Comments of Bristol Bay Native Corporation on the Second External Review Draft of the Bristol Bay Watershed Assessment

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I. INTRODUCTION

Bristol Bay Native Corporation ("BBNC") thanks the U.S. Environmental Protection Agency ("EPA") for its extensive efforts in preparing the Second External Review Draft of the Bristol Bay Watershed Assessment ("Revised Assessment").[1] BBNC appreciates EPA's responsiveness and willingness to take into consideration BBNC's previous comments and supporting documentation in its review and revision of the assessment.[2] BBNC respectfully urges EPA to complete a Final Assessment expeditiously as a means to strengthen the agency and public's understanding of the fishery and water resources of the Bristol Bay watershed. BBNC opposes the proposed Pebble Mine and other equally large mining development in the Nushagak and Kvichak watersheds because of the threats such projects pose to the wild salmon fisheries that are the cultural and economic foundation of the region.[3]

The time for EPA to act is now. After more than twenty-six months of study, EPA has a solid scientific foundation on which to take action under Section 404(c) of the Clean Water Act ("CWA"). Moreover, through public testimony and written comments from hundreds of Bristol Bay residents and thousands of other concerned citizens, EPA has heard an urgent call for protection of the region's sensitive waters and fishery resources through 404(c) action.[4] EPA has also heard repeated comments concerning the hardship already being suffered by Bristol Bay fishermen, residents, and communities due to the uncertainty surrounding the proposed Pebble Mine. Many people have urged EPA to act promptly to ensure that Bristol Bay fishermen and residents can move forward with their lives without the looming threat of large-scale destructive mining operations. EPA's delay has a very real negative economic impact on the region.[5] As detailed in a recent report, the Bristol Bay salmon fishery in 2010 generated $1.5 billion in output value and thousands of jobs across the United States,[6] and that season is generally

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[1] EPA, *An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska*, Second External Review Draft, EPA 910-R-12-004Ba (April 2013) [hereafter "Revised Assessment"], *available at* http://www.epa.gov/ncea/pdfs/bristolbay/bristol_bay__assessment_erd2_2013_vol1.pdf .

[2] A table showing how EPA has responded to BBNC's comments on the First Draft Watershed Assessment in the Revised Assessment is attached to these comments as Appendix A.

[3] *See* Callaway, Don, *A Statistical Description of the Affected Environment as it Pertains to the Possible Development of the Pebble Mine—17 Communities in Bristol Bay* (July 23, 2012) (previously submitted to EPA by BBNC in 2012 during the Draft Bristol Bay Watershed Assessment comment period).

[4] *See* Appendix B—Bristol Bay Draft Watershed Assessment Public Comments Analysis (showing that more than 500 public comments and testimony from the Bristol Bay region, or 92%, supports immediate EPA action).

[5] *See, e.g.*, Statement of Robert Waldrop, Executive Director, Bristol Bay Regional Seafood Development Association (July 11, 2012) *available at* http://www.regulations.gov/#!documentDetail;D=EPA-HQ-ORD-2012-0276-4525 (explaining the economic harms to the value of the fishery before discharges of the mine wastes even begin).

[6] Institute of Social and Economic Research at the University of Alaska, *The Economic Importance of the Bristol Bay Salmon Industry* (May 13, 2013) *available at* http://www.iser.uaa.alaska.edu/news/?p=577 and attached as Appendix C. Similarly, the State of Alaska values salmon seafood production at approximately $1.3 billion in 2010. *See* Alaska Dept. Revenue, REVENUE SOURCES BOOK (Fall 2012), at 18, *available at* http://www.tax.alaska.gov/programs/sourcebook/ .

representative of other seasons[7]. EPA should act now to prevent further economic uncertainty and disruption in the Bristol Bay region.

Finally, BBNC asks that EPA take immediate action to protect Bristol Bay resources because the State of Alaska has shown a lack of commitment to protect this pristine watershed and its communities from the unacceptable adverse impacts of large-scale mining.[8] EPA 404(c) action will provide greater protection to Bristol Bay resources and better ensure the continuation of the region's sustainable and valuable commercial fishery, sport fishing, and tourism industries. Even more importantly, EPA has an obligation to use its authority to protect the Alaska Native culture and way of life for generations to come.

II. EPA HAS CLEAR LEGAL AUTHORITY TO CONDUCT THE WATERSHED ASSESSMENT.

As discussed at length in BBNC's comments on the Draft Assessment, EPA possesses broad statutory authority to conduct a watershed assessment under Sections 104 and 404 of the CWA.[9] In preparing such an assessment, EPA is required to conduct research and gather information, take into account all information available, and set forth findings in writing to the public.[10] EPA has done an excellent job of ensuring that the Bristol Bay watershed assessment and peer review processes satisfy all applicable legal requirements, and EPA has carried out these processes in a scientifically rigorous manner.

The Revised Assessment is the culmination of nearly twenty-six months of work by EPA to collect and synthesize the best available scientific information and public testimony about the Bristol Bay watershed into one comprehensive analysis. EPA has focused its attention largely on the Nushagak and Kvichak drainages, which are at the heart of the largest undisturbed wild sockeye salmon run in the world. The Revised Assessment analyzes the watershed's natural resources, as well as the economic and cultural benefits associated with those resources. The purpose of the Revised Assessment is to enhance the agency's and the public's understanding of how future large-scale mining projects may affect water quality and fishery resources within the Bristol Bay watershed. In light of the comprehensive nature of the document, robust public comment and public hearing opportunities, and extensive peer review of the Draft Assessment by

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[7] The ISER Report focuses on the 2010 fishing season because that is the most recent year for which comprehensive economic data is available. Per the report, salmon harvests, prices and values vary from year to year both higher and lower than 2010 and thus the calculations for 2010 "provide a reasonable illustration of the overall scale and nature of the economic impacts of the industry and the distribution of those impacts between states." *Id.*, Main Report, at 15-16.

