

**EARTHJUSTICE * EARTHWORKS *
CENTER FOR BIOLOGICAL DIVERSITY**

July 1, 2019

VIA PEBBLE PROJECT EIS WEB PORTAL and U.S. MAIL

Shane McCoy, Project Manager
U.S. Army Corps of Engineers, Alaska District
public.affairs3@usace.army.mil

Jim Rypkema, Environmental Program Manager
Alaska Department of Environmental Conservation
Jim.rypkema@alaska.gov
907-334-2288

Re: Comments on Pebble Project Draft Environmental Impact Statement and Permit Application, No. POA-2017-00271

Dear Mr. McCoy and Mr. Rypkema,

Earthjustice, Earthworks, and the Center for Biological Diversity submit these comments on the draft environmental impact statement (DEIS) and the public notice of application for a permit under Section 404 of the Clean Water Act (CWA) prepared by the U.S. Army Corps of Engineers (Corps) for the Pebble Project. Earthjustice is the nation's premier nonprofit environmental law firm, whose mission is to protect healthy communities, defend wildlife and wild places, and fight for our climate future. Earthworks is a nonprofit organization dedicated to protecting communities and the environment against the adverse effects of hard rock mining. Earthworks has members and supporters who live and work in Bristol Bay. The Center for Biological Diversity is a national, nonprofit conservation organization with more than one million members and online activists dedicated to the protection of endangered species and wild places. This letter is in addition to any separate comment letters these groups may submit.

We appreciate the opportunity to comment on the DEIS and the public notice of application for a permit under Section 404. The comments also pertain to the draft biological assessments prepared by the Pebble Limited Partnership (PLP) and the Corps, as well as all forthcoming permitting processes for the project that are relevant to the subjects this letter addresses.

The proposed action is an open-pit mine to develop gold, copper, and molybdenum.¹ It involves an eventual 1.37-square-mile² open pit into which pyritic tailings and potentially acid

¹ U.S. Army Corps of Engineers, Pebble Project Draft Environmental Impact Statement at 1-4, B-3 (Feb. 2019) (DEIS).

² *Id.* at 2-12 (stating that pit would be 6,800 feet in length and 5,600 feet in width).

generating waste rock would be placed at closure,³ requiring water management and treatment in perpetuity,⁴ as well as a 2,796 acre bulk tailings storage facility (TSF)⁵ and a 1,071 acre pyritic tailings storage facility (TSF).⁶ It would require extensive new infrastructure, including a 270-MW power plant,⁷ 78 miles of new road,⁸ two new ferry terminals and an icebreaking ferry making an 18 miles trip back and forth across Lake Iliamna once a day,⁹ a new port facility and jetty on the western shore of Cook Inlet serving up to 27 concentrate vessels and 33 supply barges per year,¹⁰ and a 187-mile-long natural gas pipeline.¹¹ Significant environmental consequences include the contamination of streams and rivers and destruction, dewatering, and flow alteration of wetlands and fish and wildlife habitat.

The DEIS and supporting information are woefully incomplete. There remain crucial data gaps, unresolved key questions, and uncertain designs. On this inadequate record it is not possible for the Corps to initiate meaningful public participation, take the “hard look” required by the National Environmental Policy Act (NEPA), or reach any conclusion that the project will comply with the CWA or other state and federal laws. What the record amply shows, however, is that there is no scenario in which this project will comply with 404(b)(1) Guidelines. Therefore, the Corps should deny the application without proceeding to finalize the DEIS. There is no point in continuing to pour public resources into a permit that plainly must be denied.

At a minimum, the Corps should suspend the permitting process until PLP submits the necessary information to allow sufficient review. In order to submit a realistic and reasonably detailed proposal with adequate supporting data, PLP would have to change its proposal so radically that the Corps would not be able to proceed to a final EIS without first preparing a supplemental DEIS. Should the Corps decide to continue the permitting process, however, the only lawful choice is the no action alternative. In these comments we address several issues that warrant additional study, revision, and/or discussion under NEPA, the Clean Water Act, and other statutes. These issues include:

- ***Significant degradation of waters of the United States.*** The Corps must address EPA’s conclusion that even a mine smaller and less destructive than the proposed action would damage fisheries and cause significant degradation of waters of the United States.

³ *Id.* at 2-9.

⁴ *Id.* at 2-37 (noting that the post-closure plan requires contaminated water in the pit to be pumped and treated to maintain the contaminated water at a certain level within the pit); R. Borden, Midgard Environmental Services LLC, Letter to S. McCoy, U.S. Army Corps of Engineers, re: Pebble Mine Project Economics at 6 n.2 (March 28, 2019) (Borden Report).

⁵ DEIS at 2-19.

⁶ *Id.* at 2-19.

⁷ *Id.* at 2-13.

⁸ *Id.* at 2-13.

⁹ *Id.* at 2-50.

¹⁰ *Id.* at 2-13, 2-62.

¹¹ *Id.* at 2-13.

