57	45	38	38	47	40	38	31	26
Scraper Taxa	100*(Scraper Taxa)/95th	75	75	50	63	38	25	50	63	50	38	25	38	50	38	50	50
Clinger Taxa	100*(Clinger Taxa)/95th	84	79	74	95	79	74	74	84	58	79	58	68	68	58	79	58
	SMI Score	**55**	**59**	**48**	**65**	**56**	**44**	**51**	**58**	**52**	**51**	**39**	**52**	**47**	**40**	**54**	**39**
	Condition Rating	**2**	**3**	**1**	**3**	**2**	**1**	**2**	**2**	**2**	**2**	**1**	**2**	**1**	**1**	**2**	**1**

Metrics	Metric Scoring Formulas	CC-350								CC-1A								CC-3A		
		2006	2007	2008	2009	2010	2011	2014	2017	2006	2007	2008	2009	2010	2011	2014	2017	2006	2007	2008
Total Taxa	100*(Total Taxa)/95th	62	65	57	62	54	51	57	49	54	49	59	73	43	51	43	38	84	54	41
Ephemeroptera Taxa	100*(Ephemeroptera Taxa)/95th	40	30	40	30	30	30	30	50	20	20	40	50	30	50	30	20	50	20	20
Plecoptera Taxa	100*(Plecoptera Taxa)/95th	25	25	13	25	25	25	25	25	13	25	25	50	25	25	25	13	0	13	25
Trichoptera Taxa	100*(Trichoptera Taxa)/95th	78	78	67	78	67	67	78	67	56	44	56	56	11	44	44	33	100	67	56
Percent Plecoptera	100*(%Plecoptera)/95th	3	7	3	14	11	10	19	28	1	4	4	5	2	5	5	4	0	3	14
Hilsenhoff Biotic Index (HBI)	100*(10 - HBI)/(10 - 5th)	78	81	70	88	87	73	83	100	67	76	73	68	77	70	76	78	76	74	77
Percent 5 Dominant Taxa	100*(100 -%5dom)/(100 - 5th)	45	31	39	59	65	46	75	57	28	58	32	42	22	33	15	63	76	60	36
Scraper Taxa	100*(Scraper Taxa)/95th	50	75	63	63	50	25	88	38	100	38	25	50	38	25	38	25	100	63	38
Clinger Taxa	100*(Clinger Taxa)/95th	74	79	79	68	74	53	84	68	74	47	58	84	42	63	53	42	95	58	53
	SMI Score	**51**	**52**	**48**	**54**	**51**	**42**	**60**	**53**	**45**	**40**	**41**	**53**	**32**	**41**	**36**	**35**	**65**	**46**	**40**
	Condition Rating	**2**	**2**	**1**	**2**	**2**	**1**	**3**	**2**	**1**	**1**	**1**	**2**	**Min**	**1**	**1**	**1**	**3**	**1**	**1**

Metrics	Metric Scoring Formulas	HS					HS-3						
		2002	2004	2006	2007	2008	2006	2007	2008	2010	2015	2016	2018
Total Taxa	100*(Total Taxa)/95th	38	35	43	35	38	57	59	38	51	41	49	49
Ephemeroptera Taxa	100*(Ephemeroptera Taxa)/95th	10	20	10	40	20	30	30	30	30	30	40	50
Plecoptera Taxa	100*(Plecoptera Taxa)/95th	0	13	25	25	0	25	25	25	25	13	13	13
Trichoptera Taxa	100*(Trichoptera Taxa)/95th	22	22	44	0	11	44	22	56	67	67	56	44
Percent Plecoptera	100*(%Plecoptera)/95th	0	7	27	24	0	2	9	10	13	3	4	5
Hilsenhoff Biotic Index (HBI)	100*(10 - HBI)/(10 - 5th)	41	41	55	54	48	34	67	84	93	90	92	84
Percent 5 Dominant Taxa	100*(100 -%5dom)/(100 - 5th)	6	30	36	28	47	14	36	48	32	46	67	35
Scraper Taxa	100*(Scraper Taxa)/95th	50	50	63	25	50	63	63	13	13	50	50	50
Clinger Taxa	100*(Clinger Taxa)/95th	26	32	47	32	26	74	84	58	47	53	53	58
	SMI Score	**21**	**28**	**39**	**29**	**27**	**38**	**44**	**40**	**41**	**44**	**47**	**43**
	Condition Rating	**minimum**	**minimum**	**1**	**minimum**	**minimum**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

