Appendix 4B

Yellowstone Cutthroat Trout Biological Evaluation

YELLOWSTONE CUTTHROAT TROUT
BIOLOGICAL EVALUATION

FOR THE

PREFERRED ALTERNATIVE
OF THE
Smoky Canyon Mine Expansion
Montpelier Ranger District
CARIBOU-TARGHEE NATIONAL FOREST

BIOLOGICAL EVALUATION
SUMMARY OF CONCLUSION OF EFFECTS
for the
SELECTED ALTERNATIVE
upon YELLOWSTONE CUTTHROAT TROUT

Species	No Impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Loss Of Viability To The Population Or Species	Will Impact Individuals Or Habitat With A Consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss of Viability To The Population Or Species	Beneficial Impact
Yellowstone Cutthroat		X		

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Purpose of Biological Evaluations

The Forest Service prepares biological evaluations as part of the National Environmental Policy Act (NEPA) process to review programs and activities to determine their potential effect upon Sensitive species. Each Regional Forester maintains a list of Sensitive species for their respective region. Yellowstone cutthroat trout are listed as Sensitive on the Intermountain Region list. The Forest Service Manual (FSM) (FSM 2670.32) requires the Forest to prepare a biological evaluation to determine effects and to avoid or minimize project effects upon the species.

The objectives of a biological evaluation are to ensure Forest Service actions do not contribute to the loss of viability of any native or desired non-native plant or animal species or trends toward Federal listing of any species, and to provide a process and standard by which to ensure that Sensitive species receive full consideration in the decision-making process. Biological evaluations include identification of Sensitive species, description of habitat, analysis of effects, cumulative effects, determination of effects, and mitigations (FSM 2672.42).

Smoky Canyon Mine Expansion (Panels F and G) Project

The J.R. Simplot Company has proposed an extension of its Smoky Canyon open pit phosphate mine. The following briefly describes the selected agency preferred alternative. For more description of the selected alternative, refer to the FEIS. The agency preferred alternative action plan for mining will be implemented, including the North and South Lease modifications. A total of approximately 1,165 acres would be directly disturbed by mining. Power lines for the new mining panels will be located along the haul/access road corridors. The proposed Panel F Haul/Access Road and the Panel G West Haul/Access road would be used to transport personnel and materials into the panels and for hauling phosphate ore from panels to the existing Smoky Canyon mill and would disturb 16 acres of Aquatic Influence Zone. Any seleniferous waste, stored external or internal to the pit will have a cover system consisting of at least two feet of chert, three feet of clay-like Dinwoody material, and 1 to 2 feet of topsoil, to decrease infiltration. Under the selected alternative, approximately 20,200 feet of intermittent stream, 67 acres of Aquatic Influence Zone, and 3 acres of wetland would be disturbed by mining and the transportation system.

SPECIES: Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*)

BACKGROUND

U.S. Fish and Wildlife Service was petitioned to list Yellowstone cutthroat trout in August 1998. In February 2001, the agency finalized their finding on the petition to list Yellowstone cutthroat trout. They indicated the petition did not provide substantial information to indicate listing was warranted. In December 2004, a federal judge in Colorado ruled that the US Fish and Wildlife Service was arbitrary and capricious in its 90-day review and overturned their finding, ordering the agency

to conduct a 12-month status review. In February 2006, the US Fish and Wildlife Service responded with a "not warranted for listing" determination. A lawsuit from the petitioners is expected. Yellowstone cutthroat trout currently retains its status as a Sensitive species on the Regional Foresters Sensitive Species List.

The Caribou-Targhee National Forest is currently addressing the needs of Yellowstone cutthroat trout by maintaining consistency with their Forest Plans. Within the range of Yellowstone cutthroat trout, Forest activities are guided by the Revised Targhee Forest Plan (Targhee portion of the Forest) and the Revised Caribou Forest Plan (Caribou portion of the Forest).

Intensive surveys for Yellowstone cutthroat trout distribution have been conducted on the Caribou-Targhee National Forest since 1997. The subspecies appear to be distributed throughout most of the Forest, but populations in various streams or stream segments vary in strength. While some populations are threatened by competition and hybridizing with nonnative species, others appear to be doing well. Some populations have been replaced by introduced nonnative fish species. Genetic interactions between existing Yellowstone cutthroat trout populations have diminished from historic conditions because of a decrease in connectivity.

BIOLOGY

Within Idaho, the original cutthroat trout native to the Snake River system may have been the Yellowstone cutthroat trout. It is believed they were replaced by rainbow trout and other subspecies of cutthroat trout in drainages downstream of Shoshone Falls. Shoshone Falls isolated cutthroat trout from contact with rainbow trout and the Yellowstone subspecies remains the native trout in the upper Snake River basin. Yellowstone cutthroat trout are adapted to cold water. Water temperatures between 4.5 and 15.5 C appear to be optimum for the subspecies. This subspecies migrates for spawning when threshold water temperatures approach 5 C (optimum 10 C) and stream flows subside from spring peaks. Streams selected for spawning are commonly low gradient (up to 3%), perennial streams, with groundwater and snow fed water sources. Use of intermittent streams for spawning is not well documented, but has been noted in some intermittent tributaries to Yellowstone Lake. Spawning occurs wherever optimum size gravel (12-85 mm in diameter) and optimum water temperatures (5.5-15.5 C) are found. Depending on variations in growth, spawning populations are comprised of individuals age-3 and older (primarily ages 4-7). Juveniles congregate in shallow, slow-moving parts of the stream.

DISTRIBUTION AND HABITAT CONDITION

The project is proposed for tributaries within the Salt River Drainage of Eastern Idaho and Western Wyoming. The Salt River and most of its tributaries support populations of Yellowstone cutthroat trout. Both fine-spotted and large-spotted varieties of Yellowstone cutthroat trout occur within the Salt River Drainage, although the majority of the cutthroat trout are fine-spotted. Three cutthroat trout life history patterns exist in the area; resident (spending their entire lives in one stream reach), fluvial (migrating into smaller streams to spawn and returning to larger water for

most of the year), and adfluvial (spending most of their lives in Palisades Reservoir and migrating upstream to spawn in smaller streams).

The Yellowstone cutthroat trout that occur within the Salt River Drainage are part of a metapopulation referred to in the Caribou Revised Forest Plan as the Palisades/Salt Metapopulation. In addition to the populations within the Salt River System, the metapopulation includes those streams that flow into Palisades Reservoir and populations in the Upper Snake and Greys rivers. This area is in the heart of the stronghold populations of Yellowstone cutthroat trout throughout their range.

The Palisades/Salt Yellowstone Cutthroat Trout Metapopulation, is comprised of 40 sixth code Hydrologic Unit Code (HUC) areas on the Forest (not counting those in HUCs in the upper Snake and Salt rivers in Wyoming). Of those on the Forest, 3 HUCs are considered to have depressed YCT populations and 2 HUCs have populations that are extirpated (due to upstream passage problems and brook trout introductions). Considering the large geographic range of the metapopulation that includes the Salt and upper Snake rivers, Palisades Reservoir, and all of their associated tributaries, and considering 35 of the 40 HUCs on the Forest are considered by the Forest as Yellowstone cutthroat trout stronghold streams, the Palisades/Salt Yellowstone Cutthroat Trout Metapopulation is robust and resilient.

The immediate project area includes tributaries to Crow Creek, including Wells Canyon, Nate Canyon, Deer, Manning, and Sage creeks. Wells Canyon, Nate Canyon, and Manning creeks were fishless due to lack of flow when sampled, although some portions may provide refuge to Yellowstone cutthroat trout from high flows in the spring. Salmonid communities were dominated by Yellowstone cutthroat trout in Deer and Sage creeks.

Yellowstone cutthroat trout populations in the project area are primarily residents. They may be somewhat isolated from other populations due to numerous migration barriers between them and the larger drainages, such as Crow Creek, Salt River, and Snake River. This isolation makes these populations more susceptible to stochastic events, less resilient, and decreases the potential for their long term viability.

Deer and North Fork Deer Creek were sampled by the Forest (Berg 2003) and Yellowstone cutthroat trout population densities were 175-200 fish per mile. Non-native brook trout were documented in low numbers in the headwaters of Deer Creek in 2003 (Maxim 2004). Although some livestock impacts to riparian vegetation were reported, bank instability caused by livestock was not documented. Both streams had good willow complexes, active beaver dams, areas with good gravel substrate for fish spawning, good cover, and cool water temperatures (Berg 2003). Issak and Hubert (2001) described Deer Creek as being in good shape, with limited road access to the stream.

Isaak and Hubert (2001) described Sage Creek on the Forest as small and unproductive. The stream was described as being more productive on private land below the Forest, where agricultural practices affected water quality. The salmonid community primarily consisted of brown trout in the lower watershed and cutthroat trout in the upper watershed.

Isaak and Hubert (2001) discussed management issues confronting Yellowstone cutthroat trout in the Salt River. They included nonnative salmonids such as brown, brook, and rainbow trout, habitat fragmentation from agricultural and municipal developments, whirling disease, and land use that included grazing, roads, and fire suppression.

The economic value of Yellowstone cutthroat trout in Southeast Idaho and Western Wyoming is considerable. Moore et al. (2003) determined that, in 2003, anglers spent $77.5 million in the upper Snake River Region and $15.9 million in the Southeast Idaho Region of Idaho Department of Fish and Game. The study did not include economic benefits to Western Wyoming from fishing. Loomis (2005) estimated that fishing in the upper Snake within Wyoming generates $5.5 million in jobs and income.

Loomis (2005) determined that approximately 50% of the anglers that used the South Fork Snake River (in Idaho) specifically targeted Yellowstone cutthroat trout. This rose to nearly 100% of anglers on the Flat Creek tributary to the Snake River in Jackson Hole.

COMPLIANCE WITH FOREST STANDARDS AND GUIDELINES

The following Revised Caribou Forest Plan standards and guidelines are applicable to the mine expansion project as it relates to Yellowstone cutthroat trout and their habitat. Following each standard or guideline, a brief paragraph describes current project plan compliance.

Prescription 2.8.3: Aquatic Influence Zones

Minerals/Geology Guidelines

- Locate new structures, support facilities, and roads outside AIZs. Where no alternative to inside AIZs exists, locate and construct in ways to 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.

  Compliancy: This project is consistent with the intent of this guideline. No structures or support facilities (other than powerlines) will be constructed within AIZs. Efforts have been made to minimize impacts to AIZs. Direct impacts would be approximately 16 acres. The Panel F Haul/Access Road will cross one intermittent stream. The West Haul/Access Road would cross 7 streams. Two of them would be perennial (Deer and South Fork Deer creeks). Other alternatives with less perennial crossings were analyzed and considered.

- Do not locate debris, mine overburden, excess material, leaching pads, and other facilities within AIZs, unless other alternatives are not 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.

Compliancy: The project is consistent with this guideline. No material will be stored within AIZs and safeguards will be implemented. However, segments of AIZs will be removed by the mine. Hazardous materials are not expected to enter streams directly. Selenium may enter groundwater but has been modeled to be low in concentration and is not expected to exceed water quality standards.

General Riparian Area Management Standard

- Within legal authorities, ensure that new proposed management activities within watersheds containing 303(d) listed waterbodies improve or maintain overall progress toward beneficial use attainment for pollutants which led to listing.

  Compliancy: Models used during the preparation of the EIS indicate selenium concentrations in streams within the project area will increase. Peak concentrations from the development of Panels F and G are expected to release approximately half of the EPA criteria for surface water within 80 to 100 years. In addition, the implemented and anticipated CERCLA related remediation activities on the older, inactive portions of the Smoky Canyon Mine are expected to further decrease the selenium loads downstream of the mine in Sage Creek and Crow Creek, downstream of the mouth of Sage Creek. Progress toward meeting beneficial use is expected to be maintained.

General Riparian Area Management Guidelines

- Felled trees should remain on site when needed to meet woody debris objectives and desired AIZ attributes.

  Compliancy: It is recommended that riparian trees that require felling for road and powerline construction be left whole in the riparian area and/or stream to meet the intent of this guideline, when possible. Felled trees left on site may benefit riparian areas and streams as large wood.

Fisheries Guidelines

- Where feasible, restore connectedness of disjunct populations and enhance fish passage for native fish.

  Compliancy: Mitigation measures help address this need. Restoring and maintaining Yellowstone cutthroat trout migratory life history patterns within stream populations in the project area will further ensure the long term viability of these populations.

Road and Trails Standard

- All new and replaced culverts, both permanent and temporary, shall be designed and installed to meet desired conditions for riparian and aquatic species.

  Compliancy: All culverts will be designed with capacity for 100-year flood event flows. Fish passage will be facilitated at all new crossings where needed.

Road and Trails Guidelines

- Avoid constructing roads within the AIZ unless there is no practical alternative.

