

**The Pebble Project DEIS provides no substantive proposals of compensatory mitigation for losses of wetlands and aquatic areas**

A Report Prepared for Earthworks  
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**Summary:**

Despite being fully aware for more than a decade<sup>2</sup> of its responsibilities to offset unavoidable impacts to wetland and aquatic areas that would be lost or degraded as a result of its proposed mining of the Pebble deposit, the DEIS discloses that the applicant has no specific actions proposed to offset its project impacts.<sup>3</sup> This lack of specifics comes in spite of years of assurances from the applicant that it not only expected to offset its impacts fully, but that it had identified compensatory mitigation projects at or near the project site that would actually increase and improve habitat for salmon.<sup>4</sup>

Rather than offer specific proposals, the applicant's conceptual compensatory mitigation plan, as well as the DEIS, appear to be fashioning arguments to not only allow consideration of compensatory mitigation measures that are in different watersheds, potentially hundreds of miles from the proposed mine site, but which would not, in fact, replace any of the thousands of acres of wetlands and aquatic areas that would be permanently destroyed by the 20-year mine being proposed. Of even greater concern is that the DEIS appears to be placing an overreliance on the mitigation flexibility provided in an interagency agreement between the Corps and EPA to build a case for not requiring the applicant to replace the immense losses of wetland and aquatic acreage its project would cause, reasoning that there is an overabundance of habitat in Alaska.

Finally, there seems little reason to expect that the applicant's proposed project is a single-and-complete project as proposed, as it appears to be far too small to practicably exploit the mineral resources of the Pebble deposit. And there seems even less reason to believe that the applicant would fill the mine pit with pyritic tailings and close it after 20 years of active mining, leaving the vast majority of the ore – ore that it has spent years delineating – unmined. Instead, it seems far more than “reasonably foreseeable” that larger additional phases of development are

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<sup>2</sup> Consultants to PLP (then NDM) were hired in 2004 to delineate wetland and aquatic areas, assess wetland functions and values, and to identify compensatory mitigation opportunities for a considerably larger Pebble Project (<https://foiaonline.gov/foiaonline/api/request/downloadFile/EPA-9498-0000258-EPA-9498-0000296.pdf/2146f53e-4838-4b9e-97c0-b35fe6c7a408>). Subsequently, the applicant began meeting with the Corps and other Federal and State agencies from 2007 to 2019 in pre-application meetings to discuss its project and the regulatory requirements that it would be facing (see: <http://dnr.alaska.gov/mlw/mining/largemine/pebble/twg/index.cfm>)

<sup>3</sup> DEIS, Chapter 5, pages 5-23 to 5-25; also Appendix M, Section M2.0, pages 26-30.

<sup>4</sup> See footnotes 25, 26, 27, and 29 in the main text of this report.

inevitable,<sup>5</sup> and are, in fact, contemplated by the applicant, including utilizing methods such as underground mining that the DEIS excludes as being impracticable.<sup>6</sup> As such, the realistically anticipated project impacts (12,445 additional acres of impacts to wetland and aquatic areas, according to the DEIS<sup>7</sup>) are likely to dwarf those described in the DEIS.

Even if the size of the proposed project and its planned closure is legitimate, a failure by the Corps to require that the applicant fully offset its 20-year proposed project impacts would result in unprecedented net losses of wetland and aquatic habitats beyond those of any copper mine ever proposed in the United States, and perhaps any individual permit ever issued by the Department of the Army pursuant to Section 404 of the Clean Water Act (CWA). And obviously, these net losses would be several times more severe should this mine expand in the future, without any identifiable means to offset the degradation to the aquatic ecosystem that even this smaller project would cause.

As presently proposed, the author believes that the project fails to comply with CWA regulations with regard to compensatory mitigation [40 CFR 230.10(d)], and the lack of appropriate mitigation measures should also lead to a determination that the project would cause or contribute to significant degradation of the aquatic ecosystem and thereby fail to comply with the regulations at 40 CFR 230.10(c), as well.

The Corps should consider preparing a revised DEIS to fully assess the impacts of the larger mine project that seems inevitable, and that includes a detailed compensatory mitigation plan that provides the public with an opportunity to actually assess the net impacts of the contemplated 75-year Pebble Project to wetland and aquatic habitats.

### **Author's Disclaimer:**

The analyses herein accept the applicant's acreage figures and characterizations of wetland types. In assessing the adequacy of mitigation measures proposed, the analysis also presumes

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<sup>5</sup> Borden, R.K. 2019. Pebble Mine Project Economics. Letter from Richard K. Borden to Shane McCoy, USACE, Alaska District. May 28, 2019. 7 pages.

<sup>6</sup> Northern Dynasty Mines President Ron Thiessen's presentation on Jan 22, 2018 at the Vancouver Resource Investment Conference: *"Well, I don't know too many mines that start off at a scale and don't change over time. I mean, one of the things is, you know, today I can't stand up here and tell you after 20 years what will be the next mining method. Will it be open pit, will it be underground, will we want to expand the concentrator, will we want to put a gold circuit in. So, why would we attempt to permit something like that today when we couldn't answer the questions that the Army Corps of Engineers would be asking us about that. If we want to do those things, then we will have to permit those as and when we decide how we're going to go about it. So, it's only natural we permit what we see in the foreseeable future as an operation. At 160,000 tons a day, the resource that we have actually could last for 200 years."* (emphases added. See: [https://www.youtube.com/watch?v=pBs1dnP\\_9eo](https://www.youtube.com/watch?v=pBs1dnP_9eo))

<sup>7</sup> In comparing the estimated 3560-acres of direct wetland impacts of the applicant's 20-year proposal to those of an expanded 78-year mine, the DEIS states that *"the expanded footprint would increase the acres of wetlands and waters impacted by an estimated 12,445 acres"* (DEIS, Executive Summary, page 65). The 3560-acre figure does not include the additional 2345 acres of indirect impacts nor 510 acres of "temporary" impacts reported in the DEIS for the applicant's preferred alternative (DEIS, Executive Summary pages 60 and 65); this is a total of 10 square miles of wetland and aquatic habitats. If the indirect and temporary impacts are proportional to what would result from the 78-year mine expansion, the additional impacts to waters could be well over 20,000 acres (35 square miles).

that there are no less environmentally damaging alternatives that are practicable to achieve the basic project purpose, either off-site or on-site, other than what is described in the DEIS as the applicant's preferred alternative.