[8] *See, e.g.*, Alaska Dispatch, *Pebble Mine fears shadow Alaska land plan for Bristol Bay* (May 5, 2013), *available at*: http://www.alaskadispatch.com/article/20130505/pebb le-mine-fears-shadow-alaska-land-plan-bristol-bay-area . *See also* Juneau Empire, *Senate Passes Permitting Bill* (March 12, 2013), *available at* http://juneauempire.com/state/2013-03-12/senate-pas ses-permitting-bill .

[9] *See* BBNC, *Comments of Bristol Bay Native Corporation on the U.S. Environmental Protection Agency Draft Bristol Bay Watershed Assessment—Part II*, at 2-4 (July 23, 2012) [hereafter "BBNC Part II Comments"].

[10] *See* BBNC Part II Comments, at 2-4 (explaining EPA's authority and requirements for developing a watershed assessment).

an accomplished team of professionals, preparation of this Revised Assessment fully complies with EPA's legal authority and obligations.

III. THE REVISED ASSESSMENT MEANINGFULLY CLARIFIES ITS PURPOSE, SCOPE, AND THE ECOLOGICAL RISK ASSESSMENT APPROACH.

EPA has meaningfully clarified the purpose and scope of the Revised Assessment and demonstrated how it is consistent with an ecological risk assessment approach.

In response to specific peer reviewer concerns regarding the timing of the watershed assessment,[11] the Revised Assessment clarifies that the assessment, like all risk assessments, is "based on scenarios that define a set of possible future activities."[12] The Revised Assessment properly characterizes its purpose as a means to "assess mining-related stressors that could affect ecological resources in the watershed" through the development of "realistic mine scenarios" that are largely based on plans and baseline data developed by mine proponents.[13]

In response to feedback from the peer reviewers,[14] EPA uses a spatial scale analysis to better orient the Revised Assessment around the locations of greatest potential impact from mining.[15] The Revised Assessment sets forth five spatial scales that serve to improve the reader's perspective about the Bristol Bay region and illustrate how various parameters would be impacted by the development of a large-scale mine. The five spatial scales used to analyze natural, cultural, and mineral resources are (1) the overall Bristol Bay watershed; (2) the Nushagak and Kvichak River sub-watersheds; (3) three large tributaries that originate from the proposed Pebble Mine footprint (South Fork Koktuli, North Fork Koktuli, and the Upper Talarik Creek); (4) the three mine-footprint scenarios (Pebble 0.25, Pebble 2.0, and Pebble 6.5); and (5) the combined sub-watersheds situated along the proposed transportation corridor.[16] The EPA also considered two periods of mine activities. The first is the period, likely lasting 20-100 years, during which a mine would be developed and operated. The second is the period, likely lasting "in perpetuity," during which the mine site and wastes are monitored, treated and remediated.[17]

As noted by some peer reviewers, one of the defining steps of an ecological risk assessment is the use of well-defined endpoints.[18] Accordingly, the Revised Assessment better defines and

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[11] EPA, *Final Peer Review Report—External Peer Review of EPA's Draft Document An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska*, at 21-22 (Sept. 2012) (prepared for EPA by Versar, Inc.) [hereafter "Peer Review Report"], *available at* http://www.epa.gov/ncea/pdfs/bristolbay/Final-Peer- Review-Report-Bristol-Bay.pdf .

[12] Revised Assessment, at ES-10.

[13] *Id.* at ES-10.

[14] Peer Review Report, at ii.

[15] Revised Assessment, at ES-2 to ES-3.

[16] *Id.* at ES-2.

[17] *Id.* at ES-4.

[18] *Peer Review Report*, at iii, 7, 91.

clarifies its assessment endpoints as "explicit expressions of the environmental resources of interest to the risk assessors, decision makers, and stakeholders."[19] Because "the sustainability of the Bristol Bay fishery is a concern shared by all Bristol Bay stakeholders," EPA helpfully clarified its selection of salmonid fishes as the definitive assessment endpoint.[20] In addition, EPA clarified its use of two key secondary endpoints—wildlife and Alaska Native cultures—as "affected by changes in salmonid fisheries."[21] These endpoint parameters serve to enhance the level of detail and provide a useful framework for the important site- and mine- specific analyses undertaken throughout the assessment and as a means of characterizing the impacts to Alaska Native cultures.

IV. THE REVISED ASSESSMENT AMPLY SUPPORTS EPA'S CONCLUSIONS REGARDING THE ADVERSE IMPACTS OF LARGE-SCALE MINING ON THE BRISTOL BAY WATERSHED.

The Revised Assessment is well-written, well-documented, and scientifically sound. It includes a thorough review of existing literature on the fishery and water resources of the Bristol Bay watershed and a solid assessment of the risks posed to those resources by large-scale mining activities. The Revised Assessment incorporates and utilizes the best available data within the proper geographic and substantive scope of the assessment. This data and information has been collected from a wide range of sources, including the Pebble Limited Partnership (Environmental Baseline Documents),[22] State of Alaska Department of Natural Resources,[23] State of Alaska Department of Fish and Game,[24] Northern Dynasty Minerals Ltd. (Wardrop Report, cited as Ghaffari),[25] and the U.S. Geological Survey.[26]

The Revised Assessment has also been strengthened through a rigorous peer review and public comment process. In response to the questions and concerns raised during these processes, the Revised Assessment broadens the potential mining scenarios, strengthens the biological and subsistence information, includes a more sophisticated cumulative impacts analysis, and squarely evaluates the long-term effectiveness of remediation and mitigation strategies. As a result, the Revised Assessment provides strong support for EPA's conclusions regarding the adverse impacts of large-scale mining on the fishery and water resources of Bristol Bay.

