Stibnite Gold Project DEIS – Fisheries Review
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I. BACKGROUND

Mary Faurot Petterson has over 30 years of experience as a fish biologist and manager of public lands. Her expertise includes ecology of fishes in streams and lakes inhabited by resident and anadromous salmonids, habitat relationships, aquatic habitat restoration, and effects of public land management on rivers and streams. She has worked for the US Forest Service (USFS), Fish and Wildlife Service (USFWS), National Park Service, Confederated Salish and Kootenai Tribes, and the University of Sydney. She has a Bachelors degree in Biology from Florida State University and a Masters Degree in Fish and Wildlife Management from Montana State University. She is retired from the US Forest Service and resides in McCall, Idaho.

II. SCOPE OF REVIEW

This review was requested by the nonprofit Save the South Fork Salmon organization (SSFS), for the purpose of providing fisheries analysis of the Stibnite Gold Project (SGP).

III. GENERAL FINDINGS

Net degradation. The Stibnite Gold Project (SGP) would degrade habitats and have a net impact on individuals and for Chinook salmon, steelhead, bull trout, and cutthroat at mine site streams and lakes, and in other watercourses affected by related actions.

Chinook salmon. The DEIS concludes extremely negative impacts to Endangered Species Act (ESA)-listed Chinook salmon and their habitat. It does not consider climate change, accidents and spills, and the cumulative and synergistic effects of overall habitat simplification and degradation (O'Neal 2020). The overall net effect would be a loss of both quantity and quality of habitat, a decrease of productivity as a function of water flow, and a decrease of Critical Habitat (designated by ESA) by up to 26% (DEIS p. 4.12-69).

Steelhead. A predicted modelled increase in stream temperatures of up to 4 degrees C would result in an increase in the amount of available steelhead habitat. However, this modelling did not include the potential effects of climate change, which would change, and probably decrease, any amount of increased steelhead habitat (DEIS Appendix J2).

Bull trout. Post-closure, a net decrease in quality and quantity of bull trout habitat would occur, despite removal of passage barriers and an increase of lake habitat. Access to bull trout critical habitat in upper Meadow Creek would be blocked in-perpetuity, and Critical Habitat would decrease by 28-70% (DEIS Section 4.12.2.3.6.6.)

Westslope cutthroat trout. The combination of physical stream channel changes, direct effects to individuals, and changes to many of the Watershed Condition Indicators (WCIs) would negatively affect cutthroat trout in the analysis area through the loss of suitable habitat. Despite some improvement to access, there remain potential effects which may cause injury or mortality to individuals and/or displacement of cutthroat trout. (DEIS 4.12.2.3.7.4, p. 4.12-93).

Forest Plan consistency. There is no information on Forest Plan consistency in DEIS. The DEIS effects analysis needs to demonstrate any non-compliance with Forest Plan standards, which are binding limitations placed on management actions to prevent degradation of resource conditions. The

Forest Plan consistency Table (letter from Midas Gold to Payette National Forest, May 19 2019) lists 242 applicable Forest Plan Standards. The Forest Service found that the SGP would not meet 112 of those Standartds, and only 57 were found to meet the compliance determination. Many of these Standards concern aquatics and ESA-listed fish species. Appendix A proposes only four Forest Plan amendments, two of which lessen protection for ESA-listed salmon and trout. The rationale on the transition from the Forest Consistency table to Appendix A was requested under FOIA in May 2020. The Forest Service reply was not received until one week before the comment deadline, and then, only about 10% of what was requested, was received, and about 75% of that was redacted.

Effects described in the DEIS are not consistent with many standards listed in the Forest Plan consistency table. For example, some in the TEST series (affecting Theatened, Endangered, Proposed, and Candidate species), SWST series (Soil, Water, Riparian, and Aquatic Resources), MIST series (Mineral and Geology Resources) (Payette Forest Plan 2003), and others. Actions which do not comply with these relevant Standards should not be authorized unless an amendment is proposed which waives or removes its application. All relevant Standards not complied with should be proposed for amendment in the Supplemental DEIS.