However, there are serious unresolved questions about alternatives that should have been evaluated fully, but were dismissed inappropriately.<sup>8</sup> In addition, the Corps preliminary determination of the reach and extent of waters of the United States is flawed and based upon data that are long out-of-date and/or utilized methods that are ill-suited for determining federal Clean Water Act jurisdiction.<sup>9</sup> And, finally, the proposed project may not be financially viable,<sup>10</sup> and more likely is the first phase of a much larger mine, the impacts of which would dwarf those for which compensatory mitigation is discussed herein.

### **Regulatory background:**

Compensatory mitigation measures are commonly used during the Clean Water Act Section 404 permitting process to reduce or offset losses of aquatic resources and functions resulting from the permitted discharges. Offsetting large-scale impacts in pristine environments, however, may be neither feasible nor effective in replacing lost functions, due to the lack of opportunities for aquatic resource restoration, enhancement, or preservation of similar resources.

The federal Clean Water Act (CWA), among other measures, prohibits the discharge of pollutants into the "waters of the United States" except as specifically permitted by the Act in order to achieve its declared goal of eliminating the discharge of pollutants into the navigable waters by 1985.<sup>11</sup> Section 404 of the CWA authorizes the U.S. Army Corps of Engineers (Corps) to issue permits for the discharge of dredged or fill material,<sup>12</sup> which is defined as a pollutant under the CWA regulations.<sup>13</sup>

In determining whether to issue such permits, the Corps applies CWA regulations promulgated jointly by the Corps and the EPA (referred to as the 404(b)(1) Guidelines).<sup>14</sup> The 404(b)(1) Guidelines seek to "*restore and maintain the chemical, physical, and biological integrity of the Nation's waters*" through the control of discharges of dredged or fill material.<sup>15</sup> The primary

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<sup>8</sup> Yocom, T.G. 2019. The Corps determination of basic and overall project purposes improperly eliminates consideration of less environmentally damaging practicable alternatives. Report prepared for Earthworks. May 5, 2019. 12pages.

<sup>9</sup> Yocom, T.G. 2018. Questioning the Corps' preliminary jurisdictional determination for POA-2017-271. Report prepared for Earthworks. June 17, 2018, 39 pages. Report previously submitted to the Corps, Alaska District.

<sup>10</sup> Borden, R.K. 2019. Pebble Mine Project Economics. Letter from Richard K. Borden to Shane McCoy, USACE, Alaska District. May 28, 2019. 7 pages.

<sup>11</sup> See 33 U.S.C. § 1311(a); see 33 U.S.C. § 1251(a)(1).

<sup>12</sup> See 33 U.S.C. § 1344(a).

<sup>13</sup> See 40 C.F.R. § 122.2 (for purposes of the Clean Water Act, "*pollutant*" means "*dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended . . . , heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.*").

<sup>14</sup> 40 C.F.R. part 230 (404(b)(1) Guidelines).

<sup>15</sup> 40 C.F.R. § 230.1(a). This is also a goal of the CWA, as stated at 33 U.S.C. § 1251(a).

mechanism of the Guidelines for achieving this purpose is avoidance of impact to waters of the U.S., including wetlands:

*Fundamental to these Guidelines is the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern.*<sup>16</sup>

Where a discharge of dredged or fill material into “waters of the U.S.” is unavoidable, the impacts of the discharge to the physical, chemical, and biological integrity of those waters must be minimized and offset.

The regulations that govern discharges of dredged or fill material follow this hierarchy in determining if the discharges can be authorized. The 404(b)(1) Guidelines prohibit the authorization of discharges where:

1. There is a practicable alternative that would have less adverse impact on the aquatic environment (LEDPA);
2. The discharges would violate an applicable State water quality standard or toxic effluent standard, would jeopardize the continued existence of an endangered or threatened species or destroy or adversely modify its designated critical habitat, or would violate any requirement imposed to protect a marine sanctuary;
3. The discharges would cause or contribute to significant degradation of waters of the U.S.;
- or
4. Appropriate and practicable measures have not been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.<sup>17</sup>

The Corps must deny authorization of any proposed discharge that does not comply with all of these restrictions.<sup>18</sup> For example, even where appropriate and practicable measures have been taken to minimize potential adverse impacts of the discharge, the Corps must deny the permit if the discharge still would cause or contribute to significant degradation of waters of the U.S.<sup>19</sup>

In assessing those impacts to wetland and aquatic areas, the Corps must consider 1) the direct impacts that result from the discharges of dredged or fill material into regulated “waters of the United States,” including wetlands, but also 2) the indirect effects that would result from the project that those discharges enable (such as dewatering of wetland and stream areas caused by

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<sup>16</sup> 40 C.F.R. § 230.1(c).

<sup>17</sup> 40 C.F.R. § 230.10(a)-(d).

<sup>18</sup> See 33 C.F.R. § 323.6(a) (“*Subject to consideration of any economic impact on navigation and anchorage pursuant to section 404(b)(2), a permit will be denied if the discharge that would be authorized by such a permit would not comply with the 404(b)(1) guidelines. If the district engineer determines that the proposed discharge would comply with the 404(b)(1) guidelines, he will grant the permit unless issuance would be contrary to the public interest.*”) (Corps Section 404 regulations) (emphasis added).

<sup>19</sup> Also, the Corps may deny a permit as contrary to the public interest due to inadequate mitigation, even if all appropriate and practicable mitigation measures have been taken. 33 CFR 302.4(r).

the construction and operation of the Pebble Mine), and 3) secondary impacts that the project would cause or contribute to downstream of the project.<sup>20</sup>

In addition, the Corps must deny a permit where “*there does not exist sufficient information to make a reasonable judgment as to whether the proposed discharge will comply with these Guidelines.*”<sup>21</sup> In other words, if a District Engineer cannot determine if a large mining project represents the LEDPA or, after considering proposed compensatory mitigation measures, whether it would or would not cause or contribute to significant degradation of the waters of the United States, the regulations direct the Corps to deny the permit application.