  Compliancy: Direct road impacts to AIZs have been kept as minimal as possible at approximately 16 acres. The Panel F Haul/Access Road will cross one intermittent stream. It meets the intent of this guideline. The West Haul/Access Road would cross 7 stream channels. Two of them would be perennial (Deer and South Fork Deer creeks). These crossings would require culverts that are 280 and 260 feet in length, respectively. Impacts to Deer Creek are expected from the construction, maintenance, and use of this road, including sedimentation, but no other practical alternative existed.

- Culverts (permanent and temporary) should be sized so that the probability of flow exceedance is fifty percent or less during the time the culvert is expected to be in place. Consider bedload and debris when sizing culverts.

  Compliancy: Crossings will be consistent with this guideline.

- When feasible, use bridges, arches, and open-bottom culverts in fish-bearing streams.

  Compliancy: The proposed roads would have 2 perennial stream crossing. Engineers have determined it is not feasible to use a bridge at these sites due to expense. The crossing would need to be wide enough and bear enough weight to support 2 passing mine haul trucks. Two culverts (280 feet length at the Deer Creek crossing and 260 feet length at the South Fork Deek crossing) are proposed. The culverts will be pre-fit with weirs to facilitate fish passage.

- Avoid placing ditch relief culverts where they may discharge onto erodible slopes or directly into streams.

Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure.

- New or reconstructed roads and trails should cross the AIZ riparian areas as perpendicular as possible.

  Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure.

- Avoid making channel changes on streams or drainages.

  Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure. However, some stream channels will be removed during project implementation. Mitigation measures help address this habitat loss and reclamation will occur after mining.

- 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.

  Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure.

- Road drainage patterns should avoid disruption of natural hydrologic flow paths.

  Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure.

Prescription Area 8.2.2(g): Phosphate Mine Areas

Soil and Water Standards

- Baseline, concurrent and/or post-mining water quality and aquatic habitat monitoring (both surface and groundwater) that provide a statistically valid characterization shall occur at all phosphate mine sites (where the reclamation bond has not been released) as described in an approved monitoring plan.

  Compliancy: The monitoring prescribed in this document is consistent with this standard.

DIRECT/INDIRECT EFFECTS

Watershed disturbances

The Agency Preferred Alternative would directly disturb approximately 20,200 feet of intermittent drainage channel, and 67 acres of AIZ within the project area. Also, approximately 3 acres of wetland will be disturbed through the mining of both panels and providing for transportation. These disturbances will occur in phases through the duration of the project. Not all disturbances will happen simultaneously. It is expected that, as the watershed drainage is reduced due to mining, stream flows will be reduced. These flow reductions will be slight and are not expected to noticeably contribute to channel morphology changes (DEIS Section 4.3.2.1). Once reclamation has been successfully completed, the mining area would again provide drainage in the watershed area, contributing to the runoff of streams. The effects of the project on estimated runoff are considered to be minor, local, and have a duration limited to the mining and reclamation periods (DEIS Section 4.3.2). Runoff decreases as a result of this project are not expected to affect Yellowstone cutthroat trout or their habitat.

Intermittent channels play an important role in the functioning of the watershed, including influencing Yellowstone cutthroat trout habitat (refer to The Value of Intermittent Streams to Yellowstone Cutthroat Trout, located below). The elimination of approximately 19,520 feet of intermittent channel during the mine project is expected to decrease the quantity of high flow refuge fish habitat, decrease nutrient delivery downstream, decrease water storage and regulated release, and decrease sediment storage capabilities. Slight to moderate impacts (dependent on proximity to the disturbance and length of intermittent stream removed) to Yellowstone cutthroat trout are expected through the duration of the project and will likely end upon completion of reclamation.

Sediment settling basins have been incorporated into the project plans to accommodate 100-year precipitation events plus flows from snowmelt. The capacity of these settling basins may accommodate associated project sedimentation, after the sedimentation from their initial basin construction. The sediment load is estimated to be 0.8% of normal bedload (9 tons/year). There is a potential for sediment delivery from near the pond outlet or if the dam fails. In the event of a dam failure, sediment eroded from the structure and pond bed would mobilize downstream and deposit primarily in low energy stream reaches. If delivered downstream, this sediment will likely reach Yellowstone cutthroat trout habitat, increasing the concentration of fine sediment in the stream substrate. This could potentially affect spawning and early rearing for Yellowstone cutthroat trout downstream of the failure.

Selenium Concentrations

Modeling used during the EIS process indicated that the implementation of this project would slightly increase selenium concentrations in water at Sage, Deer, and Crow creeks. This adds to current seasonal exceedances in selenium regulatory criteria within Sage Creek due to Smoky Canyon Mine. An ongoing CERCLA action is expected to reduce selenium concentrations and correct selenium exceedances in Sage Creek, before peak impacts are generated by the mine expansion. Storage of

seleniferous waste external or internal to the pit will have a cover system over it consisting of at least 2 feet of chert, 3 feet of clay-like Dinwoody material, and 1 to 2 feet of topsoil to decrease infiltration and increase surface runoff. Mine runoff would be caught by settling ponds, further decreasing selenium concentration in waters prior to delivery to fish-bearing streams below. These measures are expected to decrease mobilization of selenium from the mine site into downstream aquatic ecosystems. Modeling indicates compliance with the State of Idaho standard for selenium concentrations in surface water in lower Sage Creek with these protective measures in place and the CERCLA action successfully completed.

Most definitive research on selenium impacts to fish has occurred with warm water fish species. Selenium research with salmonids indicates they are susceptible to selenium impacts, although their tolerances to high selenium concentrations may differ from warm water fish. In general, selenium has the potential to affect Yellowstone cutthroat trout through birth deformities and, in extreme cases, toxicity. However, in streams with currently elevated selenium concentrations within the project area, no Yellowstone cutthroat trout deformities have currently been documented, even though high selenium concentrations have been documented in some fish tissue samples. Deformities may occur early in life stages (between egg and fry) within the stream and may not be readily detected prior to egg/alevin/fry mortality. Population level impacts may be masked by fish immigration. The degree to which increases in selenium concentrations within project area streams affects Yellowstone cutthroat trout is a complex issue that is dependent upon several physical factors (such as stream channel/habitat type, stream substrate, water sources, degree of connectivity, and climate) and biological factors (such as fish species, life history, sex, size, age, food, and general susceptibility to selenium).

An additional layer of complexity is associated with the use of models to predict selenium concentrations in project area groundwater and streams. All models are dependent upon certain assumptions that may limit their accuracy. Considering the complexity and difficulty involved in predicting selenium concentrations resulting from the implementation of the project, the use of models is an appropriate approach, but awareness should be exercised when using model outputs. Input and assumptions made in developing the models associated with this project were intended to be conservative, attempting to protect against underestimating selenium concentration outputs. Those who utilize models are routinely cognizant of potential limitations due to model assumptions.

Considering the complexity involved in determining bioaccumulation in Yellowstone cutthroat trout and the potential uncertainty in the use of models to predict stream selenium concentrations, it is difficult to quantify impacts to Yellowstone cutthroat trout as a result of this project. However, using two feet of chert, three feet of clay-like Dinwoody material to decrease infiltration, and one to two feet of topsoil to decrease infiltration through seleniferous materials and completion of the CERCLA project in Pole Canyon has the potential to result in low selenium concentrations in most streams within and downstream of the project area. In addition, the mitigation and monitoring measures help address these uncertainties. Mitigation measures improve habitat and increase migratory fish access to the project area. Intensive monitoring for selenium will continue beyond reclamation.

Considering this, impacts to Yellowstone cutthroat trout from selenium accumulation, if they occurred, would likely be short to long-term, site-specific, and minor to moderate, depending on the level of accumulation. Yellowstone cutthroat trout that exhibit a resident life history pattern would have more of a potential to be affected by an increase in selenium concentrations within project area streams because they tend to remain within a limited reach of the stream in the project area. They are exposed to the water with elevated levels of selenium throughout their life. Migratory life history fish would be less susceptible to selenium impacts because of less exposure over time.

Powerline along haul/access roads

The proposed powerline right-of-way is 28 acres, along the access roads. The DEIS (page 2-45) states the powerline will be constructed within the existing disturbance area of the roads, so no additional disturbance or impacts to Yellowstone cutthroat trout and their habitat is expected. It is recommended that if riparian trees must be felled for the powerline/road right-of-way, they be felled and left in riparian areas or streams whenever possible to provide large wood, an important staple for riparian and stream habitat.

Haul/Access Roads

Haul roads have the potential to affect Yellowstone cutthroat trout habitat through changes in hydrology, frequency of large wood, and sedimentation. The potential and effect of each of these parameters are discussed below.

Peak flows can change due to an increase in drainage density with ditches and cross-drains, and road crossings can affect fish passage and hydrology, particularly if the crossing is undersized or placed improperly. These concerns are addressed through minimizing the amount of hydrologically connected road as much as possible and designing road crossings that facilitate the passage of fish and have a 100-year flood event capacity.

Road right-of-ways that encroach upon Aquatic Influence Zones and streams (both perennial and intermittent) have the potential to affect aquatic and riparian habitat through the clearing of vegetation, including trees. Trees have the potential to provide large wood to streams and riparian areas, benefiting them by scouring pools, providing complexity and cover, sorting gravels, providing nutrients, and providing shade. The impact of cutting trees within AIZs is at least partially addressed by minimizing the location of roads and powerlines within them and through the recommendation to leave all AIZ trees that have been felled for the road/powerline on the ground within the AIZ and stream whenever possible.

Sediment from road surfaces and fill will likely be delivered to nearby streams through runoff and aerially from road dust. These inputs will likely be decreased through road design and proper maintenance. Sediment-related impacts to Yellowstone cutthroat trout from road construction are estimated to be short-term, site-specific, and minor to moderate, depending on the degree of sedimentation. Sediment-related impacts to Yellowstone cutthroat trout from road use and

maintenance are estimated to be through the existence of the road (approximately 16 years plus time required for road removal and restoration), site-specific, and minor to moderate. Sedimentation can affect Yellowstone cutthroat trout through embedding gravels used for reproduction and filling interstitial spaces otherwise used by juvenile trout for cover.

There is a potential for selenium release into aquatic ecosystems where road cuts are created across Meade Peak Shale outcrops. If this occurs, the impacts are expected to be minor, site-specific, and short term because full, end-bench haul construction methods would ensure that all of the selenium-bearing material will be removed and safely stored in capped piles.

Road crossings are one of the most likely locations where road fill and surface material will enter streams. There are 6 intermittent and 2 perennial road crossings of streams proposed in this project. Although this sediment input will likely occur at its peak during road crossing construction (impacts will likely be moderate and short-term), continual input of fine sediment (at lower levels) from road surfaces and fill are expected to occur through the existence of the road. Potential sedimentation associated with road crossing construction is expected to be reduced because construction is required to occur during low flow periods and standard sediment control measures will be implemented. The better the road surface and the more it is maintained, the less sediment delivery is expected through the life of the road.

The Panel F Haul/Access Road would disturb 67 acres within the Sage Creek basin, with less than 1 acre within AIZs. None of the proposed road would cross Meade Peak Shale outcrops. There would be one stream channel crossing associated with this road, an intermittent channel. New direct disturbances resulting from construction of the Panel F Haul/Access Road would total approximately 230 feet of intermittent drainage channel and 0.7 acre of AIZs in the South Fork Sage Creek drainage. Expected sedimentation increases are estimated to constitute less than 0.5 tons of sediment are expected to be generated by this haul road per year.

New direct disturbances to streams resulting from the West Haul/Access Road would include approximately 450 feet of intermittent channel disturbance, approximately 475 feet of perennial stream channel disturbance, and approximately 15 acres of AIZ disturbance. Approximately 8.5 tons of sediment are expected to be generated by this haul road per year. This access road would cross 7 stream channels. Two of them would be perennial (Deer and South Fork Deer creeks). The 475 feet of perennial stream disturbance will be in the form of culverts and road fill placed in the stream channels. Fish passage will be provided at the 2 perennial stream crossings with appropriately sized culverts (sized to account for bankfull width and 100 year flood events) that are either pre-fit with weirs to form pools or low relief baffles to retain appropriately sized stream substrate that is installed in the pipe during culvert placement. Culverts pre-fit with weirs do not account for the upstream passage needs of less mobile biota such as amphibians and macroinvertebrates, while the simulated stream bottom provided by stream substrate retained by low-relief baffles provide upstream passage for all aquatic life forms.

The mining project and the use of the roads for mine-related haul will end approximately 16 years after the initiation of the project. Upon completion of the mine project, the Panel F haul road and portions of the West haul road will be reclaimed. The crossing structures and associated fill will be removed from Deer and South Fork Deer creek. These actions are expected to benefit Yellowstone cutthroat trout by decreasing road-related sedimentation (after approximately 16 years) and facilitating the passage of other stream biota (if culverts pre-fit with weirs are used) such as aquatic macroinvertebrates that may provide forage for cutthroat trout.