III-A. IMPACTS OF MINING AND ASSOCIATED DEVELOPMENT

O'Neal (2020) provides an overview of ecological effects of mine and mine development, in the following categories: habitat simplification, decreased water quality, migration barriers, introduction of non-native species, and indirect and cumulative impacts.

III-B. SHORTCOMINGS OF THE STIBNITE GOLD PROJECT DEIS (Headings 1-10 are those provided by O'Neal 2020)

1. Comparing impacts to current habitat conditions drastically underestimates cumulative impacts of mining. See O'Neal (2020).

2. Current baseline conditions are insufficiently-and frequently inaccurately-characterized, rendering predictions of impact unreliable.

For example: because adequate characterization of existing, listed salmon and trout populations are lacking, population level impacts to salmonids from the SGP cannot be evaluated from the information provided in the DEIS (O'Neal 2020).

The DEIS (p. 4.12-24) states that the percentage of populations affected by impacts described in Chapter 4.12 is expected to be small and population-level impacts are not expected. This statement is flawed because of the lack of adequate baseline characterization of salmon populations (O'Neal 2020). About 100,000 fish are modelled to be potentially injured or killed from 1.6 km of channel alterations in the EFSF (Table 4.12-2b). This large number of potentially affected fish only takes into account those injured or killed by the 1.6 km of channel alterations, and not those affected by blasting, lethal temperatures, exposures to metals contminants, exposures to toxic spills, effects of sediment loading, food web disruptions, changes in access , and other adverse effects.

3. Physical habitat impacts from mining are underestimated in the DEIS.

Physical habitat is described, but data sources are not provided, in the DEIS baseline (DEIS p. 3.12-62). However, physical habitat is ignored in the DEIS prediction of impacts (DEIS p. 4.12-1). The Stream Function Assessment uses an unrepeatable, unproven model based loosely on WCIs to track degradation and improvement of various physical characteristics (see discussion under #10, Stream Function Assessment, below).

Spill Risk. The DEIS (p. 4.12-23) states: "It is expected the risk associated with a spill large enough to negatively affect fish or aquatic habitat would generally be low." This unjustified conclusion overlooks inevitable cumulative, chronic, and potentially additive effects of multiple spills over time (O'Neal 2020), underestimates effects on fish habitats because assessments are based on measuring the amount of stream that is a 91 m distance from the roadway centerline, which is less than half the published distance for a 200 meter impact zone around rural roadways (Lubetkin 2020), and estimates spill risk rates that are two orders of magnitude lower than rates cited in other large mine DEIS's (Lubetkin 2020).

According to the DEIS (Section 4.12.2.3.2.2): "the magnitude of impacts could be high to fish exposed to harmful concentrations of hazardous materials, and the duration of the risk of impacts would extend throughout the SGP. A large diesel spill could kill 100 percent of the Chinook salmon juveniles, adults, alevins, and eggs for a considerable distance (several miles) downstream of the accident (National Marine Fisheries Service [NMFS] 1995). In terms of toxicity to water-column organisms, diesel is one of the most acutely toxic oil types. Fish, invertebrates, and aquatic vegetation that come in direct contact with a diesel spill may be killed (U.S. Environmental Protection Agency [EPA] 2019). Thus, a large spill could potentially kill a substantial number of adult salmon depending on various factors (NMFS 1995). A spill in the fall could kill all the 1-year old juveniles and zero age eggs/alevins, thus eliminating 2 years of Chinook salmon progeny. Diesel from a spill could mix with spawning gravels and sand and be retained in the stream substrate for a year or more, and thereby negatively affect salmon eggs, alevins, and juveniles for several years (Korn and Rice 1981; Moles et al. 1981)".

The impacts that spills and accidents may have on the aquatic environment along the transportation corridor should be seriously and thoroughly considered further in a supplemental DEIS, using Lubetkin's (2020) data and analysis methods, and analyzing specific impacts to species and life stages.

4. Impacts to water quantity and quality from Stibnite Mine development are vastly underestimated in the DEIS. O'Neal (2020) documents effects of many metals and contaminants on fish.

The DEIS (4.12.2.3.3.1) states: **"**Despite activities that would improve water quality for fish from the removal and reclamation of legacy mine wastes, exceedances of the NMFS and USFWS and other applicable criteria for antimony, arsenic, copper, and mercury are anticipated to extend indefinitely post-closure". These exceedences need to be evaluated for their effects to fish affected by the SGP so the entire array of impacts to fish from the SGP can be understood.