In subsequent guidance specifically applicable to Alaska, the Corps Alaska District clarified what project impacts will require compensatory mitigation pursuant to Section 404 of the CWA under the 2008 Mitigation Rule. Although the Alaska District subsequently rescinded this guidance, its 2009 Regulatory Guidance Letter (RGL ID No. 09-01) lists types of projects that always require compensatory mitigation including those requiring “*fill placed in anadromous fish streams and wetlands adjacent to anadromous fish streams,*”<sup>22</sup> clearly recognizing the importance of these habitats.

The RGL also identified compensatory mitigation ratios that apply in Alaska. For waters in the “high” or “moderate” compensation category, as those in the Koktuli River and Upper Talarik Creek headwaters region would likely be, the required ratio is 1:1 or 2:1 for restoration and/or enhancement and 2:1 or 3:1 for preservation.<sup>23</sup> Under that guidance, the proper compensation ratio for the headwaters streams and wetlands destroyed by discharges of dredged or fill material from mining the Pebble Deposit would be 2:1 if the mitigation method is restoration or enhancement or 3:1 if the compensatory mitigation method is preservation.<sup>24</sup> This would translate to roughly 12,000 acres of compensatory mitigation for restoration or enhancement (to

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<sup>20</sup> See 40 C.F.R. § 230.11(h): *Determination of secondary effects on the aquatic ecosystem.*

(1) Secondary effects are the effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final section 404 action is taken by permitting authorities.

(2) Some examples of secondary effects on an aquatic ecosystem are fluctuating water levels in an impoundment and downstream associated with the operation of a dam, septic tank leaching and surface runoff from residential or commercial developments on fill, and leachate and runoff from a sanitary landfill located in waters of the U.S. Activities to be conducted on fast land created by the discharge of dredged or fill material in waters of the United States may have secondary impacts within those waters which should be considered in evaluating the impact of creating those fast lands.  
(emphases added).

<sup>21</sup> 40 C.F.R. § 230.12(a)(3)(iv) (emphasis added).

<sup>22</sup> Alaska District Regulatory Guidance Letter, RGL ID No. 09-01, Table 2, page 8 (U.S. Army Corps of Engineers Alaska District, 2009).

<sup>23</sup> *Id.* at Appendix B. “High functioning wetlands” include those that “are undisturbed and contain ecological attributes that are difficult or impossible to replace within a human lifetime, if at all. . . . The position of the wetland in the landscape plays an integral role in overall watershed health.” *Id.* at Appendix A, p. 3. They also include those where “[s]pawning areas are present (aquatic vegetation and/or gravel beds).” *Id.* at Appendix A, p. 6. The headwaters wetlands in the Koktuli and Upper Talarik watersheds fit these descriptions, as the subsequent section indicates.

<sup>24</sup> Alaska District Regulatory Guidance Letter, RGL ID No. 09-01, Appendix B.

offset 5906 acres of Pebble Project direct and indirect impacts), or roughly 18,000 acres of compensatory mitigation for preservation.

### **Background on compensatory mitigation for the Pebble Project**

The applicant has long acknowledged compensatory mitigation as “*one of the most basic requirements of the permitting process: full, functional mitigation for all unavoidable, residual project impacts,*” stating further that “*PLP has consistently acknowledged its mitigation responsibility and has assumed that permit requirements would stipulate mitigation obligations amounting to a significant multiple of actual impacts, resulting in a net gain in anadromous and resident fish productive capacity*” (emphasis added).<sup>25</sup> Echoing the conclusions drawn by its fishery consultants, representatives of PLP have also stated that PLP “*has identified numerous opportunities for increasing anadromous fish habitat, as well as the productive capacity of that habitat for anadromous fish, greatly in excess of reasonably anticipated losses.*”<sup>26</sup> (emphasis added). It is noteworthy that these statements were made in relation to much larger proposals to mine the Pebble deposit, including 25-, 45-, and 78-year mines.

Furthermore, in a white paper prepared in 2011 for NDM, HDR Inc. listed types of compensatory mitigation that might be available to offset impacts from one or more large-scale hardrock mines in the Bristol Bay watershed:

*Compensatory mitigation for wetlands impacts could, for example, take the form of anadromous fish habitat restoration, property acquisition for conservation easements, water quality improvements, remediation of contaminated sites, biodiversity offsets, funding for research and education, or other options. There may be opportunities for development organizations to join with local tribal governments and non-governmental organizations to create wetland mitigation banks or endowment funds to manage fish and wildlife, water quality, and preservation of undeveloped natural resources for generations to come.*<sup>27</sup>

In acknowledging the requirements of the mitigation rule, PLP has stated that it understands that compensatory mitigation will be required for “unavoidable” impacts. And, in applying for a

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<sup>25</sup> July 23, 2012 letter from Thomas C. Collier, Esq., Steptoe & Johnson, LLC (before Mr. Collier became CEO of PLP), to Office of Environmental Information Docket, Docket Number # EPA-HQ-ORD-2012-0276. Collier specifically identifies measures such as “*judicious water management, including storage, and strategic delivery of excess water to streams and aquifers without adverse impacts such as seasonally incompatible temperatures; providing access to existing but inaccessible aquatic habitats and creation of extensive new habitats such as groundwater-fed secondary channels for anadromous and resident fish spawning, rearing and overwintering in local floodplains; concentrating mitigation efforts in more heavily utilized lower portions of local watersheds (North Fork Kaktuli, South Fork Kaktuli, Upper Talarik Creek) in order to maximize actual use of new habitat by the fish for which it is intended. Offsite but in-watershed (Kvichak/Nushagak) opportunities include such things as fish passage at significant anadromous fish barriers, opening up very large areas to anadromous access, significantly increasing salmon runs in associated systems. More remote opportunities include facilitation of reclamation and rehabilitation activities in existing disturbed areas.*” None of these measures are proposed in PLP’s permit application.

<sup>26</sup> Letter from Richard E. Schwartz (Crowell & Moring, LLC, Washington, DC on behalf of PLP) to Arthur A. Elkins, EPA Inspector General, January 9, 2014. 26 pages.