- ***Purpose and need.*** The Corps must support its analysis of the need for the project and define the purpose more broadly.
- ***Reasonable and practicable.*** The Corps must fully and accurately analyze and disclose whether the proposed project is reasonable and practicable.
- ***Analysis of an expanded mine.*** The Corps must fully assess the impacts of an expanded mine.
- ***Inadequate analysis of alternatives.*** The Corps must identify and thoroughly analyze additional alternatives
- ***The tailings dam and oil spill risks.*** The Corps must completely analyze the risk of a tailings dam failure and other spills.
- ***Missing information.*** The Corps must either require PLP to provide the numerous categories of information missing from the DEIS or address the regulatory criteria in explaining why that information need not be included.
- ***Inadequate analysis of impacts to water and fisheries.*** The Corps must take a hard look at the impacts of failing to perfectly capture and treat the immense volume of wastewater involved, and at the impacts of shipping hazards and oil spills.
- ***Wetlands.*** The Corps must present a more definite picture of the effects of the proposed action—as well as other alternatives—on wetlands and explain how those impacts would comport with regulations established under the Clean Water Act.
- ***Mitigation.*** The Corps must identify additional mitigation and describe the measures with sufficient detail.
- ***Wildlife.*** The Corps must take a hard look at all the potential impacts to wildlife, including impacts to marine mammals in Bristol Bay and impacts that would flow from spills, seepage, TSF failures, and other risks not adequately analyzed in the DEIS.
- ***Climate change.*** The Corps should fully and fairly discuss all of the alternatives' contributions to climate change and explain how climate change could alter the project's environmental impacts.
- ***The public interest.*** The Corps cannot make the requisite finding that the proposed action is in the public interest because its benefits do not outweigh the harm it will cause to conservation, economics, wetlands, fish and wildlife values, recreation, water quality, safety, food production, and the needs and welfare of the people.

Each of these topics requires substantial additional analysis. If the Corps continues with the permitting process, the agency must prepare a supplemental draft environmental impact

statement, allow public comment on the supplemental draft, and fully disclose the environmental consequences of all reasonable alternatives in a final environmental impact statement (FEIS).

SIGNIFICANT DEGRADATION OF WATERS OF THE UNITED STATES

The Clean Water Act prohibits the Corps from issuing a permit for this project because every action alternative would cause significant degradation of waters of the United States.¹² That the Pebble mine would cause significant degradation of waters of the United States is indisputable. The proposal is to destroy an unprecedented quantity of wetlands, lakes, ponds, and streams in the headwaters of one of the world's most productive remaining wild salmon fisheries, a fishery that generates an estimated \$1.5 billion dollars in output sales value nationwide every year (ISER 2014) and supports over 14,000 jobs. If these facts do not amount to significant degradation, nothing does.

Indeed, EPA's Bristol Bay Watershed Assessment and Proposed Determination found that even the smallest plausible copper mine located at the Pebble deposit ("Pebble 0.25") could cause or contribute to significant degradation of the aquatic ecosystem.¹³ EPA explained that irreversible "unacceptable environmental effects . . . would result from such mining," including the "complete loss of fish habitat due to elimination, fragmentation, and dewatering of streams, wetlands, and other aquatic resources" and "significant impair[ment of] the fish habitat functions of other streams, wetlands, and aquatic resources."¹⁴ "In simple terms, the infrastructure necessary to mine the Pebble deposit jeopardizes the long-term health and sustainability of the Bristol Bay ecosystem."¹⁵ The impacts of even the 0.25 scenario mine "would be inconsistent with the requirements of the Section 404(b)(1) Guidelines" in "a number of ways."¹⁶

As independent expert reviews have confirmed, EPA's conclusions apply even more forcibly to the proposed action, which is larger than the Pebble 0.25 scenario EPA examined and will cause more damage to the aquatic ecosystem.¹⁷

The DEIS does not address the "significant degradation" finding that the Corps must make under the 404(b)(1) Guidelines, providing no support for the decision that must be made under the Guidelines. EPA's Proposed Determination found that the loss of 5 or more miles of anadromous fish streams; the loss of 19 or more miles streams; the loss of 1,100 or more acres of wetlands, lakes, and ponds; or streamflow alterations greater than 20% of daily flow in 9 or more miles of anadromous fish streams, would amount to significant degradation requiring denial of a

¹² 40 C.F.R. § 230.10(c).

¹³ U.S. Environmental Protection Agency, Bristol Bay Watershed Assessment and Proposed Determination at 4-56 (July 2014) (PD).

¹⁴ 79 Fed. Reg. 42,314, 42,315-16 (July 21, 2014).

¹⁵ *Id.* at 42,316.

¹⁶ PD at 4-31.

¹⁷ M. Schweisberg, "Compliance with Section 230.10(c) of the 404(b)(1) Guidelines" at 12 (June 11, 2019); M. Gracz, "Is a Finding of Significant Degradation in a 404(b)1 Analysis of the Pebble Project Scientifically Supportable?" at 7 (May 24, 2019).

404 permit. By comparison, the proposed 20-year Pebble mine plan would destroy 8.75 miles of anadromous fish streams,¹⁸ 73.2 miles of streams,¹⁹ and 3,458 acres of wetlands.²⁰ The project would also cause significant impacts to the water balance generally, including stream flows.²¹ An independent analysis of the 78-year mine plan estimated a loss of 34 miles of salmon streams, 218.8 – 407.2 miles of tributaries and 7,208-14,893 acres of wetlands.²² “These values exceed the EPA thresholds for unacceptable adverse effects by more than half for the loss of documented salmon streams, up to fourfold for loss of tributaries and up to threefold for loss of wetlands.”²³

The DEIS fails even to acknowledge EPA’s thoroughly documented findings. Moreover, it comes to the opposite conclusions with statements such as “measurable impacts to salmon populations would be unlikely.”²⁴ The failure to acknowledge EPA’s contrary conclusions is fatal to the DEIS. CEQ regulations binding on the Army Corps provide: “The agency shall make every effort to disclose and discuss at appropriate points in the *draft* statement all major points of view on the environmental impacts of the alternatives including the proposed action.”²⁵ EPA’s Proposed Determination includes “major points of view” on impacts that the DEIS wholly fails to disclose or discuss. Because the regulation imposes this requirement for draft EISs, the error cannot be corrected in a final EIS alone. The Army Corps must publish a supplemental draft EIS, and make it available for public comment, to disclose and discuss EPA’s conclusions about impacts to fisheries and the aquatic ecosystem.