Maest (2020) states: "The food chain/dietary pathway for fish (contaminated stream sediment to macroinvertebrates to fish) was not considered in the DEIS conceptual models, in the examination of existing conditions, or in current or future modeling efforts. It was also not considered when evaluating potential environmental improvements from planned legacy cleanup or mitigation measures. No information is provided in the DEIS on stream sediment metal/metalloid concentrations"; and "A reliable evaluation of the potential effects of the mine cannot be completed without site-specific information on chemical speciation and the toxicity of antimony to fish populations". Further, Maest discloses that sediment arsenic concentrations exceed the probable effects level (PEL) by up to 400 times, and sediment mercury concentrations exceed the PEL by up to 50 times. The food chain/dietary pathway for arsenic has been shown to adversely affect salmonids in laboratory experiments and at locations in Montana and Idaho, yet it was completely ignored in the DEIS". Maest concludes that little information on the toxicity of antimony to aquatic biota; no site-specific information on antimony or arsenic toxicity to resident and protected fish, macroinvertebrate, and aquatic plant populations; and no information is provided on the relationship between fish life cycles and temporal variability of arsenic, antimony, mercury, or any other analytes in site surface waters. No information is provided on the exposure to fish from As, Sb, Hg, or other contaminants via the dietary pathway (sediment-macroinvertebrate-fish). This pathway has been shown to cause adverse effects to salmonids at mine sites in Idaho and Montana".

Effects analysis needs to include food chain pathways, toxicity for arsenic, antimony, mercury, and other contaminants, and other lacking information stated by Maest (2020) in order to understand the effects of the SGP mining proposal.

5. Impacts to salmonids from project-related groundwater changes are ignored in the DEIS. See O'Neal (2020).

6. Temperature increases ignore climate change, are otherwise underestimated, and their impacts are unreasonably minimized. The increase in stream temperatures as a result of the SGP would affect habitats in the mine site and downstream. Chinook salmon and bull trout would be the most advesrsely affected, because they spawn at the warmest time of year. An increase in modelled stream temperatures in Meadow Creek and the East Fork South Fork Salmon River is predicted to range from 0.5-9.0 degrees C (DEIS Table 4.12-66, without considering climate change.

Appendix J2 states: "During the life of the mine and irrespective of other environmental constraints in Meadow Creek, maximum water temperatures have the potential during the summer season to exceed temperatures that are known to be stressful and even lethal to all the special status salmonids. Meadow Creek downstream of the East Fork Meadow Creek would have potential water temperatures that are lethal to Chinook salmon during the summer in perpetuity.

Effects of these temperature increase need to be displayed with specific effects to life stages of fish number of generations affected, and effects on populations in the EFSF.

7. Impacts to all non-salmon/trout species-fish and other aquatic life that support them- are ignored in the DEIS.
Macroinvertebrates are food for fish, and therefore are critical elements of the aquatic environment which support salmon and trout life histories. The DEIS does not include any analysis or data presentation of the decades of macroinvertebrate sampling which occurred in Stibnite mine site streams from the mid 1990's through the mid 2000's (Payette National Forest files). A supplemental DEIS is

needed that provides analysis of macroinvertebrate baseline conditions, and predicted effects of the mine to macroinvertebrates, so that impacts to salmon and trout can be adequately understood.

8. The DEIS assumes no interactions among impacts. The DEIS does not sufficiently discuss the inextricable connections between the myriad impacts to fish An impact from, for example, temperature increase, will inevitably cause synergistic and/or cumulative impacts to other impacts such as metals exceedences (ie mercury, arsenic).

9. Loss of headwater streams is falsely assumed to have no downstream impacts. As an example of O'Neal's discussion the inportance of these habitats, three barriers to fish passage (among one alternative or another) will be constructed below tailings and/or waste rock dumps at the very headwaters of Fiddle Creek, Meadow Creek, and the East Fork (DEIS Figure 4.12-2). Impacts of loss of physical, chemical, and biological characteristics of these headwaters, fragmentation, habitat simplification, contminants introduction, and impoundment failure risk and effects need to be analyzed in a supplemental DEIS.