Metrics	Metric Scoring Formulas	LSV-2C								LSV-4							
		2006	2007	2008	2009	2010	2011	2014	2017	2006	2007	2008	2009	2010	2011	2014	2017
Total Taxa	100*(Total Taxa)/95th	62	57	46	49	51	46	41	57	59			NM	57	38	46	49
Ephemeroptera Taxa	100*(Ephemeroptera Taxa)/95th	30	30	20	10	50	30	40	60	40			NM	60	40	30	40
Plecoptera Taxa	100*(Plecoptera Taxa)/95th	25	25	25	13	13	13	0	13	25			NM	25	0	13	25
Trichoptera Taxa	100*(Trichoptera Taxa)/95th	56	67	44	56	56	44	44	78	56			NM	56	56	78	78
Percent Plecoptera	100*(%Plecoptera)/95th	4	8	8	1	14	4	0	10	27			NM	11	0	6	3
Hilsenhoff Biotic Index (HBI)	100*(10 - HBI)/(10 - 5th)	59	81	69	83	90	53	89	99	74			NM	76	74	72	75
Percent 5 Dominant Taxa	100*(100 -%5dom)/(100 - 5th)	46	55	46	29	63	41	39	42	50			NM	54	22	20	35
Scraper Taxa	100*(Scraper Taxa)/95th	63	63	38	50	38	25	38	25	38			NM	50	25	63	38
Clinger Taxa	100*(Clinger Taxa)/95th	68	74	53	53	68	53	47	63	63			NM	74	47	63	63
	SMI Score	**46**	**51**	**39**	**38**	**49**	**34**	**37**	**50**	**48**	**NS**	**NS**	**NM**	**51**	**34**	**43**	**45**
	Condition Rating	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**NS**	**NS**	**NM**	**2**	**1**	**1**	**1**

NM - Not Measured

SMI Bioregion Scoring Thresholds: Central and Southern Mountains

	Score	Condition Rating
Above the 25th percentile of reference	≥59	3
10th to 25th percentile of reference	51-58	2
Minimum to 10th percentile of reference	33 -50	1
Below minimum of reference condition	<33	Minimum threshold (Min)

Stream Macroinvertebrate Index Scores and Condition Ratings

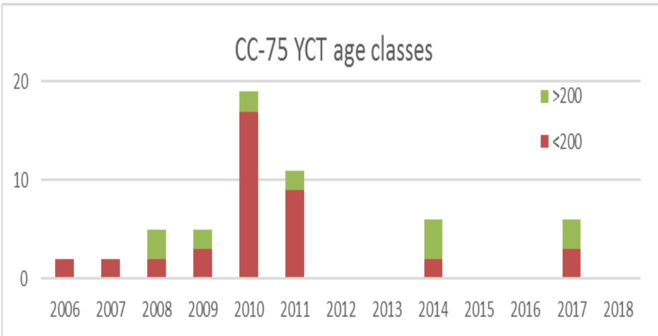
Metrics	Metric Scoring Formulas	LS				LSS				
		2010	2011	2014	2017	2009	2010	2011	2014	2017
Total Taxa	100*(Total Taxa)/95th	62	54	59	43	49	70	59	89	49
Ephemeroptera Taxa	100*(Ephemeroptera Taxa)/95th	60	60	70	60	40	60	60	70	50
Plecoptera Taxa	100*(Plecoptera Taxa)/95th	38	25	38	25	25	38	38	38	25
Trichoptera Taxa	100*(Trichoptera Taxa)/95th	33	67	33	22	56	56	67	100	56
Percent Plecoptera	100*(%Plecoptera)/95th	82	22	55	74	18	33	18	20	63
Hilsenhoff Biotic Index (HBI)	100*(10 - HBI)/(10 - 5th)	76	74	76	74	85	100	100	100	100
Percent 5 Dominant Taxa	100*(100 -%5dom)/(100 - 5th)	35	31	37	27	25	45	23	35	53
Scraper Taxa	100*(Scraper Taxa)/95th	38	63	75	38	38	75	63	100	63
Clinger Taxa	100*(Clinger Taxa)/95th	58	63	74	53	53	84	79	100	53
SMI Score		**54**	**51**	**57**	**46**	**43**	**62**	**56**	**72**	**57**
Condition Rating		**2**	**2**	**2**	**1**	**1**	**3**	**2**	**3**	**2**