ALASKA WATER QUALITY STANDARDS

The 404(b)(1) Guidelines also require the Army Corps to deny the permit if the discharge “[c]auses or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable State water quality standard.”²⁶ The EIS must address compliance with these requirements.²⁷ The DEIS does not adequately do so.

¹⁸ DEIS at 4.24-31, Tbl. 4.24-4.

¹⁹ *Id.* at 4.22-33, Tbl. 4.22-10.

²⁰ *Id.*

²¹ See C. Wobus, Lynker Technologies, Letter to B. Litmans, Trustees for Alaska, Re: Comments on Pebble Project Draft EIS at 4-7 (May 30, 2019) (Wobus Comments); see generally M. Schweisberg *Pebble Mine: Anticipated Adverse Impacts to Wetlands* (May 12, 2019) (Schweisberg, *Adverse Impacts to Wetlands*).

²² D. Albert, The Nature Conservancy, *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 at 1* (June 1, 2019) (Albert, *Loss of Salmon Streams and Wetlands Report*).

²³ *Id.*

²⁴ DEIS at 4.24-6.

²⁵ 40 C.F.R. § 1502.9(a) (emphasis added).

²⁶ 40 C.F.R. § 230.10(b)(1).

²⁷ 40 C.F.R. §§ 1502.16(c), 1506.2(d).

The DEIS notes that stream temperatures in the project area already frequently exceed the Alaska water quality standards, with 89% of summer readings exceeding the standard for spawning and egg incubation and 78% exceeding those for migration and rearing.²⁸ The DEIS further discloses that discharges would increase temperatures significantly, by as much as 2.4 degrees Celsius in the summer in the North Fork Koktuli River.²⁹ Nevertheless, the DEIS projects that there would be no resulting violations of temperature standards.³⁰ These contradictory disclosures require explanation. Further, the temperature increases and their adverse impacts are likely to be much worse than disclosed in the DEIS due to inadequate baseline data, inconsistencies in reporting, underestimated downstream effects, and other analytical shortcomings.³¹

The DEIS also hints at the likelihood of discharges exceeding water quality standards for total dissolved solids (TDS), punting the question to unspecified future “adaptive management strategies.”³² This is not sufficient. If TDS is a problem, the EIS should address it now, and the Army Corps must ensure there is actually a demonstrable way to comply with standards rather than speculating about future adaptive management.

There will likely be many additional violations of state water quality standards that the DEIS denies altogether in its blithe prediction that the water treatment plants will control everything. These problems are discussed under the heading of Water Quality below.

An important part of the state water quality standards is the antidegradation rule, which the DEIS neglects entirely. Under that rule, the mine must “fully protect existing uses of the water,”³³ including uses for fish. For the reasons disclosed in EPA’s Watershed Assessment and Proposed Determination, and as discussed elsewhere in this letter, the mine assuredly will not protect existing uses for fish. For this reason alone, the Army Corps should simply deny the permit. If the Army Corps wishes to complete the EIS process, it will be necessary first to publish a supplemental draft EIS for public and agency comment, with substantially improved discussion of the many issues addressed in this letter.

PURPOSE AND NEED

The Corp’s defined purpose of the proposed activity is used for evaluating practicable alternatives under the Clean Water Act (CWA) Section 404(b)(1) Guidelines, to evaluate a proposed project from the public’s perspective under the CWA’s public interest review criteria, and to inform the identification of reasonable alternatives under NEPA. Although the Corps begins with the applicant’s stated need for the project, it must exercise its independent judgment

²⁸ DEIS at 4.24-23.

²⁹ *Id.* at 4.18-11.

³⁰ *Id.* at 4.24-24.

³¹ G. Reeves & S. Mauger, Review of Water Temperature Impacts in the Proposed Pebble Mne Draft Environmental Impact Statement (undated).

³² DEIS at 3.18-13.

³³ 18 AAC 70.015(a)(2)(C).

in defining the purpose.³⁴ An agency may not define the objectives of its action in unreasonably narrow terms.³⁵

Although the Corps determined that PLP's stated purpose was too narrow because it limited the proposed development to the Pebble deposit,³⁶ the agency's focus on developing the same mine elsewhere in Alaska³⁷ was just as narrow, leading the agency to dismiss all alternatives that did not include mining the Pebble deposit.³⁸ By defining the purpose specifically to develop and operate a copper, gold, and molybdenum mine in Alaska, the Corps' screening of alternatives dismisses every alternative that does not contain all three of these metals.³⁹ At the same time, it excludes from the purpose the production of other metals, including silver, palladium, and rhenium, even though the production of all or some of these metals is included in the project description⁴⁰ and the description of the proposed alternative,⁴¹ and notwithstanding the fact that the price of these metals and the costs of producing them is incorporated into the company's earlier financial assessment.⁴² The assessment explains that the mix of resources provides flexibility "in near-term and long-term development options,"⁴³ for example by enabling "future mine planners to consider exploiting different parts of the deposit for higher grades of, for example, silver if the silver price is high. . ."⁴⁴ The Corps even acknowledges in the DEIS that the project will not be limited to these three metals, but that

