

A Report Prepared for Review of the SDEIS for the
Proposed Stibnite Gold Project (SGP):
Wetland Issues and
Clean Water Act Section 404(b)(1) Guidelines Analysis

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Introduction

I am a retired federal wetlands ecologist and wildlife biologist with over four decades of experience in the Clean Water Act Section 404 (dredge and fill) Program. I spent nearly 33 years with the U. S. Environmental Protection Agency at its Headquarters office in Washington, D.C., and New England Region office in Boston, Massachusetts. Prior to retiring from federal service, I served concurrently as Chief of the New England Region's Wetlands Protection Program, as Senior Mediator with the Region's Alternative Dispute Resolution Program, and as the Agency's representative on the International Joint Commission's International St. Croix River (Maine/New Brunswick) Watershed Board. I also served as the Region's Wetlands Enforcement Coordinator for 11 years, Senior Wetlands Ecologist for 26 years, and as Special Assistant to the Deputy Regional Administrator for one year. While with the Agency's Headquarters office, I managed nationally controversial wetland cases and also worked in the Superfund Program.

As a nationally recognized expert in the federal Clean Water Act's Section 404 Program, I convened and supervised teams to prepare expert testimony for litigation for federal court cases. I also testified before federal grand juries and served several times as an expert witness on wetland regulatory and technical matters in civil litigation at both federal and state levels.

I served as the technical expert for EPA Clean Water Act section 404(c) veto actions for projects in New England and advised both EPA Headquarters and other EPA Regions on section 404(c) veto actions in other parts of the country.

Upon retiring from federal service in 2012, I opened my own consulting company—Wetland Strategies and Solutions, LLC (WSS). WSS provides expert and affordable environmental consulting services to small and large companies; law firms; federal, state, and municipal agencies; non-governmental organizations; and private land owners. As an environmental consultant, I have worked on numerous projects throughout 1 nation, including the proposed Rosemont mine in Arizona, Pebble mine in Alaska, and PolyMet mine in Minnesota.

I received my degree in Wildlife Management from the University of Maine. I am a certified Professional Wetland Scientist under the Professional Certification Program of the Society of Wetland Scientists.

Summary of Conclusions

Based on an estimate, the proposed mine will directly fill at least 76 acres of diverse wetlands and streams. Also, at least 300 acres of riparian habitat would be directly filled. This acreage figure does not account for full range and extent of indirect (secondary) impacts downstream of the Mine facilities, e.g., riparian wetlands along the East Fork of the South Fork of the Salmon River (EFSFSR), as well as several smaller streams that would be affected by the proposed SGP.

- There are significant information gaps for the SGP regarding alternatives, adverse impacts, and compensatory mitigation.
- The alternatives analysis under both NEPA and CWA Section 404 is inadequate. Besides the SGP, no other alternatives have been proposed and described.
- The likely direct, indirect (secondary), and cumulative adverse impacts must be more fully described and analyzed.
- It is premature to address compensatory mitigation in a meaningful and definitive manner. Until the Least Environmentally Damaging Practicable Alternative (LEDPA) has been identified, all appropriate and practicable compensatory mitigation cannot be determined.

Environmental Setting

The SGP is located in the Stibnite-Yellow Pine Mining District (District) in Valley County, central Idaho, near the Frank Church River of No Return Wilderness Area (see SDEIS, Figure 1-1). The District is characterized by historical mining activities and federal land and private land mining claims with known deposits of gold, silver, tungsten, and antimony. The District is in the Boise National Forest but is administered by the Krassel Ranger District of the Payette National Forest. The SGP site is located along the East Fork of the South Fork of the Salmon River (EFSFSR) and its tributaries, principally Johnson Creek, approximately 15 miles upstream of the town of Yellow Pine in central Idaho (See Figure 1-1 of the SDEIS). There are several smaller creeks and streams in the project area. The terrain within the SGP site consists of narrow valleys surrounded by steep mountains. Elevations along valley floors range from 6,000 to 6,600 feet above mean sea level. The surrounding mountains reach elevations over 8,500 feet above mean sea level. See SDEIS at Section 1.2.1 for a more detailed description of the location of the proposed SGP.