<sup>27</sup> Wrobel, C., J. Morton, M. Witter, and J. Anderson. Undated. White Paper No. 5: Wetlands Mitigation. 2011.

permit, PLP understands that it must clearly demonstrate that any proposed discharges of dredged or fill material into wetlands or other special aquatic sites are unavoidable in order to achieve the basic purpose of its proposal, in this case mining. In fact, beginning with field studies beginning in 2004 and pre-application meeting with the Corps and other federal and state agencies that began in 2007, PLP (Northern Dynasty Minerals) was fully aware of its needs to develop a comprehensive compensatory mitigation plan (see footnote 2 on page 1).

In 2014, consultants to PLP claimed that “*the track record for successful mitigation of potential impacts to salmon and resident fish species in settings like that surrounding the Pebble deposit is very long, very comprehensive and very clear*” and that “*there are myriad opportunities for implementation of these methods in streams in and around the general Pebble Project area.*”<sup>28</sup> Whereas some other PLP consultants were less willing to make such claims, they cited similar types of compensatory mitigation measures, such as providing access to side-channel habitat and placement of instream structures, among other options.<sup>29</sup>

One well-documented review by Canadian government scientists that PLP’s consultants cited found that compensatory mitigation was generally not successful unless mitigation ratios were higher than 1:1 and closer to 2:1 (*i.e.*, a greater acreage or length of stream miles restored than were lost as a result of a project).<sup>30</sup> The senior author of that study subsequently became an official at PLP’s parent company, Hunter Dickenson, and has maintained the view that in order to ensure that compensatory mitigation will adequately offset the losses of acreage and function, mitigation ratios should be greater than 1:1 and closer to 2:1.<sup>31</sup>

It is especially noteworthy that the proposed mining operations for which PLP has made such claims were considerably larger than the 20-year mining project it now proposes in the DEIS. Accordingly, one would presume that PLP would find compensating for impacts from its proposed project to be far less challenging, and expect its compensatory mitigation plan to be detailed and specific at this juncture.<sup>32</sup>

However, rather than propose a comprehensive compensatory mitigation plan in its 2018 Permit application, based on its own studies and assurances to implement the measures it had previously stated were available, PLP’s permit application simply stated that “*mitigation will be considered*

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<sup>28</sup> See Buell, J.W. and R.E. Bailey. Mitigation and EPA’s Bristol Bay Watershed Assessment Final Assessment. (a report submitted on behalf of PLP to EPA), April 23, 2014. 16 pages.

<sup>29</sup> Hocking, M. and A. Lewis. 2014. Memorandum to Northern Dynasty Minerals (attention Bruce Jenkins). Re: Literature review of the successes and efficacy of fish habitat restoration and compensation project in British Columbia. Ecofish Research, Ltd., Vancouver, B.C., April 24, 2018. 22 pages.

<sup>30</sup> See Quigley, J.T., and D.J. Harper. 2006. Effectiveness of fish habitat compensation in Canada in achieving no net loss. *Environmental Management* 37: 351-366.

<sup>31</sup> “...our research demonstrated that many compensation projects that were deemed failures would have been successful had they simply employed larger compensation ratios....Ultimately, regulators should require more than 1:1 replacement for aquatic habitat displaced by development activity - perhaps as high as 2:1.” Jason Quigley, Hunter Dickenson Inc. April 28, 2014 letter to EPA Region 10, Dennis J. McLerran, Regional Administrator.

<sup>32</sup> As recently as 2018, PLP’s CEO complained to EPA that its Bristol Bay Watershed Assessment had shown bias against the Pebble Project, noting that “any mine of Pebble’s size would necessarily involve compensatory mitigation, which EPA’s hypothetical mines conspicuously omitted.” (see letter from Tom Collier to EPA Administrator Scott Pruitt, April 25, 2018, 4 pages). Nevertheless, PLP offered no substantive proposals in its permit application or the DEIS that would offset the wetland and aquatic impacts of its artificially small project.

*in detail throughout the permitting and NEPA processes*<sup>33</sup> (emphasis added). And, the applicant stated further that *“PLP will work with the USACE (Corps) throughout the process to identify and implement a compensatory mitigation plan that is appropriate for the final Project”*<sup>34</sup> (emphases added).

These statements suggest the PLP had no detailed compensatory mitigation plan at the time it finally applied for a permit. It also suggests that the applicant may not have considered its proposed project to be the least environmentally damaging practicable alternative (the LEDPA), particularly if it was anticipating that a “final” project might be so significantly different as to obviate the need for a detailed compensatory mitigation plan for its project as proposed.

Under the regulations, it is PLP’s responsibility to clearly demonstrate that its proposed project is the least environmentally damaging practicable alternative (the LEDPA) to achieve the basic project purpose, and that its project otherwise complies Federal and State regulations. It is not the job of the United States agencies to design projects for applicants or the compensatory measures needed to offset unavoidable impacts. Rather, it is the job of the Corps and EPA to determine if projects proffered by applicants, including the applicant’s proposals for compensatory mitigation, can be authorized under the regulations.

### **The applicant’s conceptual plan for compensatory mitigation for impacts of the Pebble Project to wetland and aquatic areas**

The DEIS for the Pebble Project identifies 3560 acres of direct impacts, 2345 acres of indirect impacts (dewatering and dust), and 510 acres of temporary impacts (construction access) to jurisdictional wetlands and aquatic areas;<sup>35</sup> the DEIS describes temporary impacts as jurisdictional waters that would be filled for as long as a year, but for which the fill would be subsequently removed, under a presumption that the wetland or aquatic area functions would fully recover thereafter.<sup>36</sup> Indirect impacts, such a dewatering, are described as permanent *“because they would last at least until the post-closure phase.”*<sup>37</sup> Secondary impacts to wetland and aquatic functions that may occur upstream or downstream as a result of the proposed project are not discussed or quantified, insofar as the compensatory mitigation responsibilities of the applicant are concerned.

Simply accounting for the direct and indirect impacts of the applicant’s preferred alternative, the project could eliminate wetland and aquatic functions for 5906 acres of pristine habitat at the mine site and in the transportation corridor. This areal extent of impacts to the “waters of the United States” represents what the Corps should consider to be the applicant’s minimum

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<sup>33</sup> Pebble Project Department of the Army Application for Permit (POA-2017-271), December 2017, page 31.