³⁴ See, e.g., *Simmons v. U.S. Army Corps of Eng'rs*, 120 F.3d 664, 669 (7th Cir.1997) (holding that the Corps' "wholesale acceptance of [the permit applicant's] definition of purpose" did not comply with NEPA); *Sierra Club v. Van Antwerp*, 709 F. Supp. 2d 1254, 1263 (S.D. Fla. 2009), *aff'd*, 362 F. App'x 100 (11th Cir. 2010).

³⁵ *City of Carmel-By-The-Sea v. U.S. Dep't of Transp.*, No. CIV. 92-20002 SW, 1994 WL 190839, at *10 (N.D. Cal. May 12, 1994), *aff'd in part, vacated in part, rev'd in part*, 95 F.3d 892 (9th Cir. 1996), *opinion withdrawn and superseded*, 123 F.3d 1142 (9th Cir. 1997), and *aff'd in part, rev'd in part*, 123 F.3d 1142 (9th Cir. 1997).

³⁶ DEIS at B-3.

³⁷ *Id.* at 1-4.

³⁸ See generally T. G. Yocom, Huffman-Broadway Group, Inc., *The Corps Determination of Basic and Overall Project Purposes Improperly Eliminates Consideration of Potentially Less Environmentally Damaging Practicable Alternatives* (June 6, 2019) (Yocom, Basic and Overall Project Purposes).

³⁹ See, e.g., DEIS at B-6 (screening out alternative solely because it does not contain molybdenum), B-8 (same).

⁴⁰ *Id.* at N-12, N-31.

⁴¹ *Id.* at 2-19.

⁴² H. P. Ghaffari *et al.*, Preliminary Assessment of the Pebble Project, Southwest Alaska at 10, 12-13, 67, 77, 473, 477, 482, https://pebblewatch.com/wp-content/uploads/2017/05/Pebble_Project_Preliminary-Assessment-Technical-Report_February-17-2011.pdf (Feb. 17, 2011) (2011 Preliminary Assessment).

⁴³ *Id.* at 5.

⁴⁴ *Id.* at 81, 518.

PLP's stated need is to produce "commodities *such as* copper, gold, and molybdenum" (emphasis added).⁴⁵

The project purpose must not be defined arbitrarily, because it limits the Corp's ability to conduct a meaningful examination of practicable alternatives, as required by NEPA and the CWA Guidelines. In particular, the narrowly-defined purpose precludes consideration of less-damaging practicable alternatives, as is required under both statutes. For projects like Pebble's proposal that are not water-dependent, the Corps is required to presume alternatives that do not destroy wetlands are available under CWA regulations "unless clearly demonstrated otherwise."⁴⁶ However, the narrow project purpose excludes such potential alternatives, including deposits outside Alaska and those with different secondary minerals. The Corps must expand the purpose and need to include these potential alternatives, or at a minimum, must explain why the selected purpose and need is appropriate.

REASONABLE AND PRACTICABLE

The Corps must assess whether the proposed project is reasonable and practicable,⁴⁷ including from a technical or economic perspective.⁴⁸ Economic considerations are also part of the Corp's public interest determination, which in some cases may require an independent review of the need for the project, including an economic analysis.⁴⁹ For the following reasons, this is clearly one of those cases.

⁴⁵ DEIS at 1-3; *see also* The Pebble Partnership, Pebble Project Department of the Army Application for Permit POA-2017-271 at 8 (Jan. 2019) (stating project purpose "to produce commodities, including copper, gold, and molybdenum" and need "to meet increasing global demand for commodities such as copper, gold, and molybdenum.").

⁴⁶ 40 C.F.R. § 230.10(a)(3); *see also id.* §§ 230.3(m), 230.41.

⁴⁷ *See* DEIS at 2-2 (explaining that NEPA requires alternatives to be "practical or feasible from the technical and economic standpoint and using common sense"); 40 C.F.R. § 230.12(a)(3)(ii) (stating that alternatives must be practicable).

⁴⁸ DEIS at B-3; *Sylvester v. U.S. Army Corps of Eng'rs*, 882 F.2d 407 (9th Cir. 1989) (holding that cost is a consideration in evaluation of alternatives).

⁴⁹ 33 C.F.R. 320.4(q); 51 Fed.Reg. 41,206, 41,207-08 (1986).

I. INSUFFICIENT ECONOMIC ANALYSIS

The existing economic analysis is inadequate for the Corps to determine whether the proposed project is reasonable or practicable from an economic or technical standpoint. For a proposed alternative, this is typically demonstrated by either a Preliminary Assessment/Pre-Feasibility/Feasibility Study,⁵⁰ or at a minimum, an NI 43-101 compliant technical report.

For Pebble, Northern Dynasty Minerals published an NI 43-101 compliant Preliminary Assessment in 2011.⁵¹ The study considered three alternatives: (1) a 25-year Investment Decision Case, and would process 1.99 billion tons of ore (17% of the identified resource); (2) a 45-year Reference Case, which would process 3.8 billion tons of ore (32% of the identified resource); and, (3) a 78-year Reference Case, which would process 6.5 billion tons of ore (55% of the identified resource). All cases were open pit mining only.