Aquatic Resources

The South Fork Salmon is a major tributary to the second longest free-flowing river in the lower 48 states, the Wild and Scenic Main Salmon River. Most of the South Fork Salmon and many sections of its tributaries have been deemed eligible and suitable under the Wild and Scenic Rivers Act by the U.S. Forest Service. The Salmon River is critically important spawning habitat for migratory fish. Recognizing this importance, Federal agencies, tribes, and other organizations have expended significant efforts to improve the ecological health of the watershed. The South Fork Salmon watershed is indeed a cornerstone in ongoing efforts to restore threatened Chinook

salmon and steelhead to Idaho. In addition, there are numerous wetlands adjacent to the rivers, creeks and streams throughout the project area. Many of the proposed mine components would be constructed in streams and wetlands. Accordingly, Perpetua must obtain Clean Water Act Section 404 authorization to construct the mine because there would be discharges of dredged and fill material in wetlands and other waters.

According to Table 6-1 in the Wetlands and Riparian Resources Specialist Report (August 2022), approximately 429 acres of waters and wetlands were identified within the Mine Site Focus Area. According to Table 6-2 in that Report, approximately 2,139 acres of waters and wetlands were identified in the Off-Site Focus Area.

According to Table 6-4 in that Report, approximately 60 miles of perennial streams were identified in the Mine Site Focus Area, and approximately 50 miles of non-perennial streams were identified in the Off-Site Focus Area.

Table 6-5 in that Report provides more detail of the major drainages in the analysis area.

Overview of the Proposed Project

The analysis below is my evaluation of the proposed Perpetua Resource's Stibnite Gold Project mine for compliance with the Clean Water Act Section 404 (b)(1) Guidelines (the Guidelines). This evaluation is based upon my review of,

- Portions of the Forest Service 2021 Supplemental Draft EIS and related documents;
- Portions of Perpetua's Refined Proposed Action, ModPRO2, October 2021;
- Wetlands Functions and Values Report by Tetra Tech, 2021;
- Stibnite Gold Project EIS, Appendix I, Wetlands and Riparian Resources;
- Stibnite Gold Project EIS, Appendix K, Wildlife and Wildlife Habitat;
- CWA Section 404 (b)(1) Evaluation Framework for the Stibnite Gold Project, December 2019;
- Stibnite Gold Project EIS, Plan of Operations, Appendix G;
- Stibnite Gold Project Wetlands and Riparian Resources Specialist Report, USDA Forest Service, Payette National Forest for: Payette and Boise National Forests, August 2022;
- On-line mapping resources, such as the USDA-NRCS Web Soil Survey and the U.S. Fish and Wildlife Service-National Wetland Inventory;
- Several maps of the principal watershed for the South Fork;
- My on-line research regarding:
 - Fish and wildlife resources documented or expected to occur throughout the South Fork corridor and in the surrounding landscape; and,
 - My knowledge of and over 40-years experience with the CWA Section 404 (b)(1) Guidelines and Program. ¹

¹ See attached references list.

The revised Plan submitted by Perpetua Resources (Perpetua) in October 2021 is considered to be the Proposed Action, also known as the 2021 MMP (modified mine plan), and would consist of cyanide leach mine operations, including an open pit hard rock mine and associated processing facilities, located within Valley County in central Idaho on federal, state, and private lands. See SDEIS Figure ES-1. The SGP would have a projected life (construction, operation, reclamation, closure, reclamation, and closure/post-closure water treatment), not including post-reclamation monitoring, in excess of 40 years.

The proposed SGP would consist of the following mine components and would be common to the proposed mine and its two potential access routes:

- Mine pit locations, areal extents, and mining and backfilling
- Transportation on existing and proposed roads;
- Pit dewatering, surface water management, and water treatment;
- Ore processing;
- Lime generation;
- Tailings storage facility (TSF) construction and operation methods;
- TSF Buttress construction methods;
- Water supply needs and uses;
- Management of mine impacted water and stormwater runoff;
- Stibnite Gold Logistics Facility (SGLF);
- A road maintenance facility;
- Surface and underground exploration; and,
- Worker housing facility.

For access to the site, Perpetua would utilize Warm Lake Road, Johnson Creek Road, and Stibnite Road during construction of the proposed Burntlog Route; once constructed, the Burntlog Route would be the primary access route during operations and reclamation.