The Value of Intermittent Streams to Yellowstone Cutthroat Trout

A total of 20,200 feet of intermittent stream are estimated to be directly impacted by the mine project. Of those, 680 feet of intermittent stream are estimated to be impacted by access roads. The value of these intermittent streams within a watershed that is inhabited by Yellowstone cutthroat trout is similar to the value of fingers to a hand. The stream does not function as well without them. Intermittent streams can provide several benefits to trout. They provide refuge areas from high flows and potentially spawning habitat (Erman and Hawthorne 1976). They produce and deliver nutrients downstream in the form of invertebrates and organic matter (Newbold et al. 1982 and Wipfli and Gregovich 2002). Collectively, they provide natural flood control by storing significant amounts of precipitation, runoff, and snowmelt before flooding, and release it in a regulated fashion to help maintain flows later in the summer (Coes and Pool 2005). They trap excess sediment, moderating delivery downstream (Dieterich and Anderson 1998) (Gregory et al. 1991 and Vanote et al. 1980). The intermittent streams that are directly impacted by this project will not likely provide these benefits until they are reclaimed.

CUMULATIVE EFFECTS

This cumulative effects analysis will concentrate upon effects to Yellowstone cutthroat trout and their habitat. The analysis area for discussion of fisheries cumulative effects includes watersheds located in the project area on the Forest, extending downstream from the Forest where migratory life history forms of cutthroat trout spend part of their life in larger water bodies off Forest. This would include Sage and Deer creeks, Crow Creek, and the Salt River to Palisades Reservoir. Smaller, intermittent tributaries within the project area are also included because these may serve as refuge habitat for fish during high flow events.

The selected alternative is expected to impact Yellowstone cutthroat trout through the loss of 19,520 feet of intermittent stream and its associated 51 acres of aquatic influence zone through direct mine disturbances. In addition, access roads would cross 6 intermittent streams and 2 perennial streams with 680 feet of intermittent stream being disturbed. The project will add selenium to streams in the project area through leaching into groundwater but selenium was modeled to not exceed water quality standards when considered in combination with the effects of an ongoing CERCLA project in Pole Canyon. Large wood delivery to streams over time may decrease with the construction and maintenance of access roads/powerlines.

The loss of intermittent stream channel length is additive to length lost in the past from other construction activities in the cumulative effects analysis area from activities such as road building and housing development. It is likely these activities will continue in the future within the cumulative effects analysis area.

Sediment generated from project implementation will be additive to past, present, and future land management activities. When past, present, and future land management activities associated with this cumulative effects analysis area are considered, most either directly or indirectly contribute sediment to aquatic habitat. Some past activities that contributed sediment to streams include firewood collection, road and trail building/maintenance/use, grazing, timber harvest, mining, cross country motorized access, agriculture, housing developments, wildfires, and prescribed burns. These uses and impacts are presently occurring and are expected to continue in the future, although at different intensities and locations through time. While most of these actions do not individually contribute overwhelming amounts of sediment to streams, they collectively maintain a baseline of sediment delivery to streams within the project area that is greater than pre-management baselines. The increase in sedimentation from road construction/maintenance/use and mining will likely add to the current baseline.

Selenium concentrations are elevated in different locations within the cumulative effects analysis area. In some places, selenium concentrations are abnormally elevated in fish tissue and in other places, they are abnormally elevated in water samples. Although ongoing CERCLA activities may eventually offset selenium concentrations predicted from the proposed mining activity, the project would likely cumulatively add to existing concentrations.

Roads and powerlines proposed to be located in or near riparian areas have the potential to affect riparian vegetation (primarily associated with intermittent streams). This may occur in riparian areas where vegetation provides nutrients, shade, and large wood to streams. In the past and present, impacts to riparian vegetation occur in the cumulative effects analysis area through grazing, agriculture, housing developments, trails, and roads. The proposed roads/powerlines will add to these effects until the roads are fully reclaimed.

There are biological impacts to Yellowstone cutthroat trout in the project area that also need to be considered. Fish disease, competition with non-native fish, and harvest have been (and will be) additional stresses upon Yellowstone cutthroat trout populations in the project area.

Impacts from the proposed project will contribute to the cumulative effects upon Yellowstone cutthroat trout and their habitat when project impacts are considered in sum. These populations are considered more susceptible to these cumulative effects because of the degree of their isolation. Increasing habitat condition and connectivity in the project area may help address these concerns.

IRRETRIEVABLE AND IRREVERSIBLE EFFECTS

Irretrievable effects are those that can result in a loss of fish habitat or populations. A change in management activities has the potential to reverse this effect. A hypothetical example would be the improper placement of a culvert in a stream crossing that becomes a migration barrier to upstream-migrating fish. The culvert is producing the irretrievable effect of eliminating the genetic interchange between the fish upstream and downstream. Irretrievable effects can be reached from the intense use of a single Forest resource or several Forest resources affecting the same area. Over the long term, we would consider the expected slight contribution of selenium to Yellowstone cutthroat trout habitat from project implementation to be irretrievable in that they are expected to eventually (over 100 years) decrease. The proposed haul/access roads would disturb approximately 16 acres of AIZ, approximately 680 feet of intermittent stream channel, and approximately 475 feet of perennial stream. These expected impacts to aquatic and riparian habitat can be addressed through future management decisions to remove the roads and, with intensive management and time, re-establish the structure and function of the stream.

Irreversible effects are those that can result in a permanent loss of habitat or populations. Irreversible effects eliminate future management options. A hypothetical example of an irreversible effect is the loss of a fish population or metapopulation. No matter what management action is taken, we will never be able to reverse the loss of the diversity that made that particular population unique. The development of Panels F and G (actual pit excavation) will directly remove intermittent stream channels. Those stream channels impacted by direct excavation may result in irreversible effects because, even if reclaimed, they may not achieve the structure and function of the original streams, resulting in an irreversible effect.

DETERMINATION OF EFFECTS

The Smoky Canyon Mine Expansion Project May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Loss Of Viability To The Population Or Species. This is due to habitat loss, expected sedimentation, and riparian impacts. The determination also accounts for any uncertainty associated with the models used to predict selenium delivery and concentrations. The mitigation measures (below) may eventually mitigate for expected sediment generation associated with the project, when considered over the long term. The mitigation that improves fish passage at two culverts may help address any uncertainties associated with the selenium issue by improving connectivity (read mitigation section below). Remaining uncertainty will be addressed by a sound selenium monitoring plan included in the monitoring section below. The loss of 1 acre of wetland within the footprint of the mine will likely be mitigated for by creation of new wetlands. The loss of 19,520 feet of intermittent stream and 51 acres of associated aquatic influence zone within the footprint of the mine will not be immediately mitigated for. These areas will be reclaimed after mining and may eventually regain structure and function, but not likely the same ecologically as what occurred prior to the mine. Proposed mitigation measures will decrease risk associated with this project and further insure the long term viability of Yellowstone cutthroat trout in the project area.

REQUIRED MITIGATION MEASURES

Authority for requiring mitigation comes from the National Environmental Policy Act (NEPA), the National Forest Management Act (NFMA), the Forest Service Manual (FSM), the Revised Caribou Forest Plan, and the Interagency Yellowstone Cutthroat Trout Memorandum of Agreement. NEPA 1502.14(f) and 1502.16(h) requires the inclusion of appropriate mitigation measures not already included in the proposed action or alternatives. NFMA (CFR 219.19(a)(1)) requires the prescription of mitigation measures for adverse effects upon fish and wildlife species where appropriate. NFMA also requires (CFR 219.27(a)(6)) the maintenance of viable native fish populations. FSM (FSM 2670.32) requires the Forest to prepare a biological evaluation to determine effects and to avoid or minimize project effects upon the species. The Interagency Yellowstone Cutthroat Trout Memorandum of Agreement, signed by the Regional Forester in 2000, established a cooperative, interagency goal to maintain and improve Yellowstone cutthroat trout populations and habitat.

Approximately 20,675 feet of stream channel will be directly disturbed by the proposed mine project. Sediment will be delivered to Yellowstone cutthroat trout habitat through the mining and road building/use/maintenance. In addition, the project is expected to add selenium to Yellowstone cutthroat trout habitat downstream, although CERCLA activities (intended to decrease selenium from Pole Canyon) are expected to counter this increase. Although road and mining BMPs will be incorporated into the project plans to decrease impacts, some fine sediment and selenium deliveries may occur.

Although selenium increases in project area streams are estimated to be slight as a result of they project, any remaining public concern over the predicted selenium increase in area streams can be addressed by increasing migratory Yellowstone cutthroat trout access to the stream. Resident life history pattern Yellowstone cutthroat trout are more susceptible to potential selenium impacts than migratory life history patterns because they spend their entire lives in one stream. The key to maintaining the long term viability of Yellowstone cutthroat trout populations in the project area is to increase their biodiversity through facilitating the access of migratory life history patterns. It is in the best interest of all parties involved in the project to increase Yellowstone cutthroat trout access to project area streams. This would be accomplished through working on the Forest to correct upstream passage barriers such as irrigation diversions and impassable culverts and by helping private landowners with the issue. The opportunities that are known to exist on the Forest will be included in required mitigation. Opportunities to accomplish this work downstream on private land must be accomplished with willing partners and landowners, but not associated with these mitigation measures.

There is value to treating some of these migration barriers through mitigation. By decreasing the number of barriers the fish encounter while migrating upstream, we increase the potential they reach their destination to spawn. In addition, we at least reconnect segments of streams and increase segment size. It is also important to consider that partnerships may be formed to treat the barriers that exist on private land, where there are willing landowners.

The following mitigation measures are required to help address the project impacts upon Yellowstone cutthroat trout and their habitat. It is in the interest of everyone involved in the project to maintain the long-term viability of Yellowstone cutthroat trout populations in the project area and protect and restore their habitat. The mitigations listed below help address some impacts associated with the mine expansion project. Mitigation measure #1 assists migratory Yellowstone cutthroat trout and other aquatic biota to access project area streams. Impassable culverts and irrigation diversions would need to be identified and treated downstream of the Forest to fully enable migratory fish access, but the included mitigation measure is a step to this goal. These culvert passage projects will successfully reconnect segmented populations, potentially increasing their vigor. Increasing the patch size of populations and increasing migratory fish access to the population increases biodiversity, an insurance policy to account for the uncertainty associated with the use of models to predict selenium concentrations, the lack of a fish tissue based selenium standard, and the uncertainty of how selenium affects local Yellowstone cutthroat trout populations. Migratory fish increase the vigor of local populations and can refound extirpated populations if necessary. All mitigation measures are intended to decrease erosion and sedimentation, helping to address the sedimentation associated with the proposed project implementation. By increasing habitat quality and connectivity, we increase the potential viability of project area Yellowstone cutthroat trout populations over the long-term. These mitigation measures were developed in cooperation with Idaho Department of Fish and Game.

1. This mitigation measure helps address concerns about mining project sedimentation and slight selenium increases (it has the potential, in coordination with other passage projects, to increase migratory life history Yellowstone cutthroat trout to the project area). During the summer of 2005, the Forest inventoried road crossings within the range of Yellowstone cutthroat trout. Culverts were identified as under-capacity and/or blocking the upstream migration of fish. Culverts that are under capacity cause unnecessary erosion and sedimentation. The culverts that are blocking fish isolate populations upstream, decreasing the potential they remain viable over the long term and impacting their population vigor. To reconnect some segmented populations of resident Yellowstone cutthroat trout and begin to facilitate access of migratory life history Yellowstone cutthroat trout into Deer Creek, J.R. Simplot Company will replace impassable culverts at the FS Road 102 and 111 crossings. The crossing at FS Road 102 will be replaced with an oversized culvert (to provide for the development and access to floodplains within the culvert) placed below grade (for a simulated stream substrate) or a bottomless arch. The crossing at FS Road 111 will be replaced with a structure to properly accommodate stream hydraulics and fish passage.

FS Road 102_1.03, FS Road 102 Crossing of Upper Deer Creek

FS Road 111_2.5, Crow Ck Road Crossing of Deer Creek

2. Decrease the impact of Smoky Canyon Road upon Smoky Canyon Creek by relocating an 8,000 feet segment and decreasing the width of another 2,000 feet by pulling it out of Smoky Canyon floodplain.

   This mitigation measure improves habitat quality in Smoky Canyon by decreasing sedimentation. The construction of Smoky Canyon Road encroached upon the Smoky Canyon Creek floodplain. The road is a sediment source to the stream. These impacts can be decreased by obliterating an 8,000 feet long section of the road and relocating it over the reclaimed C Panel. In addition, a remaining 2,000 feet long segment of the road will be improved by decreasing its width, excavating it away from the riparian area and restoring the floodplain integrity.

3. Address sediment concerns at FS Road 146 as it parallels South Fork Deer Creek to decrease road-related sedimentation. This includes improving drainage and relocating a road segment.