10. The DEIS assumes that mitigation and restoration efforts are possible and effective.

Speicific mitigation for specific degradation is missing. The lists of design features and mitigations in Appendix D are intended to reduce impacts to various resources. They are merely lists, with no rationale or interpretation or analysis in the DEIS. Chapters 4.11 and 4.12 clearly describe multiple specific aquatic and watershed degradations, yet omit any analysis of specific mitigations. A supplemental DEIS is needed, which includes analysis of the specific mitigations that allegedly "correct" corresponding specific aquatic and watershed degradation.

Stream Function Analysis (SFA) (DEIS Appendix D2, Conceptual Stream and Mitigation Plan, p. 6-3, Rio ASE 2019) was developed for the SGP to track impacts on streams before, during and after mining following restoration, as a tool to quantify compensatory mitigation debits and credits for the US Army Corps of Engineers to determine compliance with the Clean Water Act, and for the DEIS analysis and associated ESA consultation.
- The SFA is an unproven model, used in the DEIS to ensure mitigation for the SGP's unavoidable impacts on jurisdictional aquatic resources. Other proven models exist and are used on the Payette and Boise National Forests and in the Pacific Northwest to characterize impacts to streams (p. 2-9). Using a new, unproven, made-for Midas Gold model does not comply with NEPA's Best Available Science requirement.
- The SFA used some Watershed Condition Indicators (WCIs) to feed the model, and ignored others, replacing the WCI analysis with SFA analysis for SGP NEPA and ESA consultation. Forest Plans and associated NEPA direct using the WCI analysis for all NEPA and ESA consultation for projects affecting ESA-listed aquatic species. Usage of the SFA instead of the WCI needs to go through ESA consultation to be a valid replacement for WCI analysis.
-Description and results of the SFA do not appear anywhere in the body of the DEIS. Yet they are pivotal to the DEIS conclusions that mitigation for historic and proposed mining efforts will offset impacts from proposed mining efforts.
- Conceptual/compensatory mitigation does not appear anywhere in the body of the DEIS, it is buried in Appendix D. Even in Appendix D, there is no discussion of SFA results, and no attempt at interpretation of results, only presentation tables and graphs.

-Input data and results of the SFA modelling are not shared in the DEIS: “Midas Gold and its consultants maintain the one and only official version of the SFA Ledger”. The DEIS reader/user is not able to use the model to come to the same conclusions as the project proponent.

11. The DEIS assumes no downstream impacts. The DEIS (p. 3.12-1) describes the fish analysis area as encompassing all areas in which fish resources and fish habitat may be affected directly or indirectly by the SGP, and not merely the immediate area involved. The analysis area is located in the South Fork Salmon River hydrological subbasin and the North Fork Payette River hydrological subbasin as illustrated Figure 3.12-1), Yet, the DEIS does not analyze effects to subwatersheds downstream and outside of the SGP mine site area within the fish analysis area illustrated in Figure 3.12-1. Effects to waters downstream of the Yellow Pine Pit Lake - which may be the most impacted waters-are not evaluated. Failure to incorporate those effects in the DEIS results in substantial underestimation of project effects. (ie: temperature increases, potential spill risk effects to fish, road effects, increases in metals concentrations, and synergistic effects on fish populations).

DEIS Figure 3.9-1, p. 3.9-1 describes the surface water quality analysis area to include streams and lakes located in the 22 sub-watersheds that encompass the proposed mine site, access roads, transmission lines, and off-site facilities within the East Fork and South Fork Salmon River watersheds. Yet Chapter 4 only analyzes effects to water quality at the mine site area. The DEIS does not analyze consequences to the surface water quality analysis area downstream and outside of the SGP area (increased temperatures, spill risk, metals concentrations).

ESA-listed salmon, steelhead, and bull trout migrate through many miles of waters downstream and outside of the mine site, and rely on habitat conditions therein to complete their life histories. A supplemental DEIS needs to describe and analyze effects of the mine downstream of the mine site to water quality and fish, and if not, analyze and describe why there are no downstream effects.