PLP admits the 2011 preliminary assessment is no longer reliable,⁵² and acknowledges that the “potential economic viability of the Pebble Project is not currently supported by a preliminary economic assessment, prefeasibility study or feasibility study.”⁵³ Despite this claim, PLP provides the 2011 report in response to Corps questions about the costs.⁵⁴ Because the 2011 report is no longer valid and PLP has yet to provide an updated economic analysis, this suggests that the project has changed in technical ways since the earlier analysis and the engineering information to support these changes is incomplete or that the economics of the project have changed so significantly that the smaller project is no longer economic.

The company also acknowledges that “it has not yet determined whether the Pebble Project contains mineral reserves that are economically recoverable.”⁵⁵ A mineral reserve is the

⁵⁰ There are three level of Feasibility Studies: (1) A Preliminary Economic Assessment, Resource Assessment (or Order of Magnitude Feasibility), (2) A Prefeasibility Study and Preliminary Feasibility Study (which includes a financial analysis sufficient to meet Canadian reporting standards, and (3) A Feasibility Study (which includes a financial analysis sufficient to serve as the basis for a final decision). *See* D. M. Chambers, Center for Science in Public Participation, Comments on the Pebble Draft Environmental Impact Statement at 11 n.1 (May 20, 2019).

⁵¹ 2011 Preliminary Assessment at 1.

⁵² *See, e.g.*, Northern Dynasty Minerals Ltd., *Project Economics*, <https://www.northerndynastyminerals.com/pebble-project/project-economics/> (stating, with respect to the 2011 report, “While instructive as to the size and scale of project that the Pebble resource might support, it is now outdated and cannot be relied upon.”).

⁵³ Northern Dynasty Minerals Ltd., *Annual Information Form for the Year Ended December 31, 2018* at 15 (Mar. 20, 2019).

⁵⁴ Response to PLP 2018 RFI 059, Project Optimization Study Cited with Regard to Throughput in PLP Technical Note on Project Options and Screening Criteria (Sept. 12, 2018).

⁵⁵ Northern Dynasty Minerals Ltd., *Consolidated Financial Statements for the Years Ended December 31, 2018 and 2017* at 7,

economically mineable part of the resource, as demonstrated through sufficient technical and economic information, for which “economic extraction can be justified.”⁵⁶ Instead, the Wardrop 2011 Preliminary Assessment and a technical report submitted in 2018⁵⁷ both rely on mineral resource estimates, which are those for which there are “reasonable prospects for eventual economic extraction.”⁵⁸ As noted by Canadian disclosure rules, “Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.”⁵⁹ Thus, the Corps has inadequate information to establish whether the project is economically and technically viable.

Information in the 2011 assessment must be updated for a variety of reasons. First, the scenarios analyzed in that assessment differ in important respects from the proposed project. For example, because the proposed project targets lower-grade portions of the ore body, the value per ton of ore mined by the 20-year EIS plan is about 21% lower than the average ore mined in the 2011 report’s 25-year plan, the smallest plan analyzed in that economic assessment.⁶⁰ The proposed project would process 43% less copper,⁶¹ 26% less gold,⁶² and 35% less molybdenum.⁶³ The smaller mine has a profound negative impact on the likely economics of the mine. The company acknowledged that the “substantially smaller mine facility footprint” of the proposed project rendered the 2011 analysis no longer reliable.⁶⁴ It also acknowledged that the project design was not yet final⁶⁵ and that estimated resource recovery was “subject to change as a consequence of more detailed analyses that would be required in pre-feasibility and feasibility studies.”⁶⁶

https://www.northerndynastyminerals.com/site/assets/files/4752/year_end_2018_financial_report.pdf (Apr. 1, 2019) (Northern Dynasty, Consolidated Financial Statements).

⁵⁶ CIM Council, *CIM Definition Standards for Mineral Resources and Mineral Reserves* at 6, http://web.cim.org/UserFiles/File/CIM_DEFINITON_STANDARDS_Nov_2010.pdf. (Nov. 27, 2010) (CIM Definition Standards).

⁵⁷ Northern Dynasty Minerals Ltd., *Technical Report on the Pebble Project, Southwest Alaska, USA* at 117 (Feb. 22, 2018) (Northern Dynasty, Technical Report).

⁵⁸ CIM Definition Standards at 4.

⁵⁹ Ontario Securities Comm’n, National Instrument 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Report and Related Consequential Amendments at Section 3.4(e), https://www.osc.gov.on.ca/documents/en/Securities-Category4/ni_20110624_43-101_mineral-projects.pdf (June 24, 2011).

⁶⁰ See Borden Report at 3.

⁶¹ Compare 2011 Preliminary Assessment at 516 (12.9 billion pounds) with DEIS at 4.13-2 (7.4 billion pounds).

⁶² Compare 2011 Preliminary Assessment at 516 (16.4 million ounces) with DEIS at 4.13-2 (12.1 million ounces).

⁶³ Compare 2011 Preliminary Assessment at 516 (616 million pounds) with DEIS at 4.13-2 (398 million pounds).

⁶⁴ Northern Dynasty, Technical Report at 53.