   FS Road 146 (near Trapper Cabin) encroaches upon the South Fork of Deer Creek, contributing sediment to the stream. This mitigation measure is intended to identify and reduce sedimentation from the road to the project area. Segments of this road that are sources of sediment can be treated through resurfacing, drainage improvements, narrowing away from the stream, and/or obliteration/relocation away from the stream. FS Road 146 will be re-routed to the Panel G access road from Trappers Cabin to Panel G. That segment of the

rerouted road will be reclaimed to a 20-foot surface. J.R. Simplot Company will be responsible for obliterating the portion of FS Road 146 that is no longer needed for access. Other mitigation measures can be accomplished with stewardship funding generated by the timber sale component of this project.

4. There is currently a muddy ford crossing of Wells Canyon Creek (0.1 mile upstream from the Forest boundary). This mitigation measure helps address sedimentation concerns in relation to the mine expansion project. This ford contributes sediment to the stream that affects the quality of Yellowstone cutthroat trout habitat downstream. J.R. Simplot Company will assist the Forest to replace that crossing with a bridge or a below-grade, oversized culvert (if appropriate) to accommodate truck and trailer traffic, decreasing the sediment contribution of that crossing to the stream. The widened stream channel at the ford will be narrowed to natural stream channel width during crossing construction.

5. Livestock will be excluded from approximately 1 mile of Crow Creek on Forest Land (T9S R46E S31) with the construction of a 4-strand barbed wire or buck-and-pole fence. This will occur in coordination with the Forest Service Montpelier Ranger District Range personnel. Within the mile, there is currently a 22-acre exclosure that needs minor repair and improvements. Offsite watering will be provided using Crow Creek water to deliver water to five troughs. This will include the construction of the exclosure and watering system. Simplot Company will be responsible for the maintenance of the fenceline for up to 10 years unless maintenance is assigned to the permittee prior to then. This mitigation measure helps address sedimentation concerns.

6. Sedimentation will be reduced on FS Road 102 from Trappers Cabin to the Diamond Creek Divide to benefit streams in the project area. Segments of this road that are sources of sediment can be treated through resurfacing, drainage improvements, narrowing away from drainages, and/or obliteration/relocation away from streams. Funding for this project will be secured by and the work will be implemented by the Forest.

MITIGATION MEASURES TO BE INCLUDED IN MINE EXPANSION PLAN

1. All trees within AIZs that require cutting within the right-of-way of the road/powerline will be felled and left whole on the ground within the AIZ. This will mitigate for the loss of large wood contribution to AIZs and streams when the powerline is constructed and maintained.

MONITORING

A project of this magnitude and complexity requires a solid monitoring program to ensure mining impacts do not exceed established standards and direction. In addition, The National Forest Management Act (36 CFR 219) and the National Environmental Policy Act (1505.2(c) and FR Vol. 57 No. 182 page 43212) require monitoring where applicable. The Caribou Forest Plan requires “Baseline, concurrent and/or post-mining water quality and aquatic habitat monitoring (both surface and groundwater)

that provide a statistically valid characterization shall occur at all phosphate mine sites (where the reclamation bond has not been released) as described in an approved monitoring plan."

Monitoring was designed to validate the assumptions made during infiltration and transport modeling and attempt to address some uncertainties associated with the complexity of the selenium issue. The effectiveness of the protection measures within the mining plan and the project mitigation measures will be monitored through fish population surveys, aquatic habitat surveys, and selenium concentration inventories. All monitoring reports are due two weeks before the spring Annual Operations Meeting. These monitoring measures were developed in cooperation with Idaho Department of Fish and Game (IDFG).

1. Fish Populations. J.R. Simplot Company will fund fish population monitoring in key units within the Crow Creek watershed. This population monitoring will generally occur every three years for 50 years. After 21 years, IDFG and Forest Service (USFS) Fisheries Biologists will determine if there is a need to change the frequency of monitoring or continue with every three years. Every three year sampling is helpful at least initially to account for natural fluctuations in trout populations in mountain streams. Less frequent sampling does not provide enough resolution in population trends to accurately make population effects determinations. After 30 years, IDFG and USFS Fisheries Biologists will again review the population monitoring effort and determine if adjustments to the sampling schedule or strategy are necessary. If adjustments are not unanimously agreed upon, sampling will continue as is until year 50. If fish population data do not indicate long term negative trends after 50 years of monitoring, the agencies will determine the need to continue the surveys for an additional 50 years. If there is a long term negative trend detected in the project site streams by year 50, the survey will continue for an additional 50 years as necessary. Any determination to change monitoring frequency must be approved by the Forest Supervisor and BLM District Manager.

Fish population monitoring will occur during low flow. Fish population monitoring will occur in **Crow Creek** (sampling sites CC-150, CC-350, CC-1A), **Spring Creek** (Three sampling sites to be determined by J.R. Simplot Company. They should be similar as possible to conditions that exist at the Crow Creek sites.), **Beaver Dam Creek** (Three sampling sites to be determined by J.R. Simplot Company, located in the lower, middle, and upper sections of the stream. If there is not enough available habitat in this stream, sampling sites can be decreased to two), **Sage Creek** (LSV-4, LSV-2C, LS), **South Fork Sage Creek** (LSS and one more site as far upstream of there as possible), **Deer Creek** (DC-100, DC-200, DC-600), **North Fork Deer Creek** (NFDC-700, NFDC-200), and **South Fork Deer Creek** (SFDC-100).

A backpack electroshocker and at least 2 netters will be used to sample each 100 meter unit utilizing a 3-pass method. Surveyors will request sampling permits and coordinate their efforts with IDFG (and Wyoming Game and Fish when surveying in Wyoming-WGF). The fish population data will be entered into a database provided by IDFG and USFS and a monitoring report will be prepared summarizing the data and detected trends. Data and reports will be shared with Bureau of Land Management (BLM), IDFG, WYGF, Idaho Department of Environmental Quality

(IDEQ), and the C-T Forest fisheries program. Data will be reviewed by the agencies and negative trends will be reported to the Forest Supervisor. Forest Service action in response to these trends will be at the discretion of the Forest Supervisor.

2. Aquatic Habitat. J.R. Simplot Company will fund aquatic habitat surveys that will be conducted once prior to mining, the year after Panel G is opened, and the year after the reclamation release. Any additional physical survey requirements will be event driven (The agencies can request additional surveys after hydrological events that had the potential to affect monitoring parameters). Physical surveys will occur during low flow periods and include R1/R4 longitudinal surveys and channel cross-sections.

Longitudinal surveys will occur in Deer, South Fork Sage, and Wells Canyon creeks. During the longitudinal surveys, all perennial stream length will be surveyed using a modified Hankin-Reeves survey methodology (R1/R4), as described in Overton et al. (1997).

More information about this survey methodology can be found at: http://www.fs.fed.us/rm/boise/research/techtrans/projects/r1r4inventory/r1r4inv_procedures.shtml

All applicable parameters within this reference will be used in the survey. In addition, a Stream Reach Inventory and Channel Stability Evaluation will be conducted and documented for each survey reach. The R1/R4 data will be entered in the R1/R4 database, the datasheets and database copied, and both shared with the agencies.

Cross section surveys will occur in **Crow Creek** (CC-150, CC-350, CC-1A), **Beaver Dam Creek** (same locations as fish population sites. This will be a one time only sample), **Sage Creek** (LSV-4), **South Fork Sage Creek** (LSS), **Deer Creek** (DC-200, DC-600), and **North Fork Deer Creek** (NFDC-700, NFDC-200).

The IDEQ Stream Habitat Index will be performed at each cross section site. This requires such parameters as bankfull width, reach length, stream gradient, Rosgen stream type, sinuosity, substrate, width:depth ratio, stream bank condition, bank stability, stream bank cover, canopy closure, large woody debris, #pools, pool variability, predominant habitat type, overhead cover, embeddedness score, pool substrate character, channel shape, disruptive pressure, zone of influence, instream cover, bank angle, and % undercut banks. These parameters will be measured and/or ranked, then used to derive a SHI value that can be compared to other sites being evaluated and to reference sites.

The cross sections will include channel cross section diagrams, Wolman pebble counts, sediment grab samples (Duffield 1996), and a Riffle Stability Index as described by Kappesser (1992). In addition, at these cross sections, macroinvertebrate samples will be collected in accordance with IDEQ Beneficial Use Reconnaissance Program protocol for establishment of a macroinvertebrate biotic index to monitor beneficial use support.

The data will be entered into a database and a monitoring report will be prepared summarizing all physical survey data and detected trends. The report will be shared with the C-T National Forest Fisheries personnel, BLM, IDFG, and IDEQ. The agencies will review the data and reports and report negative trends to the Forest Supervisor. Forest Service reaction to the trends will be at the discretion of the Forest Supervisor.

3. Selenium. Trends in selenium concentrations within sediment, macroinvertebrates, periphyton, and fish will be monitored every 6 years (and as many annual baseline surveys will be conducted as possible, between the project decision and project implementation). Sampling will occur during low flow conditions. Sediment chemistry, benthic macroinvertebrate and periphyton tissue chemistry, and fish tissue will be studied. In addition, every 6 years, a minimum of one redd (fish nest) will be sampled for juvenile trout near each Crow, Sage, South Fork Sage, Deer, and North Fork Deer creek sampling location listed below and the Spring and Beaver Dam creek locations listed above in the population monitoring section (if not sampled during the separate site specific criteria development effort). If trout redds are sampled for the site specific criteria process or other field study in the future and the samples are at least as frequent as the samples required in this biological evaluation, the redd samples required through this biological evaluation will be discontinued. The redd sampling will occur through redd excavation. Percent of the juvenile trout in the redd that were deformed will be documented. A permit is required through either IDFG or WGF (depending upon sample location) for this activity.

Water chemistry will be sampled through the Surface Water Monitoring Plan so will not be included in this monitoring plan. However, care should be taken to make sure those water chemistry sampling locations are consistent with the sampling locations in this monitoring plan. We request that water quality data be submitted to the agencies the same time as fish population data is submitted to facilitate interpretation.

The agencies (FS, BLM, and IDEQ) reserve the right to require fish egg selenium composition sampling within spawning gravels if trends in selenium concentration monitoring and populations are considered detrimental to the well-being of fish populations.

Selenium sample locations are in **Crow Creek** (CC-150, CC-350, CC-1A), **Beaver Dam Creek** (same locations as fish population sites. This will be a one time only sample), **Sage Creek** (LSV-4), **South Fork Sage Creek** (LSS), **Deer Creek** (DC-200, DC-600), and **North Fork Deer Creek** (NFDC-700, NFDC-200).
All samples will occur every 6 years except at Beaver Dam Creek, where sampling is only required once. Sampling and analysis will be consistent with the interagency fish tissue selenium sampling protocol (currently being developed).

Data and reports will be provided to the agencies for their review. If the agencies identify concerns or negative trends, the Forest Supervisor and BLM District Manager will be notified. Forest and BLM response to the assessment report will be at the discretion of the Forest Supervisor and BLM District Manager. After 30 years, Fisheries Biologists from FS, BLM, IDFG, and IDEQ will review the selenium

monitoring effort and recommend necessary adjustments to the sampling schedule or strategy to the Forest Supervisor and BLM District Manager. Data collection will continue for 50 years, unless the agencies unanimously recommend its termination due to no detected impacts. After 50 years, the agencies will decide each decade up to 100 years whether to continue the assessments. Decisions for continuing monitoring during these decade intervals beyond year 50 must be reviewed and approved by the Forest Supervisor and BLM District Manager.

This monitoring effort is in addition to and does not supplant state water quality standards for selenium, or other metals, in surface water and for support of beneficial uses such as coldwater aquatic life.

Aquatics Survey Schedule

Parameter	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Fish Populations*	X	X	X			X			X			X			X			X			X		
Aquatic Habitat**		X		X						X													
Sediment Chemistry***	X	X	X						X						X						X		
Benthic Macroinvert***	X	X	X						X						X						X		
Periphyton***	X	X	X						X						X						X		
Fish Tissue***	X	X	X						X						X						X		
Trout Redd***	X		X						X						X						X		

Parameter	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052
Fish Populations*	X			X			X			X			X			X			X			X	
Aquatic Habitat**																							
Sediment Chemistry***				X						X						X						X	
Benthic Macroinvert***				X						X						X						X	
Periphyton***				X						X						X						X	
Fish Tissue***				X						X						X						X	
Trout Redd***				X						X						X						X	

Parameter	2053	2054	2055	2056	2057
Fish Populations*		X			X
Aquatic Habitat**					
Sediment Chemistry***					X
Benthic Macroinvert***					X
Periphyton***					X
Fish Tissue***					X
Trout Redd***					X

*=Fish population surveys will occur every three years for 21 years, then it will be decided if frequency of sampling can be changed. Also, fish population surveys will continue for 50 years, then it will be decided if they are still necessary. Maximum sampling is 100 years.