12. Effects description of barrier removals inadequately characterize impacts and improvements.

The DEIS claims “the positive impacts of removing barriers outweigh the potential negative impacts” (DEIS p. 4.12-39).

Three **barriers** to fish passage exist at baseline that are proposed to be removed in one alternative or another: EFSFSR upstream of the Yellow Pine Pit Lake (YPP) (complete barrier, blocks 39.7 km, including that blocked by the other two barriers); 2) EFSFSR box culvert (partial barrier, blocks 31.6 km); and 3) Meadow Creek (partial barrier, blocks 9.6 km) (DEIS Figure 4.12-2, and DEIS Appendix J-3). Three additional barriers are proposed to be constructed and in place (in one alternative or another) by the end of the project, in perpetuity: Fiddle Creek, Meadow Creek, and Upper EFSFSR (Figure 4.12-2).

Fish habitat evaluated included the following analysis models: Critical habitat for Chinook salmon and bull trout, Intrinsic Potential (IP) for Chinook salmon and steelhead, and Occupancy Model (OM) for cutthroat trout and bull trout (Used as a surrogate for available fish habitat for the two species). O’Neal (2020) describes the oversimplifications, underestimations, and flaws in using these models. Even using these flawed models, there would be a significant net Critical habitat loss for ESA-listed Chinook

(21-26%) and bull trout (28-70%), and a marginal increase in useable for steelhead (4-13%), than existed at baseline (DEIS Table 4.12-66).

Effects of these additional fish passage barriers do not comply with Forest Plan Standard 1301(Payette NF Forest Plan), and 2101, 1919, and 2005 (Boise NF Forest Plan) regarding degradation of aquatic resource conditions.

13. Effects of the East Fork Fish Tunnel inadequately characterize impacts and improvements. The East Fork Fish Tunnel is described in Brown and Caldwell et al. 2019B: the Fishway Operations and Management Plan. Claims of the success of this tunnel are assumed in the body of the DEIS. However, "There is some question regarding the effectiveness and efficacy of the EFSFSR tunnel to pass fish (USFWS 2019). The U.S. Fish and Wildlife Service (USFWS) notes, in a letter to Midas Gold dated October 3, 2019, "[E]ven after close consultation and collaboration with NMFS, meeting applicable NMFS passage criteria and guidelines, and executing all potential adaptive management measures, there exists a reasonable probability that the project will not be able to volitionally pass fish safely, timely, or effectively" (USFWS 2019). The results presented in this TM must be viewed in light of the USFWS's assessment of the effectiveness of the EFSFSR tunnel. Results are presented, with the assumption that the tunnel would allow volitional passage; however, other entities involved in the project have questioned the tunnel's ability to pass fish. (DEIS Apx. J3. pg 6).

There is little rationale to support the proven success of such a tunnel in the DEIS. Of the three references cited, only abstracts were available in the Supporting Documents. None of these studies analyzed Chinook salmon or steelhead, or sites with characteristics similar to Stibnite (ie from an accessible river to an unaccessible channel upstream). Gowans et al. 2003 tracked Atlantic salmon in Scotland on a river system from a reservoir through four fish passes including fish ladders, fish lifts, and a tunnel . Only 4 out of 54 tagged adults made it to spawning grounds. Wollenbaek et al. 2011 examined genetic connectivity of lake-dwelling Arctic char in Norway across a dam through a subterranean tunnel and spill gates. The char were represented by two genetically distinct lake populations, and connectivity was demonstrated, but it was questioned to what extent char utilized the tunnel for upstream migration. Rogers and Cane (1979) indicated "numbers of fish succeeding the tunnel and weir" for Atlantic salmon from a pumped storage reservoir to upstream spawning grounds in New Wales, but the complete study was unavailable.

The backup plan, should the tunnel not work, would be to trap and haul fish up and downstream of the Yellow Pine Pit until the reconstructed East Fork is completed (this relies on the assumption that the constructed and enhanced stream reaches would perform as described in the Stream Design Report DEIS 4.12.2.2). According to the DEIS, about 100,000 fish are modelled to be "affected" (injured/killed) from 1.6 km of stream removals and diversions in the East Fork (Table 4.12-2b, and p. 4.12-17) due to dewatering, fish salvage, and relocation. (From DEIS Table 4.12-2b: 84,066 Chinook salmon + 1,009 steelhead + 620 bull trout + 10,647 cutthroat = 96,342 fish potentially affected).