Adverse Impacts—Wetlands and Riparian Habitat

NEPA and CWA Section 404 call for all direct, indirect (secondary), and cumulative adverse impacts to be accounted for and described, and potential compensatory mitigation efforts must be proposed and described as well.

Loss of Wetland and Riparian Areas

According to the DSEIS, direct losses of wetlands due to the 2021 MMP in this area would be 76.3 acres and the Johnson Creek Alternative would result in the direct loss of 71.2 acres. Perennial stream lengths affected would be approximately 4.5 miles for the 2021 MMP and approximately 4 miles for the Johnson Creek Alternative, and lengths of non-perennial streams impacts would be about 2.8 miles and 2.2 miles, respectively. Riparian area losses would be

about 300 acres for the 2021 MMP and about 353 acres for the Johnson Creek Route Alternative. Differences of impacts to wetland and riparian acreages outside the mine site focus area are predominantly due to the absence of the Burntlog Route disturbance under the Johnson Creek Route Alternative. These acreage and mileage numbers are approximations described in the DSEIS.

Mine Site Focus Area

In section 6.1.1.1 the DSEIS, mentions that within the mine site focus area, approximately 847 acres have been modified by past human activity and are considered highly disturbed. This area represents approximately half of the disturbance for the proposed SGP mine site area. As a result of almost a century of mining and exploration in the mine site area, numerous wetlands and streams have been altered, particularly those adjacent to former mine pits, tailing storage areas, and roads. Most of these activities occurred before enactment of the CWA in 1972 and associated mitigation requirements. As that filling and disturbance to wetlands and streams occurred more than 50 to 60 years ago, it would be helpful to know approximately when those disturbances occurred. The functional assessment contained in the Wetland Functions and Value Report is somewhat helpful, but it speaks to the present, not 50 to 60 plus years ago which is needed to judge how well those disturbed wetlands and streams have recovered on their own and would be helpful to gauge the needs and efficacy of proposed compensatory mitigation. The 2021 MMP and the Johnson Creek Route Alternative would result in the same loss of 120 wetland acres within the mine site focus area and 619 acres of riparian areas.

Off-Site Focus Area

Within the off-side focus area, the DSEIS identifies approximately 2,138 acres of wetlands, much of which would be adversely affected by the proposed SGP. In addition, riparian areas along the EFSFSR and nearly all of the streams in the affected corridors would be indirectly impacted. The off-site area includes features such as Big Creek - North Fork Payette River, Cascade Reservoir, Gold Fork River, Johnson Creek, Lake Fork - North Fork Payette River, Headwaters East Fork SFSR, and Upper South Fork Salmon River. Riparian corridors are extremely important for maintaining the ecological integrity of the rivers and streams, and the wetland systems with which they are associated. Riparian corridors contribute to maintaining the integrity of aquatic ecosystems by 1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams; 2) providing root strength for channel stability; 3) shading the stream to maintain stream temperature, especially for cold water fish; 4) protecting water quality; and 5) providing valuable habitat for all wildlife groups (i.e., mammals, birds, reptiles, and amphibians).

The Wetland Functions and Value Report

Wetlands provide critical habitat for wildlife, and, in fact, wetlands exceed all other land types in wildlife productivity. Wetlands are an essential habitat for many of Idaho's fish, wildlife,

invertebrate, and plant species. Nearly 50% of bird species rely on wetland and riparian habitats. Wetlands, and associated aquatic and riparian habitats, also support about 50% of Idaho's wildlife Species of Greatest Conservation Need and 50% of the state's rare plant species. They also function to cleanse and water, trap sediment and toxins, and support ecosystem food chains. Wetland-based recreation significantly contributes to Idaho's economy.^{2,3}

DSEIS Section 2.1 mentions that “[t]he USACE has determined that the MWAM is an appropriate method to meet federal requirements for the Project (Martinez, 2016; Martinez and Griffith, 2018).” The DSEIS does not explain the Corps' reasoning for this determination, and that would be key to understand why the Corps believes it is appropriate.

Overall, the 2021 MMP-related vegetation clearing would impact 3,564 acres, including primarily undisturbed areas for the Burntlog Route where an increase in the potential for non-native plant establishment and spread would be more deleterious.