**= Aquatic habitat survey years are estimated. Actual year may differ depending upon when each phase of the mine project is implemented.

***= Selenium monitoring schedule assumes project implementation is initiated in 2009. If it is earlier or later, the scheduled sampling can be adjusted accordingly. After 50 years, the agencies will decide each decade (up to 100 years) if selenium monitoring will continue to be required.

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A general list of Yellowstone cutthroat trout references can be obtained by contacting the Caribou-Targhee Forest Fisheries Biologist.

YELLOWSTONE CUTTHROAT TROUT
BIOLOGICAL EVALUATION

FOR THE

PREFERRED ALTERNATIVE
OF THE
Smoky Canyon Mine Expansion
Montpelier Ranger District
CARIBOU-TARGHEE NATIONAL FOREST

BIOLOGICAL EVALUATION
SUMMARY OF CONCLUSION OF EFFECTS
for the
SELECTED ALTERNATIVE
upon YELLOWSTONE CUTTHROAT TROUT

Species	No Impact	May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Loss Of Viability To The Population Or Species	Will Impact Individuals Or Habitat With A Consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss of Viability To The Population Or Species	Beneficial Impact
Yellowstone Cutthroat		X		

Prepared by: _/s/*James Capurso*_____ Date: __12/7/06_____
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Purpose of Biological Evaluations

The Forest Service prepares biological evaluations as part of the National Environmental Policy Act (NEPA) process to review programs and activities to determine their potential effect upon Sensitive species. Each Regional Forester maintains a list of Sensitive species for their respective region. Yellowstone cutthroat trout are listed as Sensitive on the Intermountain Region list. The Forest Service Manual (FSM) (FSM 2670.32) requires the Forest to prepare a biological evaluation to determine effects and to avoid or minimize project effects upon the species.

The objectives of a biological evaluation are to ensure Forest Service actions do not contribute to the loss of viability of any native or desired non-native plant or animal species or trends toward Federal listing of any species, and to provide a process and standard by which to ensure that Sensitive species receive full consideration in the decision-making process. Biological evaluations include identification of Sensitive species, description of habitat, analysis of effects, cumulative effects, determination of effects, and mitigations (FSM 2672.42).

Smoky Canyon Mine Expansion (Panels F and G) Project

The J.R. Simplot Company has proposed an extension of its Smoky Canyon open pit phosphate mine. The following briefly describes the selected agency preferred alternative. For more description of the selected alternative, please refer to the FEIS. The agency preferred alternative action plan for mining will be implemented, including the North and South Lease modifications. A total of approximately 1,165 acres would be disturbed as a result of development. Power lines for the new mining panels will be located along the haul/access road corridors. The proposed Panel F Haul/Access Road would be approved and the East Haul/Access road will be used to transport personnel and materials into Panel G and for hauling phosphate ore from that panel to the existing Smoky Canyon mill. Implementation of the East Haul/Access Road is contingent upon the J.R. Simplot Company securing right-of-way from the individual that owns the land on which it is proposed to cross. Any seleniferous waste, stored external or internal to the pit will have a cover system consisting of at least two feet of chert, three feet of clay-like Dinwoody material, and one to two feet of topsoil, to decrease infiltration. Under the Agency Preferred Alternative, approximately 22,433 feet of intermittent stream and 57 acres of Aquatic Influence Zone would be disturbed by mining. Approximately 2 acres of wetland will be disturbed through the mining of both panels.

SPECIES: Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*)

BACKGROUND

U.S. Fish and Wildlife Service was petitioned to list Yellowstone cutthroat trout in August 1998. In February 2001, the agency finalized their finding on the petition to list Yellowstone cutthroat trout. They indicated the petition did not provide substantial information to indicate listing was warranted. In December 2004, a federal judge in Colorado ruled that the US Fish and Wildlife Service was arbitrary and capricious in its 90-day review and overturned their finding, ordering the agency to conduct a 12-month status review. In February 2006, the US Fish and Wildlife Service responded with a "not warranted for listing" determination. A lawsuit from the petitioners is expected. Yellowstone cutthroat trout currently retains its status as a Sensitive species on the Regional Foresters Sensitive Species List.

The Caribou-Targhee National Forest is currently addressing the needs of Yellowstone cutthroat trout by maintaining consistency with their Forest Plans. Within the range of Yellowstone cutthroat trout, Forest activities are guided by the Revised Targhee Forest Plan (Targhee portion of the Forest) and the Revised Caribou Forest Plan (Caribou portion of the Forest).

Intensive surveys for Yellowstone cutthroat trout distribution have been conducted on the Caribou-Targhee National Forest since 1997. The subspecies appear to be distributed throughout most of the Forest, but populations in various streams or stream segments vary in strength. While some populations are threatened by competition and hybridizing with nonnative species, others appear to be doing well. Some populations have been replaced by introduced nonnative fish species. Genetic interactions between existing Yellowstone cutthroat trout populations have diminished from historic conditions because of a decrease in connectivity.

BIOLOGY

Within Idaho, the original cutthroat trout native to the Snake River system may have been the Yellowstone cutthroat trout. It is believed they were replaced by rainbow trout and other subspecies of cutthroat trout in drainages downstream of Shoshone Falls. Shoshone Falls isolated cutthroat trout from contact with rainbow trout and the Yellowstone subspecies remains the native trout in the upper Snake River basin. Yellowstone cutthroat trout are adapted to cold water. Water temperatures between 4.5 and 15.5 C appear to be optimum for the subspecies. This subspecies migrates for spawning when threshold water temperatures approach 5 C (optimum 10 C) and stream flows subside from spring peaks. Streams selected for spawning are commonly low gradient (up to 3%), perennial streams, with groundwater and snow fed water sources. Use of intermittent streams for spawning is not well documented, but has been noted in some intermittent tributaries to Yellowstone Lake. Spawning occurs wherever optimum size gravel (12-85 mm in diameter) and optimum water temperatures (5.5-15.5 C) are found. Depending on variations in growth, spawning populations are comprised of individuals age-3 and older (primarily ages 4-7). Juveniles congregate in shallow, slow-moving parts of the stream.

DISTRIBUTION AND HABITAT CONDITION

The project is proposed for tributaries within the Salt River Drainage of Eastern Idaho and Western Wyoming. The Salt River and most of its tributaries support populations of Yellowstone cutthroat trout. Both fine-spotted and large-spotted varieties of Yellowstone cutthroat trout occur within the Salt River Drainage, although the majority of the cutthroat trout are fine-spotted. Three cutthroat trout life history patterns exist in the area; resident (spending their entire lives in one stream reach), fluvial (migrating into smaller streams to spawn and returning to larger water for most of the year), and adfluvial (spending most of their lives in Palisades Reservoir and migrating upstream to spawn in smaller streams).

The Yellowstone cutthroat trout that occur within the Salt River Drainage are part of a metapopulation referred to in the Caribou Revised Forest Plan as the Palisades/Salt Metapopulation. In addition to the populations within the Salt River System, the metapopulation includes those streams that flow into Palisades Reservoir and populations in the Upper Snake and Greys rivers. This area is in the heart of the stronghold populations of Yellowstone cutthroat trout throughout their range.

The Palisades/Salt Yellowstone Cutthroat Trout Metapopulation, is comprised of 40 sixth code Hydrologic Unit Code (HUC) areas on the Forest (not counting those in HUCs in the upper Snake and Salt rivers in Wyoming). Of those on the Forest, 3 HUCs are considered to have depressed YCT populations and 2 HUCs have populations that are extirpated (due to upstream passage problems and brook trout introductions). Considering the large geographic range of the metapopulation that includes the Salt and upper Snake rivers, Palisades Reservoir, and all of their associated tributaries, and considering 35 of the 40 HUCs on the Forest are considered by the Forest as Yellowstone cutthroat trout stronghold streams, the Palisades/Salt Yellowstone Cutthroat Trout Metapopulation is robust and resilient.

The immediate project area includes tributaries to Crow Creek, including Wells Canyon, Nate Canyon, Deer, Manning, and Sage creeks. Wells Canyon, Nate Canyon, and Manning creeks were fishless due to lack of flow when sampled, although some portions may provide refuge to Yellowstone cutthroat trout from high flows in the spring. Salmonid communities were dominated by Yellowstone cutthroat trout in Deer and Sage creeks.

Yellowstone cutthroat trout populations in the project area are primarily residents. They may be somewhat isolated from other populations due to numerous migration barriers between them and the larger drainages, such as Crow Creek, Salt River, and Snake River. This isolation makes these populations more susceptible to stochastic events, less resilient, and decreases the potential for their long term viability.

Deer and North Fork Deer Creek were sampled by the Forest (Berg 2003) and Yellowstone cutthroat trout population densities were 175-200 fish per mile. Non-native brook trout were documented in low numbers in the headwaters of Deer Creek in 2003 (Maxim 2004). Although some livestock impacts to riparian vegetation were reported, bank instability caused by livestock was not documented. Both streams had good willow complexes, active beaver dams, areas with good gravel substrate for fish

spawning, good cover, and cool water temperatures (Berg 2003). Issak and Hubert (2001) described Deer Creek as being in good shape, with limited road access to the stream.

Isaak and Hubert (2001) described Sage Creek on the Forest as small and unproductive. The stream was described as being more productive on private land below the Forest, where agricultural practices affected water quality. The salmonid community primarily consisted of brown trout in the lower watershed and cutthroat trout in the upper watershed.

Isaak and Hubert (2001) discussed management issues confronting Yellowstone cutthroat trout in the Salt River. They included nonnative salmonids such as brown, brook, and rainbow trout, habitat fragmentation from agricultural and municipal developments, whirling disease, and land use that included grazing, roads, and fire suppression.

The economic value of Yellowstone cutthroat trout in Southeast Idaho and Western Wyoming is considerable. Moore et al. (2003) determined that, in 2003, anglers spent $77.5 million in the upper Snake River Region and $15.9 million in the Southeast Idaho Region of Idaho Department of Fish and Game. The study did not include economic benefits to Western Wyoming from fishing. Loomis (2005) estimated that fishing in the upper Snake within Wyoming generates $5.5 million in jobs and income.

Loomis (2005) determined that approximately 50% of the anglers that used the South Fork Snake River (in Idaho) specifically targeted Yellowstone cutthroat trout. This rose to nearly 100% of anglers on the Flat Creek tributary to the Snake River in Jackson Hole.

COMPLIANCE WITH FOREST STANDARDS AND GUIDELINES

The following Revised Caribou Forest Plan standards and guidelines are applicable to the mine expansion project as it relates to Yellowstone cutthroat trout and their habitat. Following each standard or guideline, a brief paragraph describes current project plan compliance.

Prescription 2.8.3: Aquatic Influence Zones

Minerals/Geology Guidelines

- Locate new structures, support facilities, and roads outside AIZs. Where no alternative to inside AIZs exists, locate and construct in ways to 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.

  Compliancy: This project is consistent with the intent of this guideline. No structures or support facilities (other than powerlines) will be constructed within AIZs. Direct road impacts to AIZs have

been kept relatively minimal at approximately 6 acres. The Panel F Haul/Access Road will cross one intermittent stream. The East Haul/Access Road would cross 10 streams. One of them would be perennial (Deer Creek). Sedimentation associated with these impacts is expected to be offset through mitigations. Impacts upon frequency of large wood in riparian areas and streams can be reduced by leaving felled trees on the ground within these areas.

- Do not locate debris, mine overburden, excess material, leaching pads, and other facilities within AIZs, unless other alternatives are not 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.

  Compliancy: The project is consistent with this guideline. No material will be stored within AIZs and safeguards will be implemented. However, segments of AIZs will be removed by the mine. Hazardous materials are not expected to enter streams directly. Selenium may enter groundwater but has been modeled to be low in concentration and is not expected to exceed water quality standards.

General Riparian Area Management Standard

- Within legal authorities, ensure that new proposed management activities within watersheds containing 303(d) listed waterbodies improve or maintain overall progress toward beneficial use attainment for pollutants which led to listing.

  Compliancy: Models used during the preparation of the EIS indicate selenium concentrations in streams within the project area will increase. Peak concentrations from the development of Panels F and G are expected to release approximately half of the EPA criteria for surface water within 80 to 100 years. In addition, the implemented and anticipated CERCLA related remediation activities on the older, inactive portions of the Smoky Canyon Mine are expected to further decrease the selenium loads downstream of the mine in Sage Creek and Crow Creek, downstream of the mouth of Sage Creek. Progress toward meeting beneficial use would be maintained.

General Riparian Area Management Guidelines

- Felled trees should remain on site when needed to meet woody debris objectives and desired AIZ attributes.

  Compliancy: It is recommended that riparian trees that require felling for road and powerline construction be left whole in the riparian area and/or stream to meet the intent of this guideline, when possible. Felled trees left on site may benefit riparian areas and streams as large wood.