14. Roads and sediment. (Full report in Newberry 2020)

Johnson Creek (CR 10-413), Burnt Log (FDR 447) and Stibnite Roads (CR 50-412) have no sediment erosion data collected or erosion assessment made for them. Erosion data needs to be gathered from or used for modeling sediment from the road system reconstruction, new construction and use. Sediment monitoring needs to occur demonstrating that sediment will or will not enter streams from reconstruction, new construction or maintenance activities. How will stream habitat monitoring sites demonstrate whether road –generated sediment is/isn't affecting the spawning /rearing/holding habitats of these streams, especially for bull trout?

Are there stream fish habitat monitoring sites, which metrics will be used, and when will they occur? In Brown and Caldwell, 2019b. Fisheries and Aquatic Resources Mitigation p. 8-2 it states: *"Specific SFA elements outlined below will be monitored at strategic locations at a frequency determined in consultation with the agencies and with the USACE. This is because the stream restoration would be part of a compensatory mitigation plan to be submitted by Midas Gold to the USACE for a DA permit pursuant to Section 404 of the CWA."* Why are these not being used for annual stream habitat and fish monitoring, especially for instream bedload sediment monitoring? This mitigation needs to be disclosed in order to understand the analysis of adverse effects to ESA listed fish and their critical habitat.

Johnson Creek (CR 10-413), Warm Lake (CR 10-579) and Stibnite Roads (CR 50-412) have no geologic hazard assessment data.
Section 3.2.3.7.2 ACCESS ROADS states: *"… because only the Burnt Log Route has been the subject of a specific geologic hazard assessment (STRATA 2016)"*
Section 4.23.2.2.4 ALTERNATIVE 4 states**, "***Johnson Creek Johnson Creek Road (CR 10-413) would be part of the mine access route under Alternative 4. Increased traffic would occur along this route, which parallels the eligible segment of Johnson Creek. Detailed road prism studies of this potential route have not been completed."* If these roads are being used at a minimum for the first 2-3 years, and potentially in Alternative 4 for the duration of the mining, why have they not had geologic hazard assessment completed?

Stream Fisheries Monitoring data in SGP literature. Cobble Embeddedness, free matrix particle, and PIBO fisheries habitat data are available for the Fish Analysis area in the DEIS supplementary reports: HDR, 2016; MWH, 2015-2017;Great Ecology, 2018 and others. These data and sites should be used as fish habitat baseline and monitoring references to adequately understand effects of the SGP proposal.

Competency /Hardness of local granitic rock sources for Burnt Log road gravel application. What is the competency /hardness of the granite quarried for road work in the SGP proposal? "A section of road with marginal-quality aggregate produced 3.7 to 17.3 times as much sediment as a similar section with good-quality aggregate…. The marginal quality aggregate had less resistance to cross-slope flattening and, therefore, longer flow paths and hence more sediment production. Another mechanism was the inability of the marginal-quality material to resist crushing or chemical degradation, which resulted in a constant replenishment of the fine material to be transported by the flowing water." (Source: Randy B. Foltz and Mark Truebe Transportation Research Record 1819 ■ 185 Paper No. LVR8-1050).

Change in monitoring requirements for sediment. How do turbidity and suspended solids (DEIS Section 3.9.3.1.1.6 Sediment Content; and Section 4.9.2.1.2.1, Surface Water and Groundwater Quality – Mine Site Sediment – Alternative 1, pp. 4.12-30 to 31) correlate with the monitoring methodologies that are required for the Boise and Payette National Forests by the National Marine Fisheries Service (NMFS) biological opinion Term and Condition 3.B.1.which states,"… required the

Payette National Forest (PNF) and Boise National Forest (BNF) revise the default sediment watershed condition indicator (WCI) values to something more appropriate for the South Fork Salmon River (SFSR)." (Source: Letter from: UNITED STATES DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration NATIONAL MARINE FISHERIES SERVICE (NMFS) 10095 West Emerald Street Boise, Idaho 83704 July 28, 2005) . The current methods in use by the forests and approved by NMFS for the SFSR are: modified McNeil core samples; Cobble Embeddedness; and free matrix particles. Appendix J-1, Table J1-4 shows these methods. Any change should require ESA consultation.