<sup>34</sup> Pebble Project Department of the Army Application for Permit (POA-2017-271), December 2017, page 32.

<sup>35</sup> DEIS, Executive Summary, page 60.

<sup>36</sup> Whereas the DEIS considers the impacts to an additional 510 acres of wetland and aquatic sites to be “temporary,” these impacts could degrade or eliminate the habitat functions for up to a full year, and those combined impacts (functional loss multiplied by acres, factoring in the time lag for full restoration) should be evaluated further to determine if the applicant should be required to offset these impacts to some degree. The Corps should also provide evidence that such areas, temporarily filled for construction projects, actually recover naturally after the fill is removed, as well as over what period of time. These impacts should not be dismissed as inconsequential.

<sup>37</sup> DEIS, Executive Summary, page 62.

compensatory mitigation burden, and for which the applicant should have developed and submitted a comprehensive plan to offset its project impacts. Given the applicant's long history of coordination with the Corps and other agencies, as well as its repeated statements regarding its readiness and willingness to fully offset the impacts of even larger versions of its present proposed copper mine, one might have expected to see a detailed plan included in the DEIS.

Instead, the DEIS includes a "conceptual" compensatory mitigation plan (CMP) prepared subsequent to its permit application by the applicant (January 2019). The CMP only discusses the direct permanent (3560 acres) and temporary project impacts (510 acres); the 2345 acres of indirect impacts discussed above are not included in the CMP, even though some of these impacts are extensive and considered permanent.<sup>38</sup> The CMP breaks the acreages of direct and temporary impacts into different classes of wetlands and deepwater habitats,<sup>39</sup> and compares only their acreages to the reach and extent of the same types of habitats in the surrounding watersheds.

The conceptual mitigation plan also describes the types of mitigation measures called for in the 2008 mitigation rule and evaluates opportunities to utilize such measures to offset impacts of the Pebble Project, including mitigation banks and in-lieu fee providers. The applicant concludes that there are no mitigation banks or in-lieu fee providers that could provide any compensatory mitigation for the project as proposed, concluding further that permittee-sponsored mitigation is its only available choice. This author reached similar conclusions in a law review article published 8 years ago.<sup>40</sup>

The CMP proposes no compensatory mitigation for the lost functions for the 510 acres of temporary impacts, stating, rather, that *PLP is proposing compensatory mitigation to offset environmental losses from unavoidable impacts to 3524 acres of WOUS* (waters of the United States, including wetlands).<sup>41</sup> In other words, the applicant is not planning to propose mitigation for its 2345 acres of indirect impacts or 510 acres of temporary impacts. On its face, the Corps should not have accepted this conceptual plan as being adequate for failing to consider thousands of acres of indirect impacts (including permanent losses) of wetland and aquatic habitats.

However, for the sake of this analysis, even if the project impacts were, in fact, limited to the direct permanent losses of wetland and aquatic areas (3560 acres), the applicant has previously professed that it would be prepared to compensate some significant multiple of its impacts when it was contemplating a much larger mine (see footnote 25, above, and associated text). At a 1:1 or 2:1 compensatory mitigation ratio, the CMP would have been expected to provide plans to provide the equivalent of up to 7120 acres for offsite, unless it was proposing to offset impacts with habitat preservation, which would yield a 2:1 to 3:1 ratio (7120 to 10,680 acres).

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<sup>38</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), pages 3-5. The acreage figures in the mitigation plan are similar but different from those reported in the DEIS, showing 3524.27 acres of direct impacts and 513.31 acres of temporary impacts.

<sup>39</sup> Cowardin, L.M. et al. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Publication FWS/OBS-79/31. Washington, DC: US Fish and Wildlife Service, Office of Biological Services.

<sup>40</sup> Yocom, Thomas G. and Rebecca L. Bernard. 2013. Mitigation of Impacts from Large-Scale Hardrock Mining in the Bristol Bay Watershed. Seattle Journal of Environmental Law, Volume 3, pages 71-100.

<sup>41</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), page 30. Note: This 3524-acre figure is 36 acres smaller than the direct impacts identified in the DEIS.

The CMP states that the applicant may perform “*restoration, enhancement, establishment, and in certain circumstances, preservation of wetlands and other waters*” as compensatory mitigation, but that “*such options are effectively non-existent in the Analysis Area.*”<sup>42</sup> Furthermore, the CMP states that “*the watershed approach, and on-site and in-kind compensatory mitigation are not practicable to meet the Project’s compensatory mitigation needs,*” and that “*off-site, in-kind, or out-of-kind mitigation opportunities must be considered.*”<sup>43</sup>

The CMP then describes types of projects it believes will be feasible, including water quality improvement projects, invasive species identification and eradication, and similar activities. For water quality improvement projects, the CMP lists contaminated sites, solid waste sites, and areas where erosion near landfills, contaminated sites, tank farms, and other sites of environmental concern may pose risks of releasing hazardous substances into Alaska state waters. Fifteen specific sites are described (Table 5-9) near villages in the vicinity of the Pebble Project, most of which are listed as involving less than an acre of land, and most would involve bank stabilization at the nearest river or water body.<sup>44</sup>

The CMP also describes environmental risks associated with invasive plant species, suggesting that it might help fund efforts to identify areas at highest risk and/or efforts to eradicate invasive vegetation, including the early detection and eradication of reed canary grass.<sup>45</sup> The applicant proposes no specific measures to address these problems, or provide any reliable measures of short- or long-term success for any such eradication program.<sup>46</sup>

The applicant also believes there are opportunities for fish habitat restoration in the directly affected and neighboring watersheds, naming the Upper and Lower Kenai Peninsula, Lower Susitna River, and Matanuska, and proposing conceptual culvert rehabilitation and other fish passage improvements to benefit the greater Bristol Bay and Cook Inlet watershed areas.<sup>47</sup> The number and location culverts in need of rehabilitation is not specified, nor is it clear whether the responsibility for maintaining or rehabilitating these culverts already rests with other entities.