Fisheries Guidelines

- Where feasible, restore connectedness of disjunct populations and enhance fish passage for native fish.

  Compliancy: Mitigation measures help address this need. Restoring and maintaining Yellowstone cutthroat trout migratory life history patterns within stream populations in the project area will further ensure the long term viability of these populations.

Road and Trails Standard

- All new and replaced culverts, both permanent and temporary, shall be designed and installed to meet desired conditions for riparian and aquatic species.

  Compliancy: All culverts will be designed with capacity for 100-year flood event flows. Fish passage will be facilitated at all new crossings where needed.

Road and Trails Guidelines

- Avoid constructing roads within the AIZ unless there is no practical alternative.

  Compliancy: Direct road impacts to AIZs have been kept relatively minimal at approximately 6 acres. The Panel F Haul/Access Road will cross one intermittent stream. It meets the intent of this guideline. The East Haul/Access Road would cross 10 stream channels. One of them would be perennial (Deer Creek). This crossing would require a culvert that is 290 feet in length. Although impacts to Deer Creek are expected from the construction, maintenance, and use of this road, it would have less impact than other available road alternatives. Impacts associated with road construction and maintenance will be offset with project mitigation measures.

- Culverts (permanent and temporary) should be sized so that the probability of flow exceedance is fifty percent or less during the time the culvert is expected to be in place. Consider bedload and debris when sizing culverts.

  Compliancy: Crossings will be consistent with this guideline.

- When feasible, use bridges, arches, and open-bottom culverts in fish-bearing streams.

  Compliancy: The proposed roads would have one perennial stream crossing. Engineers have determined it is not feasible to

use a bridge at this site due to expense. A 290-feet culvert is proposed for this site. The culvert will be pre-fit with weirs to facilitate fish passage.

- Avoid placing ditch relief culverts where they may discharge onto erodible slopes or directly into streams.

  Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure.

- New or reconstructed roads and trails should cross the AIZ riparian areas as perpendicular as possible.

  Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure.

- Avoid making channel changes on streams or drainages.

  Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure. However, some stream channels will be removed during project implementation. Mitigation measures help address this habitat loss and reclamation will occur after mining.

- 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.

  Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure.

- Road drainage patterns should avoid disruption of natural hydrologic flow paths.

  Compliancy: The project is expected to be consistent with this guideline since this is now standard operating procedure.

Prescription Area 8.2.2(g): Phosphate Mine Areas

Soil and Water Standards

- Baseline, concurrent and/or post-mining water quality and aquatic habitat monitoring (both surface and groundwater) that provide a statistically valid characterization shall occur at all phosphate mine sites (where the reclamation bond has not been released) as described in an approved monitoring plan.

  Compliancy: The monitoring prescribed in this document is consistent with this standard.

DIRECT/INDIRECT EFFECTS

Watershed disturbances

The Agency Preferred Alternative would directly disturb approximately 22,433 feet of intermittent drainage channel, and 57 acres of AIZ within the project area. Also, approximately 2 acres of wetland will be disturbed through the mining of both panels. These disturbances will occur in phases through the duration of the project. Not all disturbances will happen simultaneously. It is expected that, as the watershed drainage is reduced due to mining, stream flows will be reduced. These flow reductions will be slight and are not expected to noticeably contribute to channel morphology changes (DEIS Section 4.3.2.1). Once reclamation has been successfully completed, the mining area would again provide drainage in the watershed area, contributing to the runoff of streams. The effects of the project on estimated runoff are considered to be minor, local, and have a duration limited to the mining and reclamation periods (DEIS Section 4.3.2). Runoff decreases as a result of this project are not expected to affect Yellowstone cutthroat trout or their habitat.

Intermittent channels play an important role in the functioning of the watershed, including influencing Yellowstone cutthroat trout habitat (refer to The Value of Intermittent Streams to Yellowstone Cutthroat Trout, located below). The elimination of 22,433 feet of intermittent channel during the mine project is expected to decrease the quantity of high flow refuge fish habitat, decrease nutrient delivery downstream, decrease water storage and regulated release, and decrease sediment storage capabilities. Slight to moderate impacts (dependent on proximity to the disturbance and length of intermittent stream removed) to Yellowstone cutthroat trout are expected through the duration of the project and will likely end upon completion of reclamation.

Sediment settling basins have been incorporated into the project plans to accommodate 100-year precipitation events plus flows from snowmelt. The capacity of these settling basins may accommodate associated project sedimentation, after the sedimentation from their initial basin construction. The sediment load is estimated to be 0.5% of normal bedload (4.5 tons/year). There is a potential for sediment delivery from near the pond outlet or if the dam fails. In the event of a dam failure, sediment eroded from the structure and pond bed would mobilize downstream and deposit primarily in low energy stream reaches. If delivered downstream, this sediment will likely reach Yellowstone cutthroat trout habitat, increasing the concentration of fine sediment in the stream substrate. This could potentially affect spawning and early rearing for Yellowstone cutthroat trout downstream of the failure.

Selenium Concentrations

Modeling used during the EIS process indicated that the implementation of this project would slightly increase selenium concentrations in water at Sage, Deer, and Crow creeks. This adds to current seasonal exceedances in selenium regulatory criteria within Sage Creek due to Smoky Canyon Mine. An ongoing CERCLA action is expected to reduce selenium concentrations and correct selenium exceedances in Sage Creek, before peak impacts are generated by the mine expansion. Storage of

seleniferous waste external or internal to the pit will have a cover system over it consisting of at least 2 feet of chert, 3 feet of clay-like Dinwoody material, and one to two feet of topsoil to decrease infiltration and increase surface runoff. Mine runoff would be caught by settling ponds, further decreasing selenium concentration in waters prior to delivery to fish-bearing streams below. These measures are expected to decrease mobilization of selenium from the mine site into downstream aquatic ecosystems. Modeling indicates compliance with the State of Idaho standard for selenium concentrations in surface water in lower Sage Creek with these protective measures in place and the CERCLA action successfully completed.

Most definitive research on selenium impacts to fish has occurred with warm water fish species. Selenium research with salmonids indicates they are susceptible to selenium impacts, although their tolerances to high selenium concentrations may differ from warm water fish. In general, selenium has the potential to affect Yellowstone cutthroat trout through birth deformities and, in extreme cases, toxicity. However, in streams with currently elevated selenium concentrations within the project area, no Yellowstone cutthroat trout deformities have currently been documented, even though high selenium concentrations have been documented in some fish tissue samples. Deformities may occur early in life stages (between egg and fry) within the stream and may not be readily detected prior to egg/alevin/fry mortality. Population level impacts may be masked by fish immigration. The degree to which increases in selenium concentrations within project area streams affects Yellowstone cutthroat trout is a complex issue that is dependent upon several physical factors (such as stream channel/habitat type, stream substrate, water sources, degree of connectivity, and climate) and biological factors (such as fish species, life history, sex, size, age, food, and general susceptibility to selenium).

An additional layer of complexity is associated with the use of models to predict selenium concentrations in project area groundwater and streams. All models are dependent upon certain assumptions that may limit their accuracy. Considering the complexity and difficulty involved in predicting selenium concentrations resulting from the implementation of the project, the use of models is an appropriate approach, but awareness should be exercised when using model outputs. Input and assumptions made in developing the models associated with this project were intended to be conservative, attempting to protect against underestimating selenium concentration outputs. Those who utilize models are routinely cognizant of potential limitations due to model assumptions.

Considering the complexity involved in determining bioaccumulation in Yellowstone cutthroat trout and the potential uncertainty in the use of models to predict stream selenium concentrations, it is difficult to quantify impacts to Yellowstone cutthroat trout as a result of this project. However, using two feet of chert, three feet of clay-like Dinwoody material to decrease infiltration, and one to two feet of topsoil to decrease infiltration through seleniferous materials and completion of the CERCLA project in Pole Canyon has the potential to result in low selenium concentrations in most streams within and downstream of the project area. In addition, the mitigation and monitoring measures help address these uncertainties. Mitigation measures improve habitat and increase migratory fish access to the project area. Intensive monitoring for selenium will continue beyond reclamation.

Considering this, impacts to Yellowstone cutthroat trout from selenium accumulation, if they occurred, would likely be short to long-term, site-specific, and minor to moderate, depending on the level of accumulation. Yellowstone cutthroat trout that exhibit a resident life history pattern would have more of a potential to be affected by an increase in selenium concentrations within project area streams because they tend to remain within a limited reach of the stream in the project area. They are exposed to the water with elevated levels of selenium throughout their life. Migratory life history fish would be less susceptible to selenium impacts because of less exposure over time.

Powerline along haul/access roads

The proposed powerline right-of-way is 28 acres, along the access roads. The DEIS (page 2-45) states the powerline will be constructed within the existing disturbance area of the roads, so no additional disturbance or impacts to Yellowstone cutthroat trout and their habitat is expected. It is recommended that if riparian trees must be felled for the powerline/road right-of-way, they be felled and left in riparian areas or streams whenever possible to provide large wood, an important staple for riparian and stream habitat.

Haul/Access Roads

Haul roads have the potential to affect Yellowstone cutthroat trout habitat through changes in hydrology, frequency of large wood, and sedimentation. The potential and effect of each of these parameters are discussed below.

Peak flows can change due to an increase in drainage density with ditches and cross-drains, and road crossings can affect fish passage and hydrology, particularly if the crossing is undersized or placed improperly. These concerns are addressed through minimizing the amount of hydrologically connected road as much as possible and designing road crossings that facilitate the passage of fish and have a 100-year flood event capacity.

Road right-of-ways that encroach upon Aquatic Influence Zones and streams (both perennial and intermittent) have the potential to affect aquatic and riparian habitat through the clearing of vegetation, including trees. Trees have the potential to provide large wood to streams and riparian areas, benefiting them by scouring pools, providing complexity and cover, sorting gravels, providing nutrients, and providing shade. The impact of cutting trees within AIZs is at least partially addressed by minimizing the location of roads and powerlines within them and through the recommendation to leave all AIZ trees that have been felled for the road/powerline on the ground within the AIZ and stream whenever possible.

Sediment from road surfaces and fill will likely be delivered to nearby streams through runoff and aerially from road dust. These inputs will likely be decreased through road design and proper maintenance. Sediment-related impacts to Yellowstone cutthroat trout from road construction are estimated to be short-term, site-specific, and minor to moderate, depending on the degree of sedimentation. Sediment-related impacts to Yellowstone cutthroat trout from road use and

maintenance are estimated to be through existence of road (approximately 16 years plus time required for road removal and restoration), site-specific, and minor to moderate. Sedimentation can affect Yellowstone cutthroat trout through embedding gravels used for reproduction and filling interstitial spaces otherwise used by juvenile trout for cover.

There is a potential for selenium release into aquatic ecosystems where road cuts are created across Meade Peak Shale outcrops. If this occurs, the impacts are expected to be minor, site-specific, and short term because full, end-bench haul construction methods would ensure that all of the selenium-bearing material will be removed and safely stored in capped piles.

Road crossings are one of the most likely locations where road fill and surface material will enter streams. There are 10 intermittent and 1 perennial road crossings of streams proposed in this project. Although this sediment input will likely occur at its peak during road crossing construction (impacts will likely be moderate and short-term), continual input of fine sediment (at lower levels) from road surfaces and fill are expected to occur through the existence of the road. Sedimentation associated with road crossing construction is expected to be reduced because construction is required to occur during low flow periods and standard sediment control measures will be implemented. The better the road surface and the more it is maintained, the less sediment delivery is expected.

The Panel F Haul/Access Road would disturb 67 acres within the Sage Creek basin, with less than 1 acre within AIZs. None of the proposed road would cross Meade Peak Shale outcrops. There would be one stream channel crossing associated with this road, an intermittent channel. New direct disturbances resulting from construction of the Panel F Haul/Access Road would total approximately 230 feet of intermittent drainage channel and 0.7 acre of AIZs in the South Fork Sage Creek drainage. Expected sedimentation increases under the Proposed Action are estimated to constitute less than 0.5 percent of current loading rates into South Fork Sage Creek.

New direct disturbances to streams resulting from the East Haul/Access Road would include 2,684 feet of intermittent channel disturbance, 300 feet of perennial stream channel disturbance, and 4.7 acres of AIZ disturbance. Approximately 4.5 tons of sediment are expected to be generated by this haul road per year. This access road would cross 10 stream channels. One of them would be perennial (Deer Creek, near its mouth). The 300 feet of perennial stream disturbance will be in the form of a culvert and road fill placed in Deer Creek. The culvert would require weirs to help pass fish upstream. Such weirs do not account for the upstream passage needs of less mobile biota such as amphibians and macroinvertebrates.