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[19] Revised Assessment, at 1-3.

[20] *Id.*

[21] *Id.* at ES-2.

[22] *See id.* at 3-12, 7-12, 8-23, 9-24, and 11-7.

[23] *See id.* at 4-9, 8-20, 9-8, 13-7 to 13-9.

[24] *See, e.g., id.* at 3-36, 5-10, 5-12, 5-35 to 5-36, 7-2, 7-12 to 7-13, 9-29 to 9-32, 10-7 to 10-8, 10-29, 13-7 to 13-8.

[25] *See, e.g., id.* at 2-3, 3-35, 4-13 to 4-14, 6-1 to 6-3, 6-9 to 6-11, 6-19, 8-59 to 8-60.

[26] *See, e.g., id.* at 2-13 to 2-14, 3-15 to 3-18, 3-34 to 3-35, 7-34 to 7-44.

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A. THE REVISED ASSESSMENT INCLUDES A SUBSTANTIALLY SMALLER PEBBLE MINE SCENARIO AND USES CONSERVATIVE ASSUMPTIONS THROUGHOUT.

As discussed at length in BBNC's previous comments on the Draft Assessment, EPA appropriately uses hypothetical mine scenarios to determine whether unacceptable impacts will result from large-scale mining operations in the headwaters of the Kvichak and Nushagak River drainages.[27] Large-scale mining projects can appropriately be generalized so long as the potential impacts of discharges of mine wastes to waters and impacts on fish habitats are site-specific.[28] Moreover, although EPA does not need to wait to see the details of any specific permit application to determine whether unacceptable impacts will occur,[29] the hypothetical scenarios utilized by EPA are modeled on preliminary plans for the Pebble Project as described by Northern Dynasty Minerals in its 2006 Alaska Department of Natural Resources Water Rights application and its 2011 Wardrop Report (Ghaffari et al.).[30] These materials provide detailed information, maps, and descriptions on which to assess a fact-based hypothetical mining scenario.

Indeed, in its Revised Assessment, EPA clarifies that the mine scenarios "draw on plans developed for Northern Dynasty Minerals, consultation with experts, and baseline data collected by the Pebble Limited Partnership to characterize the likely mine site, mining activities, and surrounding environment"[31] and that the mine scenarios "realistically represent the type of development plan that can be anticipated for a porphyry copper deposit in the Bristol Bay watershed."[32] Additionally, in response to concerns raised by peer reviewers,[33] the Revised Assessment properly clarifies that the scenarios are based on worldwide industry standards for porphyry copper mining and incorporate modern conventional mining practices.[34] Furthermore, the Revised Assessment conservatively assumes that *only* modern mining technologies and practices will be utilized in Bristol Bay and that these technologies and practices are in place and working properly at all times.[35] These are extremely careful assumptions for a risk assessment.

Perhaps the most significant and conservative overall revision to the assessment is EPA's addition of a substantially smaller Pebble Mine scenario consisting of 0.25 billion tons of ore. Although this mining scenario is substantially smaller than the 2.0 billion tons and 6.5 billion tons Pebble Mine scenarios included in the original Draft Watershed Assessment, its impacts would still be quite large, with a total surface area of 5.88 square kilometers.[36]

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[27] BBNC Part II Comments, at 12-14.

[28] *See id.*

[29] *See* 40 C.F.R. § 231.1.

[30] *See* Revised Assessment, at ES-10.

[31] *Id.*, at ES-10.

[32] *Id.*

[33] Peer Review Report, at 48.

[34] Revised Assessment, at ES-10.

[35] *Id.* at ES-11.

[36] *Id.*

The three Pebble Mine scenarios considered in the Revised Assessment are based on the preliminary mine details put forth in the Wardrop report and incorporate information from scientific and industry literature from mines around the world.[37] The Revised Assessment utilizes these scenarios to provide a better understanding of the potential range of risks and impacts associated with a particular scale of proposed action. Inclusion of the 0.25 billion ton scenario analysis—a mining scenario that is likely uneconomical to develop in such a remote area[38]—allows EPA to include an extremely down-sized assessment of impacts to the Bristol Bay watershed.

EPA's evaluation of all three Pebble Mine scenarios includes analysis and quantification of the mine and tailings footprints, miles of adversely impacted streams, acres of wetlands lost, the effect of mine leachate on streams, and the extent of effects from tailings dam failures. EPA's analysis demonstrates that the impacts on the fishery and water resources of the Bristol Bay watershed would be significant under any of the Pebble Mine scenarios. Indeed, even under the economically unlikely smaller scenario, mining development would cause the *direct loss* of 24 miles of streams, 5 miles of known spawning and rearing habitats for salmonids, and 1,200 acres of wetlands, as well as reductions in streamflow within an additional 9.3 miles of streams, unquantifiable indirect effects of stream and wetlands losses, and 95 million metric tons of potentially acid-generating waste rock.[39]

Additionally, the inclusion of the 0.25 billion tons of ore scenario allows EPA to quantify the cumulative effects from development of multiple similar-sized deposits surrounding Pebble and to quantify the impacts associated with "different stages in the potential process of mining the Pebble deposit," as discussed further below.[40] It is, nevertheless, important to note EPA's acknowledgement that estimated impacts of aquatic habitat loss "would differ across different deposits, based on the size and location of mine operations within the watersheds."[41]

B. THE REVISED ASSESSMENT BETTER DESCRIBES POTENTIAL MINING IMPACTS.

1. Impacts on Fisheries and Aquatic Habitat

The Revised Assessment is improved in that it includes more scientific information concerning Bristol Bay fisheries and aquatic habitat. The following are a few examples. The Revised Assessment contains:

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[37] *Id.* at 6-1.