The CMP appears to assume that if a culvert improves fish passage to a large area, the acreage or stream miles associated with that improvement would count fully against the project impacts.<sup>48</sup>

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<sup>42</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), page 26.

<sup>43</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), page 26.

<sup>44</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), pages 17-19.

<sup>45</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), pages 19-20.

<sup>46</sup> The Conceptual Mitigation Plan states that “*While most invasive plants have been recorded along Alaska’s road network, remote communities off the road system may be increasingly and disproportionately vulnerable to harm from exposure to invasive species.*” (DEIS, Appendix M, Section M2.0, page 19). The DEIS should assess the potential impacts of the proposed Pebble Project on the spread of invasive species along the transportation corridors.

<sup>47</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), page 26. See also Bailey, R.M. and J.W. Buell. 2013. An evaluation of EPA’s Bristol Bay Watershed Assessment 2013 2<sup>nd</sup> draft assertions regarding fish habitat mitigation measures efficacy and applicability. Report prepared for Northern Dynasty Minerals. May 22, 2013. 92 pages.

<sup>48</sup> “*For out-of-kind mitigation, PLP would, to the extent practicable, replace and equivalent amount of aquatic resources to those lost. For example, fish passage improvements would open, or improve, access to an equivalent number of stream miles suitable for anadromous fish.*” DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), page 27.

That rationale presumes that the upstream area performs no wetland or aquatic functions other than the added support of anadromous fishes from culvert improvement. This narrow view of wetland and aquatic functions should not be accepted as fully offsetting project impacts. The CMP does state that PLP may propose preservation as compensatory mitigation,<sup>49</sup> but that ratio should be at least 2:1, and more likely 3:1 under the Alaska District’s Regulatory Guidance.<sup>50</sup>

The CMP appears to be trying to build that very case by concluding that:

- 1) *wetlands and other waters in the area are abundant and in a natural state,*
- 2) *discharges of fill from the Project will impact a small percentage of aquatic resources,*
- 3) *Pacific salmon and other fish are an important component of the Analysis Area aquatic environment and of local economies, and*
- 4) *the primary threats to these aquatic resources arise from impacts associated with contaminated sites and community sanitary systems.*<sup>51</sup>

In other words, the CMP is asserting that:

- 1) there is an overabundance of wetland and aquatic habitat in the watershed;
- 2) because the proposed project’s impacts will be small, only when compared to a much larger watershed area, the applicant should not be required to fully offset the losses of wetland and aquatic areas that its project will destroy;
- 3) that salmon should be the entire focus of the compensatory mitigation plan (even though the applicant and, to some extent the DEIS, claim that the project will have no measurable impact on salmon populations); and
- 4) that somehow potential leakage from small landfills and tank farms is, therefore, a bigger risk to salmon than the permanent destruction of thousands of acres of wetland and destruction of 31% of the headwater stream length mapped as supporting at least four species of salmon in the Nushagak River basin.<sup>52</sup>

Perhaps of even greater concern is the applicant’s assertion that because it may be unable to identify practicable measures to offset its impacts in the immediate project area,<sup>53</sup> it may consider proposing measures in more broadly defined watershed areas, including HUC 8 (Figure 1 below), HUC 6, and HUC 4 watersheds<sup>54</sup> (Figure 2 below). This would conceivably include sites that are hundreds of miles from the Pebble Project site.

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<sup>49</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), page 27.

<sup>50</sup> Alaska District Regulatory Guidance Letter, RGL ID No. 09-01, Appendix B.

<sup>51</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), page 26.

<sup>52</sup> M. Gracz, Michael. PhD. 2019. Is a finding of significant degradation in a 404(b)(1) analysis of the Pebble Project scientifically supportable? An analysis prepared for Wild Salmon Center. May 24, 2019. 7 pages.

<sup>53</sup> Appendix M, Section M2.0, page 22.

<sup>54</sup> According to the CMP: “*Off-site wetlands mitigation would necessitate the evaluation of mitigation opportunities beyond the HUC 10 watersheds directly impacted by the Project. Given the limited amount of development and land status in the larger directly impacted (Nushagak, Kvichak, Tuxedni/Kamishak Bay HUC 8s) watersheds it is further likely that mitigation would be predominantly limited to wetlands preservation in the surrounding HUC 8 watersheds or even further afield.*” (emphasis added) DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), page 26.

<sup>54</sup> DEIS, Appendix M, Section M2.0 (Conceptual Compensatory Mitigation Plan), page 27.

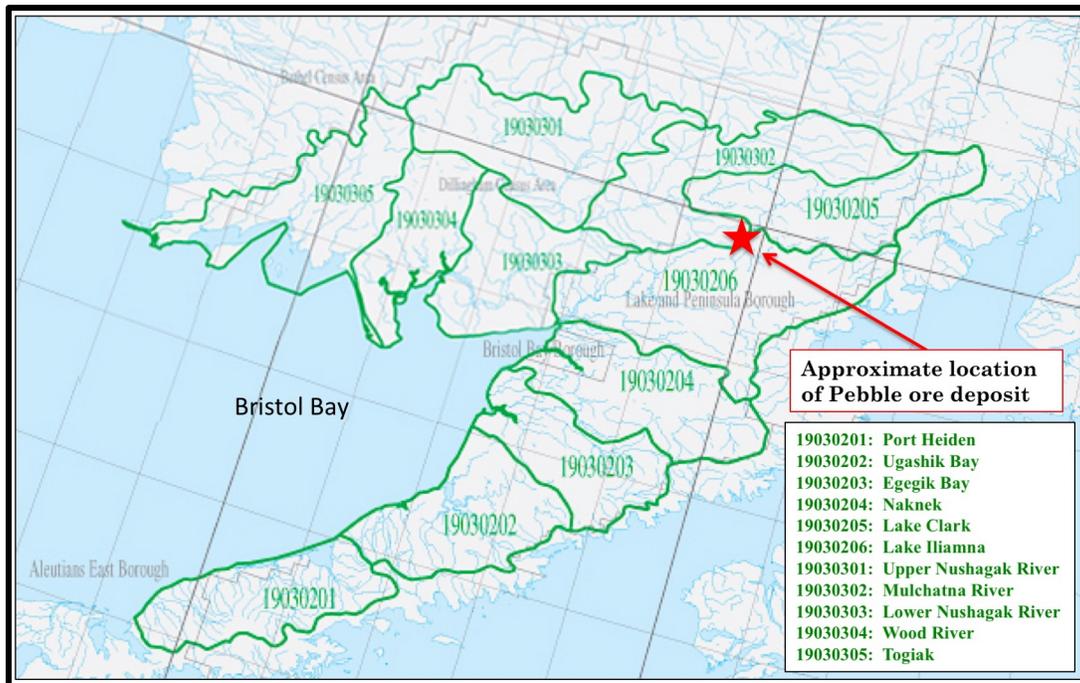


Figure 1. HUC 8 watersheds that drain into Bristol Bay.