The Johnson Creek Route Alternative would impact 3,399 acres through vegetation clearing; however, according to the DSEIS, much of the disturbance area would be along or near previously disturbed areas (i.e., existing roads) where non-native plants are already established or could become established as a result of previously authorized activities.

The SGP would destroy or degrade extensive riparian-wetland areas, which are some of the most productive aquatic resources. Riparian-wetland habitats (riparian ecosystems) are generally defined as a body of water with its adjacent soil and vegetation⁴. Riparian ecosystems have two important features: 1) woody vegetation for shade, cover, habitat, and streambank protection; and 2) streambanks themselves, sometimes referred to as the “greenline,” with their protective shrub and herbaceous plant community. Riparian-wetland vegetation also helps control erosion, stabilizes streambanks, provides shading, filters sediment, aids floodplain development, dissipates energy, delays flood water, and can increase groundwater recharge.⁵

Function and Value Assessment — TetraTech report

It is clear that TetraTech put a great deal of effort into this report, and it contains much useful information for understanding the ecological functions provided by the wetland systems identified in the study area. The report helps view wetlands at the landscape (“30,000 feet”)

² Chris Murphy, Staff Biologist, Idaho Fish and Game, December 29, 2017 <https://idfg.idaho.gov/blog/2016/08/wetlands-are-essential-habitat>

³ For more complete information regarding fisheries as well as a critique of the DSEIS section on fisheries, see the Fisheries and Aquatic Habitat specialist report from Nick Nelson, Idaho Rivers United, 2022

⁴ Hall, F.C. and L. Bryant. 1995. Herbaceous stubble height as a warning of impending cattle grazing damage to riparian areas. GTR PNW-GTR-362. Portland, OR. USDA, Forest Service, Pacific Northwest Research Station. 9 p.

⁵ Bureau of Land Management (BLM) Salmon Field Office (SFO), Salmon River Corridor Watershed Assessment Report, Salmon Field Office, September, 2011.

level, which is fine for getting “the big picture.” However, reducing ecology to a collection of acreages and subjective rating numbers does not provide adequate context for understanding both landscape and ecological functions of the wetlands in question, and what types, extents, ranges, and degree of function would be lost and disturbed and how best those functions might be compensated (whether permittee responsible or mitigation bank).⁶ The mitigation rule notwithstanding, some adverse impacts to extensive and complex wetland systems can be uncompensable, which may be the case here.

Clean Water Act Regulatory Evaluation

The proposed mine would fill and disturb wetlands and streams, all Waters of the U.S. Waters of the U.S. includes many wetlands.⁷ Currently, the Army Corps and U.S. EPA interpret Waters of the U.S. as consistent with the pre-2015 regulatory regime until further notice.

Under Section 404 of the federal Clean Water Act (CWA), there are two types of authorizations — general permits, and standard or individual permits. In the case of this proposed mine, an individual permit would be the applicable type of authorization. An individual permit can issue only if the proposed discharge complies with the environmental standards under Section 404(b) (1), also known as the 404(b)(1) Guidelines (“the Guidelines”),⁸ which are binding regulations. The Guidelines set out four independent tests for permit issuance, described below.

- Section 230.10(a): Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. (This standard is referred to as the LEDPA, or least environmentally damaging practicable alternative.)
- Section 230.10(b): No discharge of dredged or fill material shall be permitted if it [among other things], (1) Causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable State [or approved Tribal] water quality standard; ...
- Section 230.10(c): Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. ...

⁶ More often for large projects with extensive impacts, a combination of both permittee responsible and mitigation bank is most appropriate and effective.

⁷ See <https://www.epa.gov/wotus/current-implementation-waters-united-states> for current definition of Waters of the U.S., and <https://www.epa.gov/report-environment/wetlands> for the definition of wetlands.

⁸ See 40 CFR Part 230, especially 230.10.

- Section 230.10(d): Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.