⁶⁵ Northern Dynasty, Consolidated Financial Statements at 7 (explaining that a final project design has not been selected).

⁶⁶ *Id.* at 6.

In addition, the capital and operating costs in the 2011 economic feasibility assessment must be updated. The capital costs, which play a large role in whether a mine is economically viable, maybe actually be twice as high, and the reason why PLP has been unable to retain partners in the project.⁶⁷ The costs in the 2011 assessment do not include important expenses such the port, the pipeline, and the power station.⁶⁸

Costs associated with reclamation and closure,⁶⁹ including perpetual water treatment and compensatory mitigation and monitoring, must also be included in an assessment of the economic feasibility of the mine.⁷⁰ Because an inadequate assessment of costs associated with reclamation and closure can result in greater long term impacts, information about the costs of reclamation and closure is also necessary for the public to have an opportunity to evaluate and comment on the impacts of the proposed action before the Corps renders its decision.⁷¹

There is evidence to suggest that the proposed mine is not financially viable.⁷² An updated economic assessment is necessary to determine whether the proposed project is reasonable and practicable.

II. THE CLOSURE PLAN IS UNREASONABLE

In addition, certain aspects of the proposed action are entirely irrational. For example, the plan to backfill is not reasonable, because it would impose unreasonable costs on expansion of the mine. It is therefore unlikely. At the end of mining the 20-year proposed project, PLP would place pyritic tailings and waste rock back into the pit, which would also flood with water.⁷³ To continue with a mine expansion after the proposed closure, the pit would not only need to be drained of any accumulated water before additional mining could occur, both the

⁶⁷ Kerrisdale Capital, Cu at Zero at 8-14 (Feb. 2017) (Kerrisdale Report), <https://www.kerrisdalecap.com/wp-content/uploads/2017/02/Northern-Dynasty-Minerals-NAK.pdf>; *see also* *Diaz v. Northern Dynasty Minerals Ltd., et al.*, No. 17-CV-1241-PSG-SS, Doc. 56-13 at 8 (C.D. Cal. Aug. 24, 2018) (stating that capital costs would be around \$9 billion, by acknowledging the existence of a report that contains a \$13 billion cost estimate and explaining that an independent engineering commissioned by Northern Dynasty “identified issues with that study and identified savings that reduced the preliminary capital estimate by US\$ 4 billion.”); *see also* Pls.’ First Amended Complaint at ¶ 94, *Diaz*, No. 17-CV-1241-PSG-SS, Doc. 43 (C.D. Cal. Oct. 11, 2017) (providing statement made in 2012 by John Shively, the Pebble Project’s former CEO, that the capital costs would be \$7-8 billion).

⁶⁸ 2011 Preliminary Assessment at 427.

⁶⁹ For a qualitative discussion of some of these costs, *see, e.g.*, DEIS at App. N; PD at 65; *id.* at 73.

⁷⁰ The 2011 analysis excludes these costs. *See* 2011 Preliminary Assessment at 448.

⁷¹ *See* 40 C.F.R. § 1502.1 (requiring that EISs “provide full and fair discussion of significant environmental impacts” of the proposed action).

⁷² *See* Borden Report; *see generally* Kerrisdale Report at 1 (finding that the upfront capital costs necessary to build and operate the mine are so onerous that the mine is not commercially viable).

⁷³ DEIS at 2-9, 2-39.

backfilled tailings and waste rock would need to be removed. This is true even if the expansion was based on underground mining, which is too risky to do under tailings.⁷⁴ Such operations would entail a significant expense.⁷⁵

The closure plan to backfill the pit is unreasonable in light of the fact that expansion of the mine is reasonably foreseeable.⁷⁶ Significant amount of resources will remain after 20 years.⁷⁷ The company's own assurances that its currently proposed project "does not preclude development of additional resources in other phases of the project in the future" indicate that the company would not reasonably propose to fill the pit with waste and water after 20 years.⁷⁸ In addition, the company's conceptual plan for expansion does not mention removing the backfill from the pit first, before beginning additional mining.⁷⁹ Thus, the proposal is not "genuine and legitimate."⁸⁰

Because the proposed project is not reasonable, and backfilling after 20 years is highly improbable, the analysis of impacts is inadequate because it fails to include an assessment of the impacts of continuing to store waste rock and pyritic tailings at the surface, including the potential failure of the TSF after more than 20 years.

Without an updated economic study, the Corps cannot reasonably determine which of the alternatives to the proposal are practicable or cost prohibitive, as these costs would be relative to the overall financial calculations for the project. The Corps is also unable to fully assess the potential impacts of the project, since the "legitimate and genuine" project – one that is reasonable and practicable – may actually be much larger.

⁷⁴ See generally D. M. Chambers, *Long-term Risk of Tailings Dam Failure*, 13 ALASKA PARK SCI-2, 1 (2011) (Chambers, Tailings Dam Failure Analysis).

⁷⁵ *Id.*; see also DEIS at M-6 (noting that for the bulk TSF, at least, backfilling to the pit would be "a major effort that is likely not reasonable from an economic standpoint.").

⁷⁶ PD at 2-13 ("EPA has also concluded . . . development of a mine at the Pebble deposit will be much larger than the 0.25 stage mine, likely as much as 25 times larger . . .").

⁷⁷ The Pebble DEIS analyzes the impacts of a project to mine approximately 1.3 billion tons of mineralized material (measured, indicated, and inferred) over a 20-year mine life. The current combined measured and indicated resource estimate for the total deposit is approximately 7.1 billion tons. See DEIS at N-12.