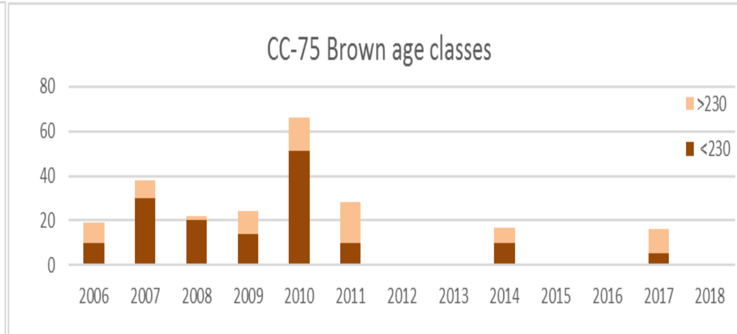
NM - Not Measured

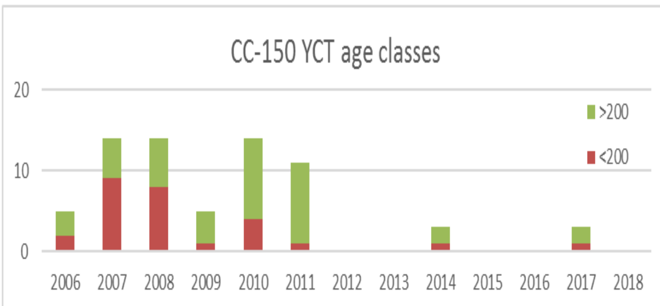
SMI Bioregion Scoring Thresholds: Central and Southern Mountains

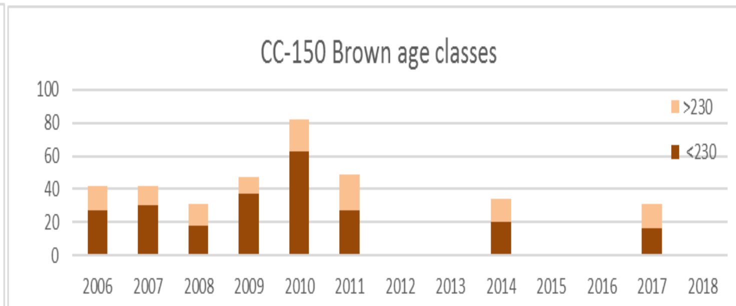
	Score	Condition Rating
Above the 25th percentile of reference	≥59	3
10th to 25th percentile of reference	51-58	2
Minimum to 10th percentile of reference	33 -50	1
Below minimum of reference condition	<33	Minimum threshold (Min)

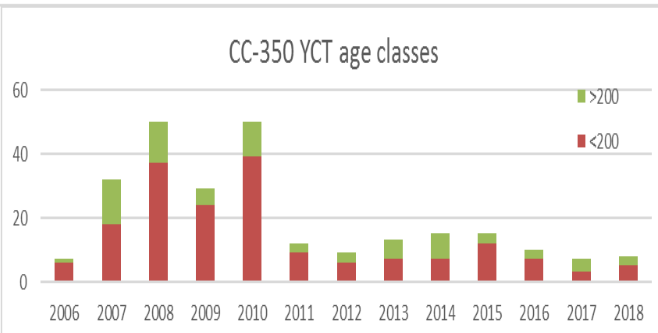
Attachment 4
Brown Trout and YCT age class frequency at Multiple Locations
(X- axis is count of size class, Y axis is Year)