If a proposed discharge is found to comply with the Guidelines, the Army Corps then must make a determination of whether the proposed project would be contrary to the Public Interest.⁹

Section 230.10(a): Alternatives

An alternatives analysis under NEPA is separate and distinct from what is required under the 404(b)(1) Guidelines. The standards are not identical: for example, NEPA is non-regulatory and requires disclosure and evaluation of a reasonable range of alternatives; Section 404 is regulatory and the Guidelines allow only the Least Environmentally Damaging Practicable Alternative (“the LEDPA”) to be authorized under the CWA. While this might lead to some differences in the NEPA and 404 analyses, the Corps and federal and state resource agencies typically work to integrate the information requirements under both processes to the extent appropriate and feasible.

Key to evaluating alternatives under CWA Section 404 is determining the Basic Project Purpose and the Overall Project Purpose of the proposed mine. In this case, the Army Corps determined that the Basic Project Purpose is to extract gold, silver, and antimony from ore. I agree with the Corps’ determination. The Corps determined that the Overall Project Purpose is to mine, gold, silver, and antimony from ore deposits *associated with SGP’s mining claims and rights in Valley County, Idaho.*” (emphasis added). Though the first part is fine, I do not agree with the italicized phrase, which is where the Corps erred. Fastening the analysis of alternatives to the SGP in a specific location automatically constrains that analysis to that location and renders the alternatives analysis meaningless.

An overall project purpose will normally describe the proposed activity in order to characterize the applicant’s fundamental objectives. Practicable alternatives (see discussion below) are examined in light of overall project purposes. An overall project purpose defined too generally could theoretically require examination of countless potential alternatives; conversely an overall project purpose framed too specifically could automatically eliminate everything but the applicant’s proposed alternative from consideration; this appears to be the case here. In most cases, the project purpose is framed so that it is neither so broad (e.g., “to operate a profitable business”) as to involve consideration of an unwieldy number of alternatives nor so narrow as to constrain the analysis unreasonably, as was done by the Corps for this proposed mine project. While determining the overall project purpose is necessarily somewhat case-specific, the intent is to capture the fundamental objective(s) of a project (i.e., mining for the ore bodies described). Doing so enables an evaluation of potentially practicable and less environmentally damaging alternatives during the permit review process while also bounding the analysis to avoid spending

⁹ <https://www.govinfo.gov/content/pkg/CFR-2011-title33-vol3/pdf/CFR-2011-title33-vol3-sec320-4.pdf>

time on alternatives that simply could not meet the project purpose. Potentially practicable and less environmentally damaging alternatives include existing or previously closed mining operations, or alternative ore deposits that are or were available to the applicant when it entered the market. By improperly defining the overall project purpose too narrowly, the Corps' analysis fails to assess the possibility that less environmentally damaging practicable alternatives may, in fact, exist.

Applicants, particularly those well along in project planning or who already invested time and resources in a particular proposal (as is the case here), may naturally desire an overall project purpose statement that contains a number of specifics aimed at increasing the likelihood that the alternatives analysis will lead to the project they already have in mind. However, the regulations require a credible alternatives analysis be performed, one that aims to identify the LEDPA rather than a proposed project "justification" analysis that steers toward a pre-determined outcome.

Finally, the 404(b)(1) regulations place the burden of proof squarely on the applicant to prove that its proposal is the least damaging alternative if the applicant's project would discharge dredged or fill material in "special aquatic sites"¹⁰ for purposes that are not water-dependent.¹¹ The level of documentation should reflect the significance and complexity of the discharge activity.¹² Therefore, the applicant is required under the regulations to "clearly demonstrate" that less environmentally damaging alternatives do not exist. In the absence of such a clear showing, the Corps is required to deny the application for a permit.¹³

Section 230.10(a) of the Guidelines requires that,

(a) Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

(1) For the purpose of this requirement, practicable alternatives include, but are not limited to:

(i) Activities which do not involve a discharge of dredged or fill material into the waters of the United States or ocean waters;

(ii) Discharges of dredged or fill material at other locations in waters of the United States or ocean waters;

(2) An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project

¹⁰ Wetlands are one type of special aquatic site. See 40 CFR §230.3(q-1)

¹¹ See 40 CFR §230.10(a).

¹² See 40 CFR §230.6(b)

¹³ See 40 CFR §230.12(a)(3)(iv).

purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant which could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered. (italics added)

Neither the DSEIS, the Clean Water Act Section 404 (b) (1) Evaluation Framework for the Stibnite Gold Project (Appendix B to the DEIS),¹⁴ nor any of the related documents discuss a thorough evaluation of alternatives, especially other locations for the mine project.