The Value of Intermittent Streams to Yellowstone Cutthroat Trout

A total of 22,433 feet of intermittent stream are estimated to be directly impacted by the mine. Of those, 2,914 feet of intermittent stream are estimated to be impacted by access roads. The value of these intermittent streams within a watershed that is inhabited by Yellowstone cutthroat trout is similar to the value of fingers to a hand. The stream does not function as well without them. Intermittent streams can provide

several benefits to trout. They provide refuge areas from high flows and potentially spawning habitat (Erman and Hawthorne 1976). They produce and deliver nutrients downstream in the form of invertebrates and organic matter (Newbold et al. 1982 and Wipfli and Gregovich 2002). Collectively, they provide natural flood control by storing significant amounts of precipitation, runoff, and snowmelt before flooding, and release it in a regulated fashion to help maintain flows later in the summer (Coes and Pool 2005). They trap excess sediment, moderating delivery downstream (Dieterich and Anderson 1998) (Gregory et al. 1991 and Vanote et al. 1980). The intermittent streams that are directly impacted by this project will not likely provide these benefits until they are reclaimed.

CUMULATIVE EFFECTS

This cumulative effects analysis will concentrate upon effects to Yellowstone cutthroat trout and their habitat. The analysis area for discussion of fisheries cumulative effects includes watersheds located in the project area on the Forest, extending downstream from the Forest where migratory life history forms of cutthroat trout spend part of their life in larger water bodies off Forest. This would include Sage and Deer creeks, Crow Creek, and the Salt River to Palisades Reservoir. Smaller, intermittent tributaries within the project area are also included because these may serve as refuge habitat for fish during high flow events.

The selected alternative is expected to impact Yellowstone cutthroat trout through the loss of 22,433 feet of intermittent stream and its associated 57 acres of aquatic influence zone through direct mine disturbances. In addition, access roads would cross 10 intermittent streams and one perennial stream with 2,914 feet of intermittent stream being disturbed. The project will add selenium to streams in the project area through leaching into groundwater but selenium was modeled to not exceed water quality standards when considered in combination with the effects of an ongoing CERCLA project in Pole Canyon. Large wood delivery to streams over time may decrease with the construction and maintenance of access roads/powerlines.

The loss of intermittent stream channel length is additive to length lost in the past from other construction activities in the cumulative effects analysis area from activities such as road building and housing development. It is likely these activities will continue in the future within the cumulative effects analysis area.

Sediment generated from project implementation will be additive to past, present, and future land management activities. When past, present, and future land management activities associated with this cumulative effects analysis area are considered, most either directly or indirectly contribute sediment to aquatic habitat. Some past activities that contributed sediment to streams include firewood collection, road and trail building/maintenance/use, grazing, timber harvest, mining, cross country motorized access, agriculture, housing developments, wildfires, and prescribed burns. These uses and impacts are presently occurring and are expected to continue in the future, although at different intensities and locations through time. While most of these actions do not individually contribute overwhelming amounts of sediment to streams, they collectively maintain a baseline of sediment delivery to streams within the project area that is greater than pre-management baselines. The increase in

sedimentation from road construction/maintenance/use and mining will likely add to the current baseline.

Selenium concentrations are elevated in different locations within the cumulative effects analysis area. In some places, selenium concentrations are abnormally elevated in fish tissue and in other places, they are abnormally elevated in water samples. Although ongoing CERCLA activities may eventually offset selenium concentrations predicted from the proposed mining activity, the project would likely cumulatively add to existing concentrations.

Roads and powerlines proposed to be located in or near riparian areas have the potential to affect riparian vegetation (primarily associated with intermittent streams). This may occur in riparian areas where vegetation provides nutrients, shade, and large wood to streams. In the past and present, impacts to riparian vegetation occur in the cumulative effects analysis area through grazing, agriculture, housing developments, trails, and roads. The proposed roads/powerlines will add to these effects.

There are biological impacts to Yellowstone cutthroat trout in the project area that also need to be considered. Fish disease, competition with non-native fish, and harvest have been (and will be) additional stresses upon Yellowstone cutthroat trout populations in the project area.

Impacts from the proposed project will contribute to the cumulative effects upon Yellowstone cutthroat trout and their habitat when project impacts are considered in sum. These populations are considered more susceptible to these cumulative effects because of the degree of their isolation. Increasing habitat condition and connectivity in the project area may help address these concerns.

IRRETRIEVABLE AND IRREVERSIBLE EFFECTS

Irretrievable effects are those that can result in a loss of fish habitat or populations. A change in management activities has the potential to reverse this effect. A hypothetical example would be the improper placement of a culvert in a stream crossing that becomes a migration barrier to upstream-migrating fish. The culvert is producing the irretrievable effect of eliminating the genetic interchange between the fish upstream and downstream. Irretrievable effects can be reached from the intense use of a single Forest resource or several Forest resources affecting the same area. Over the long term, we would consider the expected slight contribution of selenium to Yellowstone cutthroat trout habitat from project implementation to be irretrievable in that they are expected to eventually (over 100 years) decrease. The proposed haul/access roads would disturb approximately 5.4 acres of AIZ, approximately 2,914 feet of intermittent stream channel, and approximately 300 feet of perennial stream. These expected impacts to aquatic and riparian habitat can be addressed through future management decisions to remove the roads and, with intensive management and time, re-establish the structure and function of the stream.

Irreversible effects are those that can result in a permanent loss of habitat or populations. Irreversible effects eliminate future management options. A hypothetical example of an irreversible effect is the loss of a fish population or

metapopulation. No matter what management action is taken, we will never be able to reverse the loss of the diversity that made that particular population unique. The development of Panels F and G (actual pit excavation) will directly remove intermittent stream channels. Those stream channels impacted by direct excavation may result in irreversible effects because, even if reclaimed, they may not achieve the structure and function of the original streams.

DETERMINATION OF EFFECTS

The Smoky Canyon Mine Expansion Project May Impact Individuals Or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Loss Of Viability To The Population Or Species. This is due to habitat loss, expected sedimentation, and riparian impacts. The determination also accounts for any uncertainty associated with the models used to predict selenium delivery and concentrations. The mitigation measures (below) likely fully mitigate for expected sediment generation associated with the project. The mitigation that improves fish passage at two culverts may help address any uncertainties associated with the selenium issue by improving connectivity (read mitigation section below). Remaining uncertainty will be addressed by a sound selenium monitoring plan included in the monitoring section below. The loss of 2 acres of wetland within the footprint of the mine will likely be mitigated for by creation of new wetlands. The loss of 22,433 feet of intermittent stream and 57 acres of associated aquatic influence zone within the footprint of the mine will not be immediately mitigated for. These areas will be reclaimed after mining and may eventually regain structure and function, but not likely the same ecologically as what occurred prior to the mine. Proposed mitigation measures will decrease risk associated with this project and further insure the long term viability of Yellowstone cutthroat trout in the project area.

REQUIRED MITIGATION MEASURES

Authority for requiring mitigation comes from the National Environmental Policy Act (NEPA), the National Forest Management Act (NFMA), the Forest Service Manual (FSM), the Revised Caribou Forest Plan, and the Interagency Yellowstone Cutthroat Trout Memorandum of Agreement. NEPA 1502.14(f) and 1502.16(h) requires the inclusion of appropriate mitigation measures not already included in the proposed action or alternatives. NFMA (CFR 219.19(a)(1)) requires the prescription of mitigation measures for adverse effects upon fish and wildlife species where appropriate. NFMA also requires (CFR 219.27(a)(6)) the maintenance of viable native fish populations. FSM (FSM 2670.32) requires the Forest to prepare a biological evaluation to determine effects and to avoid or minimize project effects upon the species. The Interagency Yellowstone Cutthroat Trout Memorandum of Agreement, signed by the Regional Forester in 2000, established a cooperative, interagency goal to maintain and improve Yellowstone cutthroat trout populations and habitat.

Approximately 22,433 feet of stream channel will be directly disturbed by the proposed mining activity. Sediment will be delivered to Yellowstone cutthroat trout habitat through the mining and road building/use/maintenance. In addition, the

project is expected to add selenium to Yellowstone cutthroat trout habitat downstream, although CERCLA activities (intended to decrease selenium from Pole Canyon) are expected to counter this increase. Although road and mining BMPs will be incorporated into the project plans to decrease impacts, some fine sediment and selenium deliveries may occur.

Although selenium increases in project area streams are estimated to be slight as a result of they project, any remaining public concern over the predicted selenium increase in area streams can be addressed by increasing migratory Yellowstone cutthroat trout access to the stream. Resident life history pattern Yellowstone cutthroat trout are more susceptible to potential selenium impacts than migratory life history patterns because they spend their entire lives in one stream. The key to maintaining the long term viability of Yellowstone cutthroat trout populations in the project area is to increase their biodiversity through facilitating the access of migratory life history patterns. It is in the best interest of all parties involved in the project to increase Yellowstone cutthroat trout access to project area streams. This would be accomplished through working on the Forest to correct upstream passage barriers such as irrigation diversions and impassable culverts and by helping private landowners with the issue. The opportunities that exist on the Forest will be included in required mitigation. Opportunities to accomplish this work downstream on private land must be accomplished with willing partners and landowners, but not associated with these mitigation measures.

There is value to treating some of these migration barriers through mitigation. By decreasing the number of barriers the fish encounter while migrating upstream, we increase the potential they reach their destination to spawn. In addition, we at least reconnect segments of streams and increase segment size. It is also important to consider that partnerships may be formed to treat the barriers that exist on private land, where there are willing landowners.

The following mitigation measures are required to offset the project impacts upon Yellowstone cutthroat trout and their habitat. It is in the interest of everyone involved in the project to maintain the long-term viability of Yellowstone cutthroat trout populations in the project area and protect and restore their habitat. The mitigations listed below help address some impacts associated with the mine expansion project. Mitigation measure #1 assists migratory Yellowstone cutthroat trout to access project area streams. Impassable culverts and irrigation diversions would need to be identified and treated downstream of the Forest to fully enable migratory fish access, but the included mitigation measure is a step to this goal. These culvert passage projects will successfully reconnect segmented populations, potentially increasing their vigor. Increasing the patch size of populations and increasing migratory fish access to the population increases biodiversity, an insurance policy to account for the uncertainty associated with the use of models to predict selenium concentrations, the lack of a fish tissue based selenium standard, and the uncertainty of how selenium affects local Yellowstone cutthroat trout populations. Migratory fish increase the vigor of local populations and can refound extirpated populations if necessary. All mitigation measures are intended to decrease erosion and sedimentation, helping to address the sedimentation associated with the proposed project implementation. By increasing habitat quality and connectivity, we increase the potential viability of

project area Yellowstone cutthroat trout populations over the long-term. These mitigation measures were developed in cooperation with Idaho Department of Fish and Game.

1. This mitigation measure helps address concerns about mining project sedimentation and slight selenium increases (it has the potential, in coordination with other passage projects, to increase migratory life history Yellowstone cutthroat trout to the project area). During the summer of 2005, the Forest inventoried road crossings within the range of Yellowstone cutthroat trout. Culverts were identified as under-capacity and/or blocking the upstream migration of fish. Culverts that are under capacity cause unnecessary erosion and sedimentation. The culverts that are blocking fish isolate populations upstream, decreasing the potential they remain viable over the long term and impacting their population vigor. To reconnect some segmented populations of resident Yellowstone cutthroat trout and begin to facilitate access of migratory life history Yellowstone cutthroat trout into Deer Creek, J.R. Simplot Company will replace impassable culverts at the FS Road 102 and 111 crossings. The crossing at FS Road 102 will be replaced with an oversized culvert (to provide for the development and access to floodplains within the culvert) placed below grade (for a simulated stream substrate) or a bottomless arch. The crossing at FS Road 111 will be replaced with a structure to properly accommodate stream hydraulics and fish passage.

FS Road 102_1.03, FS Road 102 Crossing of Upper Deer Creek

FS Road 111_2.5, Crow Ck Road Crossing of Deer Creek

2. Decrease the impact of Smoky Canyon Road upon Smoky Canyon Creek by relocating an 8,000 feet segment and decreasing the width of another 2,000 feet by pulling it out of Smoky Canyon floodplain.

   This mitigation measure improves habitat quality in Smoky Canyon by decreasing sedimentation. The construction of Smoky Canyon Road encroached upon the Smoky Canyon Creek floodplain. The road is a sediment source to the stream. These impacts can be decreased by obliterating an 8,000 feet long section of the road and relocating it over the reclaimed C Panel. In addition, a remaining 2,000 feet long segment of the road will be improved by decreasing its width, excavating it away from the riparian area and restoring the floodplain integrity.

3. Address sediment concerns at FS Road 146 as it parallels South Fork Deer Creek to decrease road-related sedimentation.

   FS Road 146 (near Trapper Cabin) encroaches upon the South Fork of Deer Creek, contributing sediment to the stream, however, no sedimentation data exists for this road in the project area. This mitigation measure is intended to identify and reduce sedimentation from the road to the project area. Mine traffic may increase use along this corridor and measures to address sedimentation concern are identified as necessary. Segments of this road that are sources of sediment can be treated through resurfacing, drainage improvements, narrowing away from the stream, and/or obliteration/relocation away from the stream. Sediment production can be monitored and mitigations accomplished with stewardship funding generated by the timber sale component of this project.