[38] *Id.* at ES-9 ("Because these deposits are low grade . . . mining will be economic only if conducted over large areas.").

[39] *Id.* at ES-14, tbl. ES-1.

[40] *Id.* at ES-2.

[41] *Id.* at ES-25.

- Considerably more discussion of the importance of the upper Bristol Bay watershed stream reaches as rearing habitat for several species of commercially important and subsistence fishes;[42]

- A better discussion of the importance of maintaining small and diverse fish populations, both salmonid and non-salmonid, and expanded consideration of the genetic "portfolio effect" to buffer against genetic drift and protect biological complexity and stability of the fishery;[43]

- More analysis of other important Bristol Bay fish species (such as rainbow trout, char, and Dolly Varden), and an improved analysis of the importance of these fish species to the health of the watershed, to sportfishing, and as subsistence food;[44]

- Better accounting of the Chinook salmon commercial fishery and king salmon in general;[45]

- A better discussion of mine-induced changes to hydrologic connectivity between wetlands, groundwater, and surfacewater and the impacts of dewatering to aquatic habitats, including quantification of negative impacts on stream temperature and cold water refugia habitat in upper stream reaches;[46] and

- A better discussion of fish habitat degradation from routine mining activities, including an improved analysis of both the direct and indirect effects on salmonids from copper leachate. For instance, under the 6.5 billion ton scenario leaching during standard operation will directly impact salmonids in up to 35 miles of streams beyond the mine footprint and will indirectly impact up to 51 miles of streams beyond the mine footprint.[47]

It is important to emphasize that the Revised Assessment continues to use conservative information to assess the scope of mining impacts on aquatic habitat and fisheries.[48] While EPA has properly broadened its characterization of Bristol Bay fisheries and aquatic habitat, the Revised Assessment uses a very careful approach to assess the *impacts* of large-scale mining on fisheries and aquatic habitat. For instance, the Revised Assessment includes the assumption that no significant human or engineering failures will occur during mine development[49] and

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[42] *Id.* at 3-18 to 3-28. *See also* BBNC, *Comments of Bristol Bay Native Corporation on the U.S. Environmental Protection Agency Draft Bristol Bay Watershed Assessment—Part I*, at 2-3 (July 23, 2012) [hereafter "BBNC Part I Comments"] (asking EPA to include more best available information about rearing habitat, diversity, the portfolio effect, and commercially important fishes).

[43] *Id.* at 5-26. BBNC thanks EPA for its use and better explanation of the genetic "portfolio effect" and genetic diversity, as requested in BBNC's previous comments on the Draft Assessment. *See* BBNC Part I Comments, at 3.

[44] *See*, *e.g.*, Revised Assessment, at ES-5, tbl. 5-1; 5-9 to 5-11; and 5-20 to 5-23.

[45] *Id.* at 5-8, tbl. 5-3.

[46] *See*, *e.g.*, *id.* at 3-13 to 3-14; tbl. ES-2; and 6-24, box 6-2.

[47] *Id.* at ES-15, 8-54.

[48] BBNC Part I Comments, at 2 and Attch. A (discussing similar underestimates in the Draft Assessment).

[49] Revised Assessment, at ES-11 ("The assessment considers risks from routine operation of a mine designed using modern conventional mitigation practices and technologies and with no significant human or engineering failures.").

furthermore conducts tailings dam failure impact analysis for only the smaller 0.25 and 2.0 billion ton scenarios while not assessing these impacts under the larger mine scenario.[50]

Additionally, BBNC notes that the Revised Assessment is also conservative because it contains assumptions and data sets that substantially underestimate the amount of habitat that would be lost under the hypothetical mine scenarios. As discussed in BBNC's comments on the Draft Assessment and reasserted here,[51] EPA estimates wetland impacts using National Wetland Inventory ("NWI") maps that underestimate jurisdictional wetlands, leading to narrow calculations of the habitat likely to be lost under each of the Revised Assessment mine scenarios.[52]

Though it includes a much more in-depth and focused analysis, the Revised Assessment consequently remains conservative in its quantification of aquatic habitats and its assessment of the impacts to such habitats. The Revised Assessment, nevertheless, provides ample support for the conclusion that large-scale mining in Bristol Bay will result in extensive habitat degradation and destruction of fishery and water resources.[53]

2. Subsistence Impacts

The Revised Assessment rightfully notes that "[f]or Alaska Natives today, subsistence is more than the harvesting, processing, sharing, and trading of land and sea mammals, fish, and plants. Subsistence holistically subsumes cultural, social, and spiritual values that are the essence of Alaska Native cultures."[54] BBNC is pleased to see that the Revised Assessment contains a more comprehensive analysis of important subsistence resources in the Bristol Bay region and the impacts of varying mine proposal sizes on these subsistence resources. In particular, the Revised Assessment devotes more attention to important subsistence resources beyond salmon, including non-salmonid fishes (rainbow trout and char) and other wildlife (bear, moose, caribou, waterfowl).[55] The Revised Assessment also recognizes the importance of these subsistence resources—acknowledging the importance of all salmonid species, various non-salmon fishes, caribou, moose, waterfowl, and berries.[56] BBNC supports these revisions, as they further quantify the importance of maintaining small and diverse fish populations, preventing fish habitat degradation from trace metallic contaminants and dewatering, and ensuring pristine fish spawning and rearing habitat.