Despite how Perpetua presents the proposed project in the DSEIS, it has proposed only one mine site location, with two potential access routes (Johnson Creek Route and Burntlog Route). Though the DSEIS describes a few variations regarding where to locate some facilities for the SGP, e.g., the TSF, most of the variations are simply approaches to minimize adverse impacts to aquatic resources¹⁵ and not substantive alternatives for the mine project. The approaches to minimize impacts are welcome, but those approaches are required for any alternative under both NEPA and CWA Section 404. Perpetua has not identified any alternative sites for the proposed mine itself. Under NEPA, and especially under CWA Section 404, that does not constitute “a range of reasonable alternatives.”

As described in the DSEIS, as part of the NEPA process, the USFS conducted an extensive alternatives development, screening, and evaluation process with the participation of the USACE. In the documents I reviewed, there is little evidence that the USFS or the USACE “conducted an extensive alternatives development, screening, and evaluation process.” Missing from the alternatives discussion in the DSEIS and its related documents is a discussion of,

- other sites for the mine and its attendant facilities that were evaluated (not access route variations);
- their location, owner(s), availability;
- the aquatic resources present at those other sites;
- the anticipated adverse impacts to those aquatic resources that would occur at those sites were a mine to be developed;
- conceptually how those adverse impacts could be compensated; and,
- for other sites that were evaluated and rejected, the reasons for rejection.

¹⁴ This document is a framework for evaluation of compliance with the Guidelines. This document was developed by Midas Gold, and is a Midas Gold document, however this document incorporates comments and feedback from the USACE regarding the process and analysis necessary to support the USACE’s future decision. It will be revised and updated following the publication of the Draft environmental impact statement (EIS) and after Midas Gold submits a complete DA permit application package. I hope that remains the intent.

¹⁵ Minimizing adverse impacts to aquatic resources is a required consideration in the evaluation of practicable alternatives. Variations of a single alternative do not constitute different alternatives.

Section 230.10 (c): Adverse Impacts

Adverse impacts to wetlands and other waters are described in Section 4.1.1 of the DSEIS. Under both NEPA and CWA Section 230.10(c) of the Guidelines, all direct, indirect (secondary), and cumulative adverse impacts must be described and accounted for. For instance, Table 7-2, Wetland and Riparian Area Function/Value and Qualitative Corresponding Potential Impacts and Consequences, explains that for habitat for general wildlife species, there would be loss, alteration, or degradation (e.g., invasive species encroachment, loss of standing surface water, temperature, fragmentation) of wetland and riparian areas that could result in a loss of habitat suitability for wildlife. Though helpful to understand the broad types of impacts that would occur, the narrative descriptions are only moderately useful in understanding the extent and range of those impacts. Tables 7-3 to 7-5 provide acreage and linear feet impacts to wetlands and streams, respectively, however, the acreage amounts appear too precise for how those amounts were derived. Nevertheless, the acreage and length numbers in the three tables still give one a “ballpark” idea of the scope and range of impacts.

According to these Tables, direct loss of wetlands and riparian resources in the mine site focus area would be approximately 120 acres¹⁶ and more than 70,000 linear feet of perennial and non-perennial streams. For the off-site focus area, wetland and riparian loss would exceed 75 acres, while more than 38,000 linear feet of perennial and non-perennial streams would be disturbed and degraded.¹⁷

Indirect (NEPA) and secondary (Guidelines)¹⁸ adverse impacts can be challenging to account for and quantify (as mentioned in Section 7.2.1.1 of the Stibnite Gold Project, Wetlands and Riparian Resources Specialist Report (“the Report”). Because of these challengers, indirect impacts are often underestimated. For instance, indirect effects of roads (big and small) are discussed in *Road Ecology*. Several types of indirect effects (e.g., noise and lights, rainfall/snow meltwater runoff, air pollution deposition, habitat fragmentation) of roads can be felt as much as several hundred feet from the edge of some roads.¹⁹ This extent depends, among other things, upon,

- the volume of traffic;
- time of day when road is commonly used;
- type(s) of vehicles using the road; and,

¹⁶ This figure seems too low.