Figure 2. HUC 4 Watersheds in Alaska. HUC 1903 includes every river system that flows into Bristol Bay.

Defining the watershed scale this broadly would fail to meet the fundamental requirement of the Mitigation Rule that the aquatic resources provided through compensation effectively offset the adverse environmental impacts of the permitted discharge. The genetic differences between individual salmon stocks in various drainages, and the importance of this genetic diversity to the overall stability of the Bristol Bay salmon fishery, undermine the value of mitigation measures designed to protect aquatic resources in a drainage other than the site of impact.

Lower-order streams vary widely in physical, chemical, and biological characteristics, providing varied and abundant habitats crucial to maintenance of diverse aquatic ecosystem function downstream.<sup>55</sup> Headwaters may be influenced by groundwater or subsurface (hyporheic) flow and/or variable shade conditions, producing variable water temperatures often providing warm refuges during winter and cool refuges during summer.<sup>56</sup> Due to inputs of organic matter, lower-order streams determine downstream nutrient dynamics.<sup>57</sup> Many primary and secondary producers (*e.g.*, algae and aquatic macroinvertebrates) are unique to headwater ecosystems,<sup>58</sup> and may be adapted to freezing and intermittent flow conditions.<sup>59</sup> The diversity and abundance of headwater species additionally provide source populations for colonization of downstream habitat as well as prey for downstream invertebrates and fish species.<sup>60</sup>

Because they provide refuge from predators and competitors, rich feeding grounds, and thermal refuge, fish species often exploit low-order and ephemeral streams as either residents (*e.g.*, sculpin) or migrants (*e.g.*, salmonids).<sup>61</sup> Salmonids may use headwater streams as rearing (*e.g.*, coho, Chinook),<sup>62</sup> and spawning (*e.g.*, chum) habitat.<sup>63</sup> In a survey of 105 low-gradient, headwater streams in the Nushagak and Kvichak drainages, 96% of streams supported resident fish, and 75% of streams supported anadromous salmon species.<sup>64</sup> Headwater streams can also

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<sup>55</sup> J.L. Meyer, J.L., D.L. Strayer, J.B. Wallace, S.L. Eggert, G.S. Helfman, and N.E. Leonard. 2007. The contribution of headwater streams to biodiversity in river networks, 43 *J. American Water Resources Association* 86.

<sup>56</sup> Power, G., R.S. Brown, and J.G. Imhof. 1999. Groundwater and fish – insights from North America. *Hydrological Processes* 13: 401-422.

<sup>57</sup> Richardson, J.S., R.E. Bilby, and C.A. Bondar. 2005. Organic matter dynamics in small streams of the Pacific Northwest. *Journal of the American Water Resources Association* 41: 921-934.

<sup>58</sup> Progar, R.A. and A.R. Moldenke. 2002. Insect production from temporary and perennially flowing headwater streams in western Oregon. *Journal of Freshwater Ecology* 17: 391-407.

<sup>59</sup> Irons, J.G., L.K. Miller, and M.W. Oswood. 1993. Ecological adaptations of aquatic macroinvertebrates to overwintering in interior Alaska (U.S.) subarctic streams. *Canadian Journal of Zoology* 71: 98-108.

<sup>60</sup> Wipfli, M.S. and D.P. Gregovich. 2002. Export of invertebrates and detritus from fishless headwater streams in southeastern Alaska: Implications for downstream salmonid production. *Freshwater Biology* 47: 957-969.

<sup>61</sup> Yocom, Thomas G. and Rebecca L. Bernard. 2013. Mitigation of Impacts from Large-Scale Hardrock Mining in the Bristol Bay Watershed. *Seattle Journal of Environmental Law*, Volume 3, pages 71-100.

<sup>62</sup> Brown, T.G. and G.F. Hartman. 1988. Contribution of seasonally flooded lands and minor tributaries to the production of coho salmon in Carnation Creek, British Columbia. *Transactions of the American Fisheries Society* 117: 546-551; Wightington, P.J., J.L. Ebersole, M.E. Colvin, S.G. Leibowitz, B. Miller, B. Hansen, H. Lavigne, D. White, J.P. Baker, M.R. Church, J.R. Brooks, M.A. Cairns, and J.E. Compton. 2006. Coho salmon dependence on intermittent streams. *Frontiers in Ecology and the Environment* 4: 513-518.

<sup>63</sup> J.L. Meyer, J.L., D.L. Strayer, J.B. Wallace, S.L. Eggert, G.S. Helfman, and N.E. Leonard. 2007. The contribution of headwater streams to biodiversity in river networks, 43 *J. American Water Resources Association* 86.