The Revised Assessment nevertheless still contains a more limited discussion of the socioeconomic impacts on local communities that would result from large-scale mine

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[50] *Id.* at ES-17 ("Failures in the Pebble 6.5 scenario, which includes three TSFs, were not analyzed… .").

[51] BBNC Part I Comments, at 2 and Attch. A.

[52] Revised Assessment, at 7-21, Box 7-1.

[53] *See e.g.*, Revised Assessment, at ES-14, tbl. ES-2 (explaining that impacts from development of the 6.5 billion ton scenario will result in elimination, blocking, or dewatering of 145km important stream habitat).

[54] *Id.* at 5-33.

[55] *Id.* at 5-32, 12-8.

[56] *See generally id.* at Ch. 5.

development and the resulting loss of subsistence resources in the Kvichak and Nushagak river basins. While rightfully stating that "[s]almon are integral to the entire way of life in these cultures as subsistence food and subsistence-based livelihoods, and are an important foundation for language, spirituality, and social structure,"[57] the Revised Assessment is narrow in that it does not analyze the inevitable adverse impacts on the Alaska Native way of life that would result if large-scale mining development proceeds in Bristol Bay. In earlier comments on the Draft Assessment, BBNC emphasized that the assessment "does not adequately discuss the very important socioeconomic impacts to local communities that would likely result from the potential environmental impacts of the development of the hypothetical mining scenario" and that "the Assessment would benefit from greater discussion and a more thorough and prominent discussion of these threats."[58] Integrating the information cited in BBNC's comments would improve this area of the assessment.

3. Cumulative Impacts of Multiple Large-Scale Mines and Ancillary Development

The Revised Assessment now includes a more detailed analysis of the cumulative impacts of large-scale mine development in the Bristol Bay watershed.[59] In particular, the Revised Assessment includes a greatly improved discussion of a multiple-mine scenario and long-term ancillary development. For instance, the Revised Assessment explains that, if multiple mines were developed, the area suffering cumulative impacts could reach 8,600 to 13,000 acres in size, including 25 to 40 miles of eliminated or blocked stream habitats and cumulative wetlands losses from 1,800 to 6,100 acres.[60] Once again, moreover, this conservative analysis underestimates impacts because it is based on low-end mine development predictions and contains more narrow assumptions about the true extent of ancillary development. Indeed, the Revised Assessment properly notes the conservative nature of its cumulative impacts estimates.[61]

In earlier comments on the Draft Assessment, BBNC noted that EPA's cumulative analysis underestimated cumulative habitat losses by excluding certain areas from the mine footprint and by underestimating stream reaches and wetlands delineations.[62] In addition, BBNC noted that the Draft Assessment underestimated cumulative impacts by assuming joint use of facilities by multiple mining operations.[63] BBNC thus notes that the Revised Assessment remains conservative with regard to these two points as well.[64]

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[57] *Id.* at ES-8.

[58] BBNC Part I Comments, at 5.

[59] Revised Assessment, Ch. 13 (responding to peer reviewer concerns set forth in Peer Review at 95, 98).

[60] *Id.* at ES-25.

[61] *See id.* (Referring to the cumulative risks analysis, "These are conservative estimates of lost habitats . . ..).

[62] BBNC Part I Comments, at 4.

[63] *Id.*

[64] *See* Revised Assessment, at 13-9 (showing that EPA's methods for estimating cumulative impacts from other mines utilizes wetlands and stream data underestimates aquatic impacts, and that EPA further assumes that four additional mining facilities included in its cumulative impacts analysis would utilize the mill, tailings storage facility, and other facilities developed at Pebble Mine).

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Moreover, the Revised Assessment's treatment of ancillary development is similarly improved, and remains conservative. EPA properly expands its analysis of the potential transportation corridor to include an analysis of diesel pipeline spills, product concentrate spills, truck accidents involving process chemicals, and culvert failures. Indeed, in response to peer reviewer requests,[65] the Revised Assessment contains an extensive discussion of culverts in Chapters 6 and 10 and an entire Appendix devoted to road and pipeline development on water quality and freshwater resources.[66] At the same time, the Revised Assessment remains conservative because it does not include a more detailed accounting of other types of inevitable ancillary development. In fact, EPA openly acknowledges that it "does not consider all impacts associated with future large-scale mining in the Bristol Bay watershed."[67] Specifically, EPA points out that the Revised Assessment confines its scope of analysis to exclude impacts associated with the following mining-related infrastructure and ancillary development: construction and operation of a deep-water port in Cook Inlet; "one or more large-capacity, electricity-generating power plants that would be required to power the mine and port;" induced development (such as support services for mine employees and families); increased access to recreational resources; and an increased transportation infrastructure throughout the Bristol Bay region.[68] EPA also admits that it has used "conservative estimates of lost habitats, because we did not estimate the hydrologic drawdown zones around each pit mine."[69]

4. Seasonal Flow Variations and Climate Change Impacts

In response to peer review requests[70], the Revised Assessment better characterizes and discusses seasonal hydrologic processes, seasonal flow variations, and how global climate change will influence these hydrologic processes and rates. The Revised Assessment then properly utilizes modeling to evaluate the expected impacts of combined pressures from seasonal climate and flow variability and mine development on the fragile watershed ecosystem.[71] While EPA admits its modeling technique is limited, it notes that climate change and seasonal variation impacts during salmon migration events will likely intensify any effects caused by large-scale mining.[72] BBNC agrees with this additional analysis, as limited as it admittedly is, as a means of acknowledging, if not fully quantifying, additional and compounding impacts from large-scale mining on the Bristol Bay Watershed.