4. There is currently a muddy ford crossing of Wells Canyon Creek (0.1 mile upstream from the Forest boundary). This mitigation measure helps address sedimentation concerns in relation to the mine expansion project. This ford contributes sediment to the stream that affects the quality of Yellowstone cutthroat trout habitat downstream. J.R. Simplot Company will assist the Forest to replace that crossing with a bridge or a below-grade, oversized culvert (if appropriate) to accommodate truck and trailer traffic, decreasing the sediment contribution of that crossing to the stream. The widened stream channel at the ford will be narrowed to natural stream channel width during crossing construction.

5. Livestock will be excluded from approximately 1 mile of Crow Creek on Forest Land (T9S R46E S31) with the construction of a 4-strand barbed wire or buck-and-pole fence. This will occur in coordination with the Forest Service Montpelier Ranger District Range personnel. Within the mile, there is currently a 22-acre exclosure that needs minor repair and improvements. Offsite watering will be provided using Crow Creek water to deliver water to five troughs. This will include the construction of the exclosure and watering system. Simplot Company will be responsible for the maintenance of the fenceline for up to 10 years unless maintenance is assigned to the permittee prior to then. This mitigation measure helps address sedimentation concerns.

Work identified near each panel is expected to occur prior to or when each panel is mined. For example, the improvement of the FS Road 111 crossing at Deer Creek and the relocation of segments of the Smoky Canyon Road will occur at the mining of Panel F. The improvement of the FS Road 102 crossing at Deer Creek, the improvement of the muddy ford at Wells Canyon, and the exclosure on Crow Creek will occur at the mining of Panel G.

MITIGATION MEASURES TO BE INCLUDED IN MINE EXPANSION PLAN

1. All trees within AIZs that require cutting within the right-of-way of the road/powerline will be felled and left whole on the ground within the AIZ. This will mitigate for the loss of large wood contribution to AIZs and streams when the powerline is constructed and maintained.

MONITORING

A project of this magnitude and complexity requires a solid monitoring program to ensure mining impacts do not exceed established standards and direction. In addition, The National Forest Management Act (36 CFR 219) and the National Environmental Policy Act (1505.2(c) and FR Vol. 57 No. 182 page 43212) require monitoring where applicable. The Caribou Forest Plan requires "Baseline, concurrent and/or post-mining water quality and aquatic habitat monitoring (both surface and groundwater) that provide a statistically valid characterization shall occur at all phosphate mine sites (where the reclamation bond has not been released) as described in an approved monitoring plan."

Monitoring was designed to validate the assumptions made during infiltration and transport modeling and attempt to address some uncertainties associated with the complexity of the selenium issue. The effectiveness of the protection measures within the mining plan and the project mitigation measures will be monitored through fish population surveys, aquatic habitat surveys, and selenium concentration inventories. All monitoring reports are due two weeks before the spring Annual Operations Meeting. These monitoring measures were developed in cooperation with Idaho Department of Fish and Game (IDFG).

1. Fish Populations. J.R. Simplot Company will fund fish population monitoring in key units within the Crow Creek watershed. This population monitoring will generally occur every three years for 50 years. After 21 years, IDFG and Forest Service (USFS) Fisheries Biologists will determine if there is a need to change the frequency of monitoring or continue with every three years. Every three year sampling is helpful at least initially to account for natural fluctuations in trout populations in mountain streams. Less frequent sampling does not provide enough resolution in population trends to accurately make population effects determinations. After 30 years, IDFG and USFS Fisheries Biologists will again review the population monitoring effort and determine if adjustments to the sampling schedule or strategy are necessary. If adjustments are not unanimously agreed upon, sampling will continue as is until year 50. If fish population data do not indicate long term negative trends after 50 years of monitoring, the agencies will determine the need to continue the surveys for an additional 50 years. If there is a long term negative trend detected

in the project site streams by year 50, the survey will continue for an additional 50 years as necessary.

Fish population monitoring will occur during low flow. Fish population monitoring will occur in **Crow Creek** (sampling sites CC-150, CC-350, CC-1A), **Spring Creek** (Three sampling sites to be determined by J.R. Simplot Company. They should be similar as possible to conditions that exist at the Crow Creek sites.), **Beaver Dam Creek** (Three sampling sites to be determined by J.R. Simplot Company, located in the lower, middle, and upper sections of the stream. If there is not enough available habitat in this stream, sampling sites can be decreased to two), **Sage Creek** (LSV-4, LSV-2C, LS), **South Fork Sage Creek** (LSS and one more site as far upstream of there as possible), **Deer Creek** (DC-100, DC-200, DC-600), **North Fork Deer Creek** (NFDC-700, NFDC-200), and **South Fork Deer Creek** (SFDC-100).

A backpack electroshocker and at least 2 netters will be used to sample each 100 meter unit utilizing a 3-pass method. Surveyors will request sampling permits and coordinate their efforts with IDFG (and Wyoming Game and Fish when surveying in Wyoming-WGF). The fish population data will be entered into a database provided by IDFG and USFS and a monitoring report will be prepared summarizing the data and detected trends. Data and reports will be shared with Bureau of Land Management (BLM), IDFG, WYGF, Idaho Department of Environmental Quality (IDEQ), and the C-T Forest fisheries program. Data will be reviewed by the agencies and negative trends will be reported to the Forest Supervisor. Forest Service action in response to these trends will be at the discretion of the Forest Supervisor.

2. Aquatic Habitat. J.R. Simplot Company will fund aquatic habitat surveys that will be conducted once prior to mining, the year after Panel G is opened, and the year after the reclamation release. Any additional physical survey requirements will be event driven (The agencies can request additional surveys after hydrological events that had the potential to affect monitoring parameters). Physical surveys will occur during low flow periods and include R1/R4 longitudinal surveys and channel cross-sections.

Longitudinal surveys will occur in Deer, South Fork Sage, and Wells Canyon creeks. During the longitudinal surveys, all perennial stream length will be surveyed using a modified Hankin-Reeves survey methodology (R1/R4), as described in Overton et al. (1997).

More information about this survey methodology can be found at: http://www.fs.fed.us/rm/boise/research/techtrans/projects/r1r4inventory/r1r4inv_procedures.shtml.

All applicable parameters within this reference will be used in the survey. In addition, a Stream Reach Inventory and Channel Stability Evaluation will be conducted and documented for each survey reach. The R1/R4 data will be entered in the R1/R4 database, the datasheets and database copied, and both shared with the agencies.

Cross section surveys will occur in **Crow Creek** (CC-150, CC-350, CC-1A), **Beaver Dam Creek** (same locations as fish population sites. This will be a one time only sample), **Sage Creek** (LSV-4), **South Fork Sage Creek** (LSS), **Deer Creek** (DC-200, DC-600), and **North Fork Deer Creek** (NFDC-700, NFDC-200).

The IDEQ Stream Habitat Index will be performed at each cross section site. This requires such parameters as bankfull width, reach length, stream gradient, Rosgen stream type, sinuosity, substrate, width:depth ratio, stream bank condition, bank stability, stream bank cover, canopy closure, large woody debris, #pools, pool variability, predominant habitat type, overhead cover, embeddedness score, pool substrate character, channel shape, disruptive pressure, zone of influence, instream cover, bank angle, and % undercut banks. These parameters will be measured and/or ranked, then used to derive a SHI value that can be compared to other sites being evaluated and to reference sites.

The cross sections will include channel cross section diagrams, Wolman pebble counts, sediment grab samples (Duffield 1996), and a Riffle Stability Index as described by Kappesser (1992). In addition, at these cross sections, macroinvertebrate samples will be collected in accordance with IDEQ Beneficial Use Reconnaissance Program protocol for establishment of a macroinvertebrate biotic index to monitor beneficial use support.

The data will be entered into a database and a monitoring report will be prepared summarizing all physical survey data and detected trends. The report will be shared with the C-T National Forest Fisheries personnel, BLM, IDFG, and IDEQ. The agencies will review the data and reports and report negative trends to the Forest Supervisor. Forest Service reaction to the trends will be at the discretion of the Forest Supervisor.

3. Selenium. Trends in selenium concentrations within sediment, macroinvertebrates, periphyton, and fish will be monitored every 6 years (and as many annual baseline surveys will be conducted as possible, between the project decision and project implementation). Sampling will occur during low flow conditions. Sediment chemistry, benthic macroinvertebrate and periphyton tissue chemistry, and fish tissue will be studied. In addition, every 6 years, a minimum of one redd (fish nest) will be sampled for juvenile trout near each Crow, Sage, South Fork Sage, Deer, and North Fork Deer creek sampling location listed below and the Spring and Beaver Dam creek locations listed above in the population monitoring section (if not sampled during the separate site specific criteria development effort). If trout redds are sampled for the site specific criteria process or other field study in the future and the samples are at least as frequent as the samples required in this biological evaluation, the redd samples required through this biological evaluation will be discontinued. The redd sampling will occur through redd excavation. Percent of the juvenile trout in the redd that were deformed will be documented. A permit is required through either IDFG or WGF (depending upon sample location) for this activity.

Water chemistry will be sampled through the Surface Water Monitoring Plan so will not be included in this monitoring plan. However, care should be taken to make sure

those water chemistry sampling locations are consistent with the sampling locations in this monitoring plan. We request that water quality data be submitted to the agencies the same time as fish population data is submitted to facilitate interpretation.

The agencies (FS, BLM, IDFG, and IDEQ) reserve the right to require fish egg selenium composition sampling within spawning gravels if trends in selenium concentration monitoring and populations are considered detrimental to the well-being of fish populations.

Selenium sample locations are in **Crow Creek** (CC-150, CC-350, CC-1A), **Beaver Dam Creek** (same locations as fish population sites. This will be a one time only sample), **Sage Creek** (LSV-4), **South Fork Sage Creek** (LSS), **Deer Creek** (DC-200, DC-600), and **North Fork Deer Creek** (NFDC-700, NFDC-200).
All samples will occur every 6 years except at Beaver Dam Creek, where sampling is only required once. Sampling and analysis will be consistent with the interagency fish tissue selenium sampling protocol (currently being developed).

Data and reports will be provided to the agencies for their review. If the agencies identify concerns or negative trends, the Forest Supervisor and BLM District Manager will be notified. Forest and BLM response to the assessment report will be at the discretion of the Forest Supervisor and BLM District Manager. After 30 years, Fisheries Biologists from FS, BLM, IDFG, and IDEQ will review the selenium monitoring effort and determine if adjustments to the sampling schedule or strategy are necessary. Data collection will continue for 50 years, unless the agencies unanimously decide to terminate them due to no detected impacts. After 50 years, the agencies will decide each decade up to 100 years whether to continue the assessments. Decisions for continuing monitoring during these decade intervals beyond year 50 must be reviewed and approved by the Forest Supervisor and BLM District Manager.

This monitoring effort is in addition to and does not supplant state water quality standards for selenium, or other metals, in surface water and for support of beneficial uses such as coldwater aquatic life.

Aquatics Survey Schedule

Parameter	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Fish Populations*	X	X	X			X			X			X			X			X			X		
Aquatic Habitat**		X		X						X													
Sediment Chemistry***	X	X	X						X						X						X		
Benthic Macroinvert***	X	X	X						X						X						X		
Periphyton***	X	X	X						X						X						X		
Fish Tissue***	X	X	X						X						X						X		
Trout Redd***	X		X						X						X						X		

Parameter	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052
Fish Populations*	X			X			X			X			X			X			X			X	
Aquatic Habitat**																							
Sediment Chemistry***				X						X						X						X	
Benthic Macroinvert***				X						X						X						X	
Periphyton***				X						X						X						X	
Fish Tissue***				X						X						X						X	
Trout Redd***				X						X						X						X	

Parameter	2053	2054	2055	2056	2057
Fish Populations*		X			X
Aquatic Habitat**					
Sediment Chemistry***					X
Benthic Macroinvert***					X
Periphyton***					X
Fish Tissue***					X
Trout Redd***					X

*=Fish population surveys will occur every three years for 21 years, then it will be decided if frequency of sampling can be changed. Also, fish population surveys will continue for 50 years, then it will be decided if they are still necessary. Maximum sampling is 100 years.

**= Aquatic habitat survey years are estimated. Actual year may differ depending upon when each phase of the mine project is implemented.

***= Selenium monitoring schedule assumes project implementation is initiated in 2009. If it is earlier or later, the scheduled sampling can be adjusted accordingly. After 50 years, the agencies will decide each decade (up to 100 years) if selenium monitoring will continue to be required.

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A general list of Yellowstone cutthroat trout references can be obtained by contacting the Caribou-Targhee Forest Fisheries Biologist.