> How do Nephelometry and total suspended solids measure stream bed load sediment movements which affect the salmonid rearing and spawning habitats, as well as macroinvertebrate habitat? What monitoring methodologies will be used in the replacement/new construction of culverts and bridge abutments on the Burnt Log and Johnson Creek/Stibnite roads? What monitoring will be used to determine whether bed load sediments from the reconstruction/new construction/maintenance of road systems on the spawning and rearing habitats of salmon, steelhead, and bull trout?

Culvert replacement methods, spacing and placement. Section 4.16.2.4 Alternative 4, *p.4.16-19 states that "…the Burnt Log road will have* **182** 18-inch culverts and 2 60-inch culverts installed." Section 4.9.2.1.2.2 'Access Roads states, "*Alternative 1 would cross 71 different named and unnamed streams, as inventoried in Table 4.9-13.'* DEIS Attachment 7 (Criteria for Cross-Drain spacing**)** discusses methods for installation and spacing of culverts for maximizing sediment disbursement and minimizing channeling of sediment into streams. DEIS Attachment 9- Culvert addresses specifically the Goat Creek culvert replacement and lists the requirements to be followed in removal and replacement. Will the Goat Creek requirements listed in Attachment 9 be followed during installation on-the- ground for all culverts, or just fish bearing/live stream culverts? Will culvert spacing listed in Attachment 7 be followed in relief culvert placement? How will relief culvert drainage into intermittent stream channels and "swales" (zero order streams) be accomplished to minimize development of first order channels that will create additional sedimentation downstream?

Access roads. Sections 3.15.3.2.2, 3.16.3.2 and 4.9.2.1.2.2 describe the three access roads - Johnson Creek (CR 10-579), McCall-Stibnite (CR 50-412), and Burnt Log (FR 447), but no mitigation practices, or how to use them, to compensate for SGP use. This does not allow for an assessment of the amount of sediment reduction by alternative in the DEIS or on-the-ground practices. It is the responsibility of SGP in the DEIS to design these practices first. The sediment eroded from road surfaces, ditchlines and cut/fill slopes of any road used in the SGP needs to be monitored, and methods specified. Spawning and rearing habitat in mine site and off-site affected streams needs to be monitored, and methods specified.

Running surface. What are the sediment reduction mitigation practices for the borrow sites? Why is FS Mitigation # FS-105 "*Water management features will be constructed, installed, and/or maintained on authorized temporary roads on completion of use, before expected water runoff, or before seasonal shutdown. Activities and features could include water bars, rolling dips, seeding, grading, slump removal, barriers/berms, distribution of slash, and culvert/ditch cleaning"* not being addressed here? How much more sediment will be produced by the approximately 45 passes/day of heavy vehicles compared to the 16 passes /day cited in Megahan and Kidd, 1972?

Fillslopes. Why is there no analysis of potential constructed fillslope sediment delivery to streams Why is straw the only listed mitigation for steep fill/cut slopes? Why is no type of holding material for the straw designed for steep slopes? Why is FS Mitigation # FS-52, *"To minimize sediment runoff from the temporary roads and roadbeds, water bars, silt fencing, certified weed-free wattles, and/or weed-free straw bales will be installed in strategic downslope areas and in RCAs*" not being addressed here?

Cutslopes. Why is FS Mitigation # FS-52, "*To minimize sediment runoff from the temporary roads and roadbeds, water bars, silt fencing, certified weed-free wattles, and/or weed-free straw bales will be installed in strategic downslope areas and in RCAs*" not being addressed here? Why is there no analysis of potential constructed cutslope sediment delivery to streams? How will hydro-seeding be accomplished to insure germination and catch in granitic soils of the cut/fill slopes? Besides straw, what other mulches are listed to work on granitic soils in cut/fill slope applications?