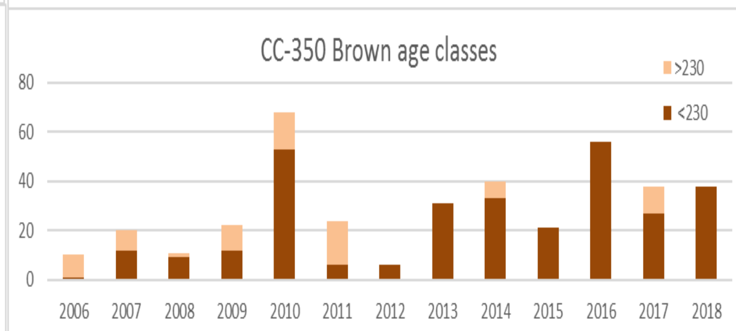


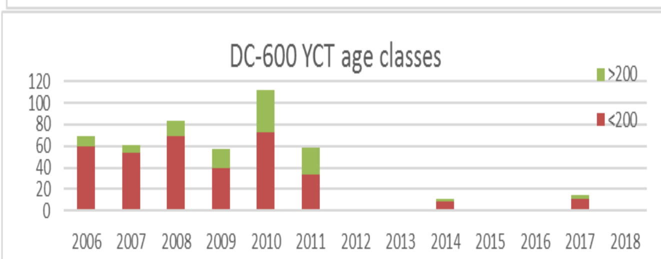




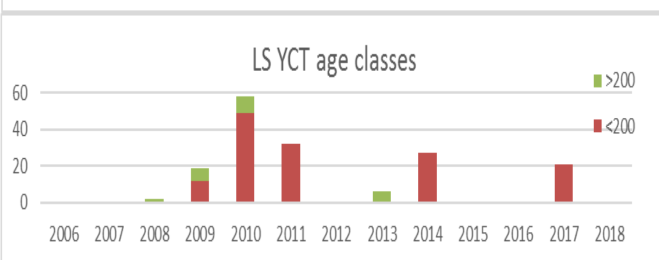


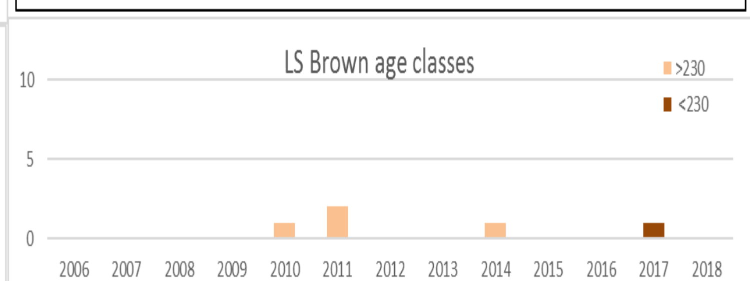


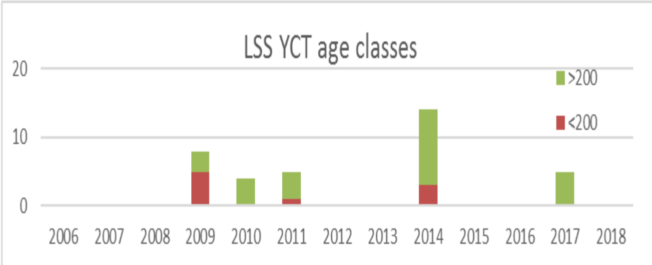


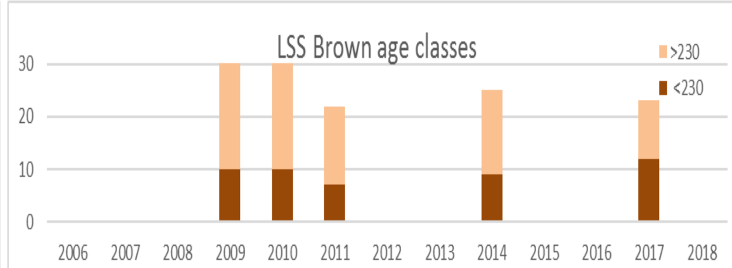


NO BROWN TROUT IN DEER CREEK






LSS YCT age classes
>200
<200
20
10
0
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018