⁷⁸ Northern Dynasty, Consolidated Financial Statements at 9.

⁷⁹ PLP 2018-RFI 062, Scenario for Expanded Development of Pebble (Sept. 6, 2018).

⁸⁰ *Cf. Ctr. for Biological Diversity v. Cal. Dep't of Transp.*, No. 12-CV-02172-JSW, 2013 WL 6698740, at *13–14 (N.D. Cal. Dec. 19, 2013) (finding that the Corps must consider applicant's purpose when it is "genuine and legitimate").

PEBBLE MINE EXPANSION

NEPA requires agencies to discuss cumulative impacts, i.e., “the incremental impact[s] of the action when added to other past, present, and reasonably foreseeable future actions.”⁸¹ “Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”⁸² The agency must take a ‘hard look’ at all actions that may combine with the action under consideration to affect the environment.⁸³ “Some quantified or detailed information is required. Without such information, neither the courts nor the public . . . can be assured that the [agency] provided the hard look that it is required to provide.”⁸⁴

Because the proposed project does not actually represent PLP’s plans for the mine, the Corps is forced to acknowledge the likelihood that the mine will actually become much larger and addresses these impacts as part of the cumulative analysis.⁸⁵ Thus, in time, the mine is likely to include a pit that is six times larger,⁸⁶ which will require new tailing storage, water storage, and waste rock storage facilities, as well as additional processing facilities, which would add up to more than 21,000 acres of additional disturbance at the mine site.⁸⁷ The larger mine would also require a new pipeline and a deepwater loading facility in Iniskin Bay.⁸⁸

The abbreviated, incomplete discussion of the impacts of a larger mine – one that is highly foreseeable – fails to sufficiently discuss the severe implications of such a mine. As the EPA explains with respect to fish, “The cumulative effects discussion is inadequate because it does not analyze the cumulative effects of the Pebble Project Buildout.”⁸⁹ This is true with respect to most of the DEIS’s discussion of the future mine. Instead, when it discusses the impacts from a larger mine, the DEIS almost invariably states that the expansion would increase the magnitude, duration, and geographic extent of the impacts.⁹⁰ Simply stating that the larger mine would increase the impacts is insufficient, because it fails to provide any level of quantification or detail.

⁸¹ 40 C.F.R. § 1508.7.

⁸² *Id.*

⁸³ *Te-Moak Tribe of W. Shoshone of Nev. v. U.S. Dep’t of Interior*, 608 F.3d 592, 603 (9th Cir. 2010).

⁸⁴ *Great Basin Res. Watch v. Bureau of Land Mgmt.*, 844 F.3d 1095, 1104 (9th Cir. 2016) (quoting *Neighbors of Cuddy Mountain v. U.S. Forest Serv.*, 137 F.3d 1372, 1379 (9th Cir. 1998)).

⁸⁵ DEIS at 4.1-6.

⁸⁶ *Id.* at 4.17-26.

⁸⁷ *Id.* at 4.22-37.

⁸⁸ *Id.* at 4.1-8, Tbl. 4.1-1.

⁸⁹ U.S. Environmental Protection Agency, Comments—Pebble Project Preliminary Draft EIS, Section 3.6—Commercial and Recreational Fisheries at 5 (Dec. 21, 2018) (EPA, Fisheries Comments).

⁹⁰ DEIS at 4.22-40 (discussing wetlands); *id.* at 4.24-37 (discussing fish); *id.* at 4.23-45 (discussing habitat).

In some cases, the DEIS provides the total additional area that will be destroyed,⁹¹ and occasionally, this amount is compared to a larger area.⁹² As discussed in more detail below, an assessment of impacts in relation to the entire watershed is “precisely the kind of limited review of ‘piecemeal changes’ that the regulations forbid.”⁹³ The use of percentages to describe impacts has no basis, because there is no underlying scientific analysis to indicate their significance.

With respect to the potential for cumulative impacts on surface water, groundwater, and sediment, the DEIS does acknowledge that the impacts would increase “substantially.”⁹⁴ However, the Corps fails to describe the effects of these changes, such as on wetlands and fish. The Corps must evaluate how the cumulative impacts to wetlands, streams, and other aquatic resources would impact the functions performed by these aquatic resources.⁹⁵

With respect to commercial fisheries, the DEIS admits that “Any impacts that result in a reduction in the number of returning adult spawners would affect commercial fisheries,” but the agency does not explain how or to what extent the expanded mine will cause reduced spawning.⁹⁶

The DEIS fails to incorporate important information about the impacts of an expanded mine.⁹⁷ As the EPA noted, the wetlands and water resources at the mine site “likely play a crucial role in the life cycles of anadromous fish.”⁹⁸ The “unprecedented losses” of thousands of acres of wetlands would eliminate “nutrient-rich, structurally complex, and thermally and hydraulically diverse habitats” essential to rearing salmonids, groundwater pumping could further eliminate, dewater or fragment wetlands, and the loss in water and nutrients to downstream areas would affect downstream foodwebs.⁹⁹

The larger mine would have other significant cumulative effects on fish as well.¹⁰⁰ For example, the EPA explains that the substantial stream habitat losses would further reduce the

⁹¹ DEIS at 4.24-37 (finding that the mine site would destroy an additional 35 miles of anadromous stream habitat).