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[65] Peer Review Report, at 56, 73–76.

[66] Revised Assessment, Chs. 6, 10; Appx. G.

[67] *Id.* at ES-4.

[68] *Id.*

[69] *Id.*

[70] Peer Review Report, at 9.

[71] Revised Assessment, at 3-36 to 3-45; 14-15.

[72] *Id.* at 3-37.

C. THE ASSESSMENT OF REMEDIATION AND MITIGATION IS GREATLY EXPANDED.

1. Wastewater Capture and Treatment

EPA's discussion of wastewater capture and treatment in the Revised Assessment represents a significant improvement over the general discussion of wastewater in the initial Draft Assessment. BBNC agrees with the heightened importance EPA devotes to this discussion and the creation of a new watershed assessment chapter devoted to Water Collection, Treatment, and Discharge.[73] In this chapter, EPA sets forth additional details concerning the drainage of waste rock leachate to streams and a mine site water balance of potential mine impacts under the different mine scenarios.[74]

Impacts from Routine Operations. In response to peer review requests that the watershed assessment include not only catastrophic wastewater pollution events, but also day-to-day routine contamination stressors,[75] the Revised Assessment now contains an improved analysis of routine operation impacts, including leachate/leaks of toxins from wastewater containment facilities and nonpoint runoff sources, wastewater treatment plant failures, road culvert failures, and truck accidents.[76] In so doing, the Revised Assessment adopts a more realistic discussion of waste rock leachate through a routine operations scenario rather than the unrealistic "no failure" scenario utilized in the Draft Assessment.[77]

This is a significant improvement to analysis of leachate escapement and is a useful starting point to analyze wastewater capture and treatment requirements. Indeed, as EPA's revised analysis shows, even routine large-scale mining operations with wastewater collection and treatment cannot operate without degrading water quality and causing direct negative impacts on salmonids downstream.[78]

Wastewater Capture. The Revised Assessment better utilizes advanced modeling to detail wastewater capture and treatment under routine operation scenarios. As noted by the peer reviewers, EPA's analysis in the Draft Assessment was cursory, and its calculations failed to include catchment and treatment of acid rock leachate.[79] In the Revised Assessment, EPA

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[73] *Id.* Ch. 8.

[74] *Id.* at 8-18 to 8-19.

[75] Peer Review Report, at 7, 20, 58, 63, 107.

[76] Revised Assessment, at ES-15 to ES-16.

[77] *Compare* Draft Assessment, at ES-14 (discussing the failure/no failure dichotomy, with "no failure" defined as the default day-to-day mode of operation) *with* Revised Assessment, at ES-15 (discussing routine operations outside of a failure/no failure dichotomy with the routine operations including assessment of leaching/leakage of wastewater containment facilities, wastewater treatment plant failures, culvert failures, and truck accidents).

[78] *See* Revised Assessment, at ES-15 (explaining that leachate from routine operations, particularly copper concentrations, would "be sufficient to cause direct effects on salmonids" in up to 35 miles of streams and beyond the mine footprint in the 6.5 billion ton scenario).

[79] Peer Review Report, at 10.

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greatly improved its analysis of this ongoing water quality threat by modeling capture of leachate from cone-of-depression wells as described in the Wardrop Report.[80]

Utilizing this modeling, EPA concludes that "greater than 99% capture efficiency would be required to prevent exceedance of the copper criteria for the South Fork Koktuli River under the Pebble 6.5 scenario."[81] Without this capture efficiency, negative effects on aquatic life beyond the mine footprint would occur, including fish aversion and avoidance on up to 35 miles of streams, "rapidly induced death of many or all fish" in up to 7.5 miles of streams, and death or reduced reproduction of the primary juvenile salmon food source (aquatic invertebrates) for up to 51 miles of streams.[82] Importantly, EPA notes that a 99% capture efficiency would "require technologies beyond those specified in . . . the most recent preliminary mine plan."[83] Indeed, the Revised Assessment assumes a leachate capture efficiency of only 50%.[84] These modeling results are, yet again, conservative because the Revised Assessment uses *average* projected leachate concentrations[85] and continues to use narrow assumptions to assess the risks and feasibility of treating massive seasonal flows and volumes of wastewater.[86]

Despite these conservative assumptions, the Revised Assessment properly concludes that even long-term, non-catastrophic wastewater capture utilizing the best mining technology cannot avoid negative impacts to aquatic habitat.

2. Post-Closure Reclamation and Perpetual Treatment

In the peer review report, multiple experts questioned the acceptability and practicality of development and operation of a mine that will require perpetual treatment after closure.[87] Specifically, the peer reviewers rightfully questioned the practicality of monitoring and managing waste rock and tailing storage facilities for tens of thousands of years.[88] In response, the Revised Assessment addresses perpetual treatment and monitoring as it relates to: the tailings facility (including dams),[89] the structural integrity of all mine infrastructure,[90] perpetual wastewater collection and treatment systems,[91] and overall uncertainties associated with long-term mine waste management.[92] Indeed, the Revised Assessment's discussion of the uncertainties associated with perpetual treatment admits "[t]he response of the current

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[80] Revised Assessment, at 4-12, 6-13.