Ditchlines. How are the ditchlines to be maintained along with the running surface of the roads? Will riprap be used where needed in ditchlines to armor and slow down erosion and sediment movement from cut slopes and road running surfaces? How will ditchlines leading directly to live and /or intermittent stream channels be designed to reduce sediment movement to the stream channels?

Utilities and sediment production. Section 3.9.3.1.2 ACCESS ROADS, UTILITIES, AND OFF-SITE FACILITIES states**,** "*The Surface Water Quality Baseline Study (HDR 2017) did not include sample locations outside of the proposed mine site. However, streams adjacent to proposed access roads, utility corridors, and off-site facilities still have the potential to be impacted by SGP activities.*"

- How will
- the widening of approximately 63 miles of existing power lines from 50 to 100 ft wide,
-the construction of approximately 4 miles of access roads,
-the construction of *laydown areas, tensioning areas,*
-the addition of new, taller transmission towers
-and new construction of about 8 miles of utility lines

specifically affect the water quality of IDEQ listed impaired streams, and ESA-listed fish and fish habitat?

- What are the, "… *erosion control and sediment BMPs*…." that will reduce sediment production at the pole construction areas?
- What processes will reduce sediment at stream crossings where new towers are to be replaced?
- What are the "reclamation processes" mentioned in Section 4.5.2.1.1.2 Boise National Forest p. 4.15-18 for the utility pad, lay down /tensioning areas and roads?
- When will this reclamation occur?
- Define: "Immediately after construction". Is this after the three years construction period has been completed, or after each one of the "…construction laydown areas, tensioning areas, and some of the new roads…." have been completed?

15. Evaluation of the proposed Burntlog Road access is insufficient or missing important information required to understand the effects of the proposal on fish and streams. (Full report in Newberry 2020)

Effects of 2020 fires. How do these affect baseline?

No listing exists of the actual WCI values in the DEIS. The potential changes in actual WCI values for Upper Burnt Log, Trapper and Riordan subwatersheds for the following WCI values are missing and should be included in the DEIS: # Road /Stream crossings; % Landslide prone; Landslide prone acres; Road miles in Landslide prone; Road miles in Riparian Conservation Areas; Change in Drainage network; Road density; and Road miles (increased).

Roads (CR 50-412) have no sediment erosion data collected or erosion assessment made for them. See previous section 14.

Are there stream fish habitat monitoring sites? See previous Section 14.

Roads (CR 50-412) have no geologic hazard assessment data. See previous section 14.

Stream Fisheries Monitoring data in SGP literature. Cobble Embeddedness, free matrix particle, and PIBO fisheries habitat data were gathered for Johnson, Burnt Log, Riordan and Trapper Creeks in the DEIS supplementary reports: HDR, 2016; MWH, 2015-2017;Great Ecology, 2018 and others. These data and sites should be used as fish habitat baseline and monitoring references to adequately understand effects of the SGP proposal.

Competency of local granitic rock sources. See previous section 14.

Change in monitoring requirements for sediment. See previous section 14. How do Nephelometry and total suspended solids measure stream bed load sediment movements which affect the salmonid rearing and spawning habitats, as well as macroinvertebrate habitat? What monitoring methodologies will be used in the replacement/new construction of culverts and bridge abutments on the Burnt Log and Johnson Creek/Stibnite roads? What monitoring will be used to determine whether bed load sediments from the reconstruction/new construction/maintenance of the Burnt Log road systems on the spawning and rearing habitats of bull trout in the Burnt Log, Trapper and Riordan Creek drainages?

Culvert replacement. See previous section 14.

Upper slope road (Burntlog) placement vs. lower slope road (Johnson) placement. The gist of the argument is that the Johnson Creek/Stibnite road access will be worse than the Burnt Log road access. The author's professional opinion is to re-construct the existing Johnson Creek/Stibnite route. The Johnson Creek/Stibnite roads already exist, where 15-20 miles of the Burnt Log road needs to be totally constructed , and the existing 20 miles needs to be re-constructed to a 20 ft running surface, creating additional sediment to headwater streams feeding bull trout, Westslope cutthroat trout and finally to Chinook habitat and spawning reaches in Johnson Creek.

Access Roads. See previous section 14.

Utilities. See previous section 14.