LSS Brown age classes
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<230
30
20
10
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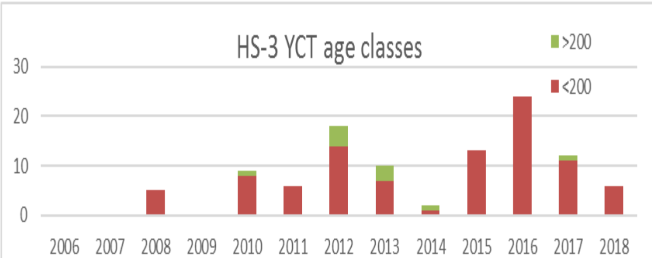
2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018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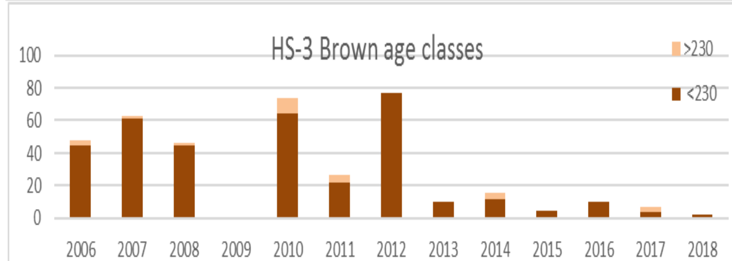
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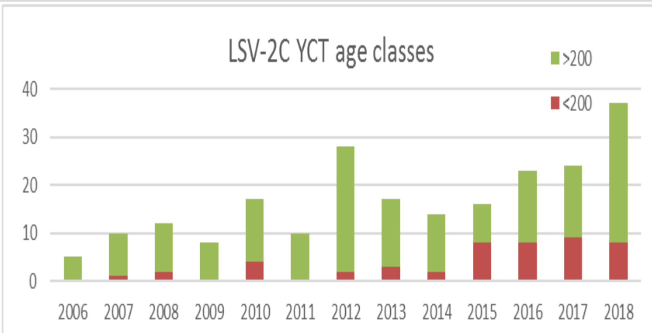
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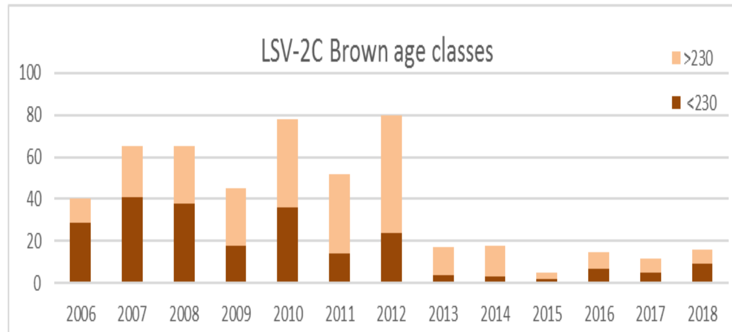
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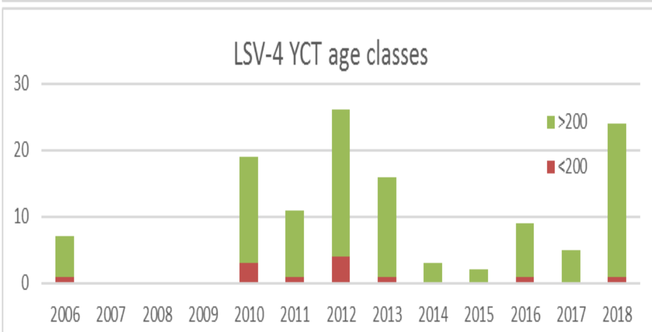