[81] *Id.* at ES-15.

[82] *Id.* (using numbers based on the 6.5 billion ton mine scenario).

[83] *Id.*

[84] *Id.* at ES-28.

[85] *Id.* at 6-40; Tables 8-4 through 8-8.

[86] *Id.* at 8-4 (routine operation wastewater volume calculated on a yearly, non-seasonal basis).

[87] Peer Review Report, at 49, 67.

[88] *Id.* at 8.

[89] Revised Assessment, at ES-27, 6-33, 9-12.

[90] *Id.* at ES-27, 6-16.

[91] *Id.* at ES-15, 6-34, 8-22.

[92] *Id.* at ES-27, 12-16, 14-16.

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technology in the construction of tailings dams is untested and unknown in the face of centuries of extreme events . . . ."[93] Further, the Revised Assessment concludes that "[e]ven if the mining and mitigation practices described in the mine scenarios were performed perfectly, an operation of this size would *inevitably destroy or degrade* habitat of salmonids."[94] BBNC agrees with EPA's characterization that perpetual treatment of mining wastes is untested and not worth the risk to such sensitive waters and fishery resources.

3. Compensatory Mitigation

The discussion of compensatory mitigation in Appendix J of the Revised Assessment represents a significant improvement over the general discussion of mitigation that was included as Appendix I of the Draft Assessment. Appendix J clarifies that CWA regulations prohibit issuance of a 404 permit where appropriate and practicable compensatory mitigation measures are lacking.[95] It is also clear from the discussion in Appendix J and from earlier analyses[96] that existing opportunities to mitigate the impacts of the Pebble Mine as proposed, as well as those of the new smaller 20-year, 0.25 billion ton mine scenario analyzed in the Revised Assessment, are highly unlikely to meet the CWA 404 regulatory requirements.

Notably EPA's compensatory mitigation conclusion is weaker than the analysis that precedes it. EPA concludes that "[t]here are significant challenges regarding the potential efficacy of compensation measures proposed by commenters for use in the Bristol Bay region, raising questions as to whether sufficient compensation measures exist that could address impacts of this type and magnitude."[97] Yet the analysis in Appendix J supports the stronger conclusion that the mine scenarios (and the Pebble Mine as proposed) would not qualify for a Section 404 permit because of the lack of sufficient appropriate and practicable compensatory mitigation measures to offset the type and magnitude of aquatic resource losses. As EPA points out, any large mine at the Pebble deposit would directly destroy hundreds to thousands of acres of high-functioning wetlands and tens of miles of salmon streams.[98] These streams and wetlands are not replaceable or fungible. Not only do they provide important ecological functions, they also support genetically unique salmon populations that are part of the overall population diversity that is key to the stability of the Bristol Bay salmon fishery.[99] Appendix J, and the earlier analysis in Yocom & Bernard 2013, thoroughly support the conclusion that there are no reasonable or practicable compensatory mitigation measures that could adequately offset the impacts of mining the Pebble deposit within the affected or nearby watersheds.

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[93] *Id.* at 14-16.

[94] *Id.*

[95] *See* 40 C.F.R. § 230.91(c)(3).

[96] *See* Yocom, Thomas G., and Rebecca L. Bernard, *Mitigation of Wetland Impacts from Large-Scale Hardrock Mining in Bristol Bay Watersheds* (2013), *available at* http://www.sjel.org/vol3/mitigation-of-wetland-impacts-from-large-scale-hardrock-mining-in -bristol-bay-watersheds .

[97] Revised Assessment, App. J, at 16.

[98] *Id.* at 7.

[99] *Id. See* Schindler *et al.*, *Population diversity and the portfolio effect in an exploited species*, 465 NATURE 609-612 (2010).

The paragraphs that follow highlight several aspects of the Appendix J compensatory mitigation analysis that support this stronger conclusion and are particularly important in any compensatory mitigation discussion relating to mining of the Pebble deposit. The following discussion also includes brief comments on each compensatory mitigation measure analyzed in Appendix J.

Ecological Functions of Lost Aquatic Resources. The discussion of the ecological functions of the streams and wetlands that would be lost under each of the Revised Assessment mine scenarios is important and on-the-mark.[100] EPA recognizes the enormity of the number of acres and miles of wetlands and streams that would be lost, as well as the important and unique ecological functions that these waters perform. EPA acknowledges that it is these functions—indeed, the whole suite of functions—that would have to be replaced through compensatory mitigation. Particularly important is EPA's acknowledgment that the losses of streams and wetlands would affect genetically unique populations of salmon, undermining the stability of the overall Bristol Bay fishery that depends on the genetic diversity of individual populations (the "portfolio effect").[101]

Appropriate Watershed Scale. The discussion correctly acknowledges that the most appropriate watershed scale is the affected drainages themselves—North Fork Koktuli ("NFK"), South Fork Koktuli ("SFK"), and Upper Talarik Creek ("UTC").[102] EPA correctly recognizes that this scale is most appropriate because compensatory mitigation in these drainages would have the greatest likelihood of replacing the suite of functions lost to mining, in particular impacts to salmon populations that are unique to these drainages. In addition, it is important to note that watersheds (as delineated by the U.S. Geological Survey) are much larger on average in Alaska, due to mapping-scale differences, and that additional caution is therefore warranted in considering mitigation measures outside of the immediate drainages where the impacts occur.