<sup>64</sup> Woody, C.A. and S.L. O'Neal. 2010. Fish surveys in headwater streams of the Nushagak and Kvichak river drainages, Bristol Bay, Alaska 2008-2010. Prepared for The Nature Conservancy. 48 pp.

be important habitat for amphibians, birds, mammals, and other biota.<sup>65</sup> Headwater and intermittent streams are sites of enormous biological diversity, hosting hundreds to thousands of species.<sup>66</sup> The Groundhog Mountain headwater watershed (12-digit HUC) contains 31% of the headwater stream miles of the 8 million-acre Nushagak River Basin that have been mapped as supporting at least four species of anadromous salmon by the Alaska Department of Fish and Game.<sup>67</sup>

PLP estimates that its 20-year mine project would result in direct permanent losses of 5.74% of the currently existing aquatic resources in the Headwaters Kaktuli River,<sup>68</sup> based upon an estimated 3,421.45-acre loss of habitat, although the full reach and extent of tributary streams are not provided in the DEIS. The reach of such streams is likely very substantial.<sup>69</sup> As noted earlier, PLP does not appear to be considering compensatory mitigation for indirect losses or temporary impacts (one year of lost functions or less, with no time line for recovery thereafter). If the indirect and temporary impacts are included, the lost headwater resources exceed 10%. The actual stream miles that would be destroyed, dewatered, or fragmented are not yet known, and are likely far greater than what is disclosed in the DEIS.<sup>70</sup>

## Conclusion

The applicant has been fully aware for many years that the impacts of mining the Pebble deposit would be immense with regard to wetland and aquatic areas regulated pursuant to Section 404 of the Clean Water Act. The applicant has also been fully aware of the 2008 Mitigation Rule, and the likelihood that its proposed project might fail to qualify for authorization, or be vetoed should the Department of the Army determine that a permit could be issued.

The applicant has repeatedly assured the public that it would fully offset its project impacts to wetland and aquatic areas, and did so on the basis of mining projects considerably larger than is proposed in the DEIS. In fact, the applicant complained bitterly that EPA's Bristol Bay Watershed Assessment unfairly characterized its project impacts because it did not consider the compensatory mitigation measures that the applicant claimed were readily available.

The Conceptual Compensatory Mitigation Plan that is appended to the DEIS offers no quantifiable measures and no specific actions that would allow the public to reach any conclusions about whether the impacts of the proposed Pebble Project would be offset in any substantive way. Not only are there no specific actions proposed that would offset the areal

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<sup>65</sup> Yocom, Thomas G. and Rebecca L. Bernard. 2013. Mitigation of Impacts from Large-Scale Hardrock Mining in the Bristol Bay Watershed. *Seattle Journal of Environmental Law*, Volume 3, pages 71-100.

<sup>66</sup> J.L. Meyer, J.L., D.L. Strayer, J.B. Wallace, S.L. Eggert, G.S. Helfman, and N.E. Leonard. 2007. The contribution of headwater streams to biodiversity in river networks, 43 *J. American Water Resources Association* 86.

<sup>67</sup> M. Gracz, Michael. PhD. 2019. Is a finding of significant degradation in a 404(b)(1) analysis of the Pebble Project scientifically supportable? An analysis prepared for Wild Salmon Center. May 24, 2019. 7 pages.

<sup>68</sup> Appendix M, Section M2.0, page 22.

<sup>69</sup> Albert, D.M. 2019. Direct loss of salmon streams, tributaries, and wetlands under the proposed Pebble Mine compared with thresholds of unacceptable adverse effects in the EPA Proposed Determination pursuant to Section 404(c) of the Clean Water Act. The Nature Conservancy, Juneau, AK. 14 pages.

<sup>70</sup> Albert, D.M. 2019. Direct loss of salmon streams, tributaries, and wetlands under the proposed Pebble Mine compared with thresholds of unacceptable adverse effects in the EPA Proposed Determination pursuant to Section 404(c) of the Clean Water Act. The Nature Conservancy, Juneau, AK. 14 pages.

losses of wetland and aquatic areas, what actions are described conceptually fail completely to address indirect and secondary impacts that involve thousands of acres.

Moreover, the actions that are described conceptually could be hundreds of miles from the actual project site and well out of the immediate watershed, thwarting the spirit and intent of the 2008 Mitigation Rule. In the place of specific proposals, the DEIS appears to be fashioning arguments to not only allow compensatory mitigation measures that are in different watersheds, but which also appears to be placing an overreliance on the mitigation flexibility provided in an interagency agreement between the Corps and EPA in order to actually offset physical losses of acreage, reasoning that there is an overabundance of habitat in Alaska.

In this, the Corps appears to be rewarding the applicant for its inaction and years of delays by accepting its conceptual plan as sufficient for the purposes of disclosing project impacts and mitigation measures in the DEIS. The DEIS is woefully inadequate in this regard.

As stated in the author's disclaimer, there seems little reason to expect that the applicant's proposed project is a single-and-complete project as proposed, and the Corps should not treat it as same. The project as proposed is artificially small, and there seems little reason to believe that the applicant will actually fill the mine pit with pyritic tailings and close it after 20 years of active mining, leaving the vast majority and richest concentrations of that ore body unmined.

Instead, the DEIS should be evaluating a much larger mine than is being proposed, because the impacts of the expansion that seems inevitable, will dwarf those described in the DEIS. And, if the compensatory mitigation outlined in the applicant's CMP is a measure of the net impacts to wetland and aquatic areas from a 20-year mine, those of a 78-year mine (or 200 years according to NDM) could be catastrophic.

But, even if the size of the proposed project and its planned closure are legitimate, a failure by the Corps to require that the applicant fully offset its 20-year proposed project impacts will result in unprecedented net losses of wetland and aquatic habitats beyond those of any copper mine ever proposed in the United States.

The bottom line is that the CMP proposes no specific compensatory mitigation measures that could even begin to offset the lost acreage or stream miles that its project would cause directly or indirectly. To conclude that a project of this magnitude – likely the greatest acreage of impacts to the “waters of the United States” that have ever been proposed for any copper mine – qualifies for authorization under Section 404 of the Clean Water Act, would require the District Engineer to find that 1) the physical and functional losses and/or degradation of over 5000 acres of predominantly pristine special aquatic sites would not cause or contribute to significant degradation of the aquatic ecosystem, and 2) replacing existing culverts, performing small bank stabilization projects, helping fund invasive species eradication, and, perhaps funding some preservation areas in distant watersheds would be sufficient to offset project impacts.

As presently proposed, the author believes that the project fails to comply with Federal Clean Water Act regulations with regard to compensatory mitigation [40 CFR 230.10(d)], and the lack of appropriate mitigation measures should also lead to a determination that the project would

cause or contribute to significant degradation of the aquatic ecosystem and thereby fail to comply with the regulations at 40 CFR 230.10(c), as well. The Corps should prepare a revised DEIS that includes a detailed compensatory mitigation plan, and that expands the scope of that plan to include mine expansion to at least the 78-year scenario.