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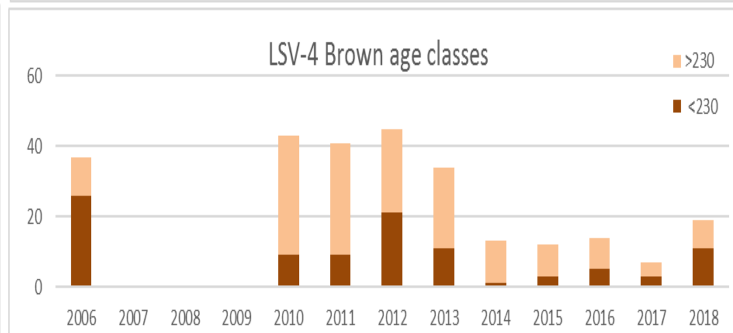
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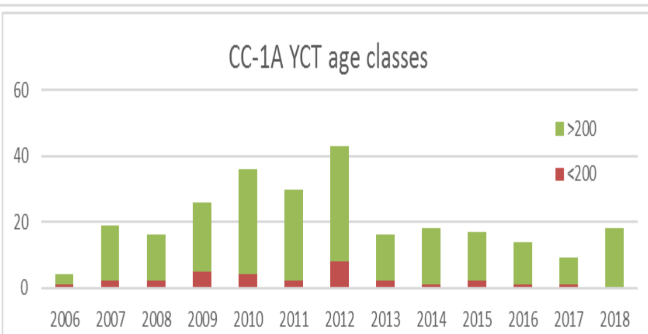
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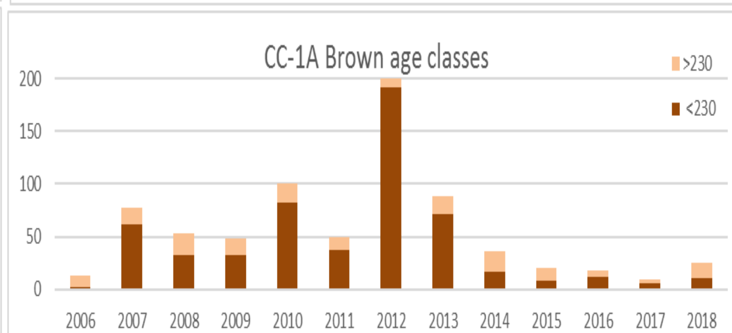
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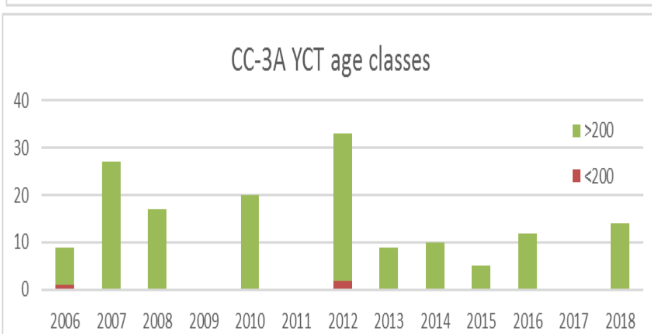
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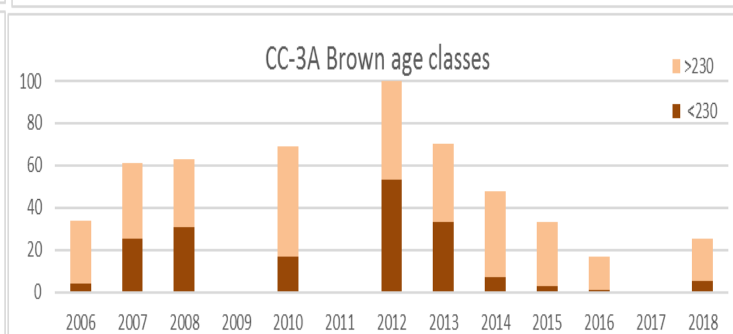
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Idaho Department of Environmental Quality • Idaho Department of Lands
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