Lack of Appropriate and Practicable Compensatory Mitigation Measures. EPA acknowledges that all three compensatory mitigation mechanisms—mitigation banks, in-lieu fee programs, and permittee-responsible mitigation—share the fundamental problem that there simply are not opportunities for mitigation that could effectively replace the suite of aquatic functions that would be lost under the Revised Assessment mine scenarios.[103] As EPA states:

> In the context of the mine scenario, the primary challenge to both a watershed approach and on-site compensatory mitigation is the absence of existing degraded resources and watershed needs within the NFK, SFK and UTC watersheds. Specifically, these three watersheds are largely unaltered by human activities, and there appear to be no sites that a mitigation project could restore or enhance to offset the magnitude of impacts expected from the mine scenarios.[104]

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[100] Revised Assessment, App. J, at 5-6.

[101] Revised Assessment, at 5-24.

[102] *Id.* at 6-7 (citing Yocom & Bernard (2013); Schindler *et al.* (2010)).

[103] *Id.* at 8.

[104] *Id.* at 8-9.

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This statement is accurate and well-supported, and it strongly underscores the reality that it is simply impossible to adequately compensate for the magnitude and type of proposed impacts associated with the mine scenarios in an ecologically intact environment.

Appendix J analyzes several potential compensatory mitigation measures proposed by public and peer review commenters. The analysis of these measures is adequate, although may understate their ineffectiveness.

Beaver Dam Removal. EPA's assessment reviews the scientific evidence concerning the impact of beaver dams on salmonid species and concludes that the impacts are more positive than negative.[105] EPA may also want to cite the findings of Pebble Partnership studies (as cited at footnote 117 in Yocom & Bernard 2013) that beaver ponds provide important habitat for salmonids.

Flow Management. EPA properly concludes that, even if a flow management system were shown to successfully control water temperature in water discharges, this system would be required as a measure to minimize impacts rather than as a compensatory mitigation measure.[106] In addition, such measures would require difficult, unprecedented, and perhaps even impossible, perpetual management and maintenance.

Spawning Channels. There is inadequate scientific evidence of success with such measures. The constant maintenance such channels require would be inconsistent with the requirement that compensatory mitigation projects be self-sustaining.[107]

Preservation. EPA states that a preservation approach to compensatory mitigation "would require a site that is very large, performs similarly important aquatic functions, and is under threat of destruction or adverse modification."[108] EPA should go further and acknowledge that, under the Section 404 regulations, the mitigation site would be required to perform not just "similarly important aquatic functions," but the same suite of aquatic functions as the resources lost to mining.[109] As EPA points out, no one has identified any such site and, perhaps even more importantly, there is no precedent for such a preservation-dominated mitigation approach in the context of this type and magnitude of ecological loss.

Unavailable and Inadequate Off-Site Mitigation:

Old Mine Site Remediation, Road Removal, and Road Stream Crossing Retrofits. EPA correctly notes that, although there are degraded sites that could benefit from restoration or enhancement, these are few and scattered, located in more distant portions of the broader Nushagak and Kvichak watersheds, and simply not adequate in size or type to offset aquatic resource losses

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[105] *Id.* at 9-10. *See also* Yocom & Bernard (2013).

[106] *Id.* at 10-11.

[107] *Id.* at 11. *See* 40 C.F.R. § 230.97(b).

[108] *Id.*

[109] *See* 40 C.F.R. § 230.93(a)(1).

associated with the mine scenario.[110] Additionally, the use of such distant sites as compensatory mitigation would not be consistent with the Section 404 regulations:

> Defining the watershed scale this broadly ... would likely fail to effectively compensate for the adverse environmental impacts of the permitted discharge—the fundamental requirement of the Mitigation Rule. 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 far from the site of impact.[111]

Hatchery Construction. Hatcheries would pose more ecological risks than benefits.[112] To put it simply, it would be inconsistent with the Section 404 regulations' emphasis on replacing lost aquatic functions to mitigate for impacts to wild—and genetically unique—salmon populations by introducing hatchery fish with all their attendant ecological problems.

Fish Stocking. For the same reasons, fish stocking poses more ecological risks than benefits.[113]

Commercial Fishery Harvest Reductions. Not only would this measure not be effective in mitigating impacts, as EPA states,[114] but there would be a fundamental inequity in forcing an existing and sustainable user group to reduce its impacts to compensate for the impacts of a new and non-sustainable user.

Other Suggested Compensation Measures. BBNC agrees with EPA's conclusion that payments to organizations for education, outreach, and research may be beneficial but do not constitute compensatory mitigation under the regulations.[115]

The analysis in Appendix J provides ample support for the conclusion that there are no appropriate and practicable compensatory mitigation measures that would adequately offset the specific aquatic resource losses that would result from development of either the Pebble Mine or any of the Revised Assessment mine scenarios.

V. CONCLUSION

The Revised Assessment is founded on a thorough review of existing literature on the fishery and water resources of Bristol Bay, takes local knowledge of those resources into account, and includes a solid assessment of the risks posed to those resources by potential large-scale mining in the region. EPA has greatly strengthened and clarified the science and estimation of risks throughout the Revised Assessment, and EPA's robust peer review and public comment process support these strong scientific findings. BBNC respectfully urges EPA to finalize the assessment

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[110] Revised Assessment, App. J, at 12-13.

[111] Yocom & Bernard (2013).

[112] *Id.* at 13-14.

[113] *Id.* at 15.

[114] *Id.*

[115] *Id.* at 15-16.

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without delay so that it can be relied on by agency decisionmakers, stakeholders, and the general public as a valuable information resource and as a guide in future federal, State, and local decision-making processes affecting the waters, fishery resources, and Alaska Native cultures of Bristol Bay.

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