¹⁷ Section 7.2.3.1 of the Wetland and Riparian Area Function/Value and Qualitative Corresponding Potential Impacts and Consequences report acknowledges that *most indirect effects have not been quantified* and it is acknowledged that indirect effects due to changes in hydrology and water quality may lead to wetland and riparian losses well beyond estimates in Tables 7-4 and 7-5 (italics added).

¹⁸ For this discussion, the NEPA and Guidelines terms are comparable and interchangeable.

¹⁹ Road Ecology, 2003.

- terrain and adjacent habitat.

Constructing a road in an expansive and mostly roadless area can be likened to the impact of a small stone on the windshield of an automobile. The first road is like the small dimple or dent caused by the small stone. A small crack first appears, growing out from the dent. Over time, the one small crack begins to extend and branch out. With more time, the branch cracks extend and branch out too. Weeks or months later, much of the windshield has suffered this fate to the point where, when viewed from several feet back, the original dent and the myriad branching cracks resemble a large spider web. The entire windshield has become compromised and at risk of shattering. The roadless expanse would likely undergo a similar progression of insults to a point where its ecological integrity and value are considerably degraded.

Ground water drawdown is another indirect adverse impact that must be accounted for and described. According to the DSEIS, an additional approximately 47 acres of wetlands could be altered and degraded from the maximum drawdown area under the 2021 MMP. See Section 7.2.3.4 and Table 7-7 of the Report. Again, this figure may be underestimating the extent of the impact. Most indirect effects have not been quantified and it is acknowledged that indirect effects due to changes in hydrology and water quality may lead to wetland and riparian losses beyond estimates in Tables 7-4 and 7-5 if these indirect impacts do occur.

Another key concern in assessing indirect impacts upon wildlife is habitat fragmentation from the roads and the mine features, which can be especially harmful for wetland dependent wildlife.²⁰ Habitat fragmentation can create movement barriers for less mobile wildlife, e.g., amphibians, some reptiles, and many mammals. It also can isolate populations of less mobile wildlife and harm long-term survivability.

Section 5.0 of the SDEIS and Section 7.0 of the Wetland and Riparian Resources Specialist Report, August 2022, address cumulative adverse impacts in very general fashion. There is little actual detail regarding anticipated cumulative adverse impacts. Table 7-2 of the Specialist Report provides a brief summary of cumulative impacts, however, there is no real discussion of those anticipated impacts other than general types (e.g., “loss, alteration, or degradation”). Overall, most of the sections dealing with adverse impacts to wetlands are focused upon acreage numbers. As with other sections dealing with impacts, here is a lack of narrative discussion that describes indirect and cumulative impacts in a meaningful way.

Section 230.10(d): Compensatory Mitigation

Section 7.0 of the Wetland and Riparian Resources Specialist Report, August 2022, briefly addresses compensatory mitigation. Again, this discussion is reduced primarily to acreage numbers. Admittedly, until a thorough and complete alternatives analysis is performed and

²⁰ Wildlife species that depend upon wetland habitat for one or more life stages or life needs, e.g., feeding, nesting, mating, resting, cover.

documented, no determination can be made regarding unavoidable adverse impacts that then could be used to properly address potential compensatory mitigation.

Purchasing credits in a mitigation bank is allowed under current federal regulation. However, purchasing bank credits does not adequately compensate for the full range, scope, and severity of adverse impacts to wetlands, rivers and streams described above, particularly when no determination has been made on unavoidable impacts to wetlands and streams. The bank described in the SDEIS is roughly 25 to 30 miles downstream from the mine site. How this approach would adequately compensate for the extent and diversity of adverse impacts at the project area is difficult to comprehend. For example, the adverse impacts to water quality in particular to the wetlands and waters cannot be adequately compensated by this approach. Impacts of this type must be avoided or reduced to the greatest extent practicable to be able to comply with Section 230.10(b) of the Guidelines. Also, purchasing wetland bank credits does not in any manner compensate for adverse impacts to creeks, streams and rivers. Though the bank is located within the same watershed, purchasing credits also will not likely address cumulative adverse impacts. Perpetua must come up with other potential ways to provide suitable compensation.

References

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