⁹² For example, different scales are used to assess wetland losses. *See* U.S. Environmental Protection Agency, Comments—Pebble Project Preliminary Draft EIS, Section 3.22—Wetlands and Other Waters/Special Aquatic Sites at 8 (Dec. 21, 2018) (EPA, Wetlands Comments).

⁹³ *Buttrey v. United States*, 690 F.2d 1170, 1180–81 (5th Cir. 1982).

⁹⁴ DEIS at 4.18-36.

⁹⁵ *See* EPA, Wetlands Comments at 8.

⁹⁶ DEIS at 4.6-17.

⁹⁷ Albert, Loss of Salmon Streams and Wetlands Report at 1 (finding that the DEIS does not evaluate the adequacy of available data to estimate effects of an expanded mine scenario).

⁹⁸ PD at 4-20.

⁹⁹ *Id.* at 4-41.

¹⁰⁰ Schweisberg, Adverse Impacts to Wetlands at 11 (“An expansion [] would cause a concomitant or greater increase in the adverse impacts. Such colossal adverse impacts to wetlands and other waters would be catastrophic for this mostly roadless, undisturbed, and nearly pristine area of the Bristol Bay watershed.”).

overall capacity and productivity of salmon in the SFK, NFK, and UTC watersheds, which may affect genetically distinct populations, resulting in the loss of “significant amounts of overall genetic variability.”¹⁰¹ The larger mine would extend into the UTC watershed, and “losses due to streamflow alterations could result in significant adverse impacts on fish populations and could extirpate or severely affect genetically unique populations of species such as coho salmon.”¹⁰² The EPA’s Proposed Determination concluded that there could be acute and chronic impacts on fish and fish food from water pollution and habitat loss from expanded development.¹⁰³

The analysis of impacts must include an assessment of all available information. For example, the wetlands study areas surveyed in 2004-2007 provides information, albeit outdated, about the area that would be impacted by the larger mine.

The analysis of the larger mine must also account for the increased spill risk.¹⁰⁴ The DEIS simply notes that a larger mine “could increase the volume and geographic extent of an unintentional release.”¹⁰⁵ For example, although the permit application includes just two tailings facilities, an expanded mine would include four facilities. The FEIS must consider the increased probability of a tailings dam failure at a larger mine. Similarly, the cumulative impacts must consider the increased probability of leakage or a failure from the pyritic TSF for the full sized mine.

Finally, the DEIS should include an analysis of reasonably foreseeable future development projects in the region, including development that is more likely to result because of the project.¹⁰⁶ The Pebble mine would develop pipelines, a port, transportation corridors, and electricity generation in an area that is currently undeveloped, and in addition to being used by

¹⁰¹ PD at 4-38.

¹⁰² *Id.* at 4-52.

¹⁰³ *Id.* at 4-54 - 4-56.

¹⁰⁴ Wobus Comments at 13 (“The DEIS provides absolutely no analysis of the potential impacts from a partial to full TSF failure for of any of the tailings dams during the 79-year mine period.”).

¹⁰⁵ DEIS at 4.27-127.

¹⁰⁶ *See* Bureau of Ocean Energy Mgmt, Cook Inlet Planning Area Oil and Gas Lease Sale 244, in the Cook Inlet, Alaska Final EIS at 5-73 (Dec. 2016) (noting that GHGs from reasonably foreseeable future activities in the area “cumulatively lead to negative synergistic sociocultural, economic, and health impacts in the region and around the globe.”); Schweisberg, *Adverse Impacts to Wetlands* at 17 (“It is reasonably foreseeable that infrastructure development for an initial mine could make mining cost-effective for other, smaller mineral deposits, facilitating further accumulation of adverse impacts to wetlands and other waters.”).

the community, this infrastructure could form the backbone of additional mining or other development.¹⁰⁷ The DEIS must assess these cumulative impacts.

ALTERNATIVES

NEPA requires an EIS to “[r]igorously explore and objectively evaluate all reasonable alternatives” to a proposed action.¹⁰⁸ This is the “heart” of an EIS.¹⁰⁹ In addition, the 404(b)(1) Guidelines prohibit filling of wetlands and other aquatic ecosystems “if there is a practicable alternative to the proposed discharge which would have less adverse impact.”¹¹⁰ An alternative is practicable if it is “available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.”¹¹¹ Where the activity in question does not require access or proximity to special aquatic sites such as wetlands, practicable alternatives that would not affect such sites—and therefore would be less harmful—are presumed to be available unless clearly demonstrated otherwise.¹¹²

For the reasons discussed above, none of the action alternatives in the DEIS are reasonable or practicable.

Further, the Corps has not explicitly proposed a finding that the PLP’s proposal would be the least environmentally damaging practicable alternative (LEDPA). On the contrary, it has determined that the basic purpose of the project— mining for copper, gold, and molybdenum — is not water-dependent, and it acknowledges that that determination creates a presumption that practicable alternatives less damaging to wetlands exist.¹¹³ The DEIS fails to rebut the presumption.¹¹⁴ Although the Corps did consider a few options that would have lesser impacts

¹⁰⁷ See U.S. Environmental Protection Agency, Comments—Pebble Project Preliminary Draft EIS, Section 4.24—Fish Values at 5 (Dec. 21, 2018) (Fish Values Comments) (noting need to consider induced development); U.S. Environmental Protection Agency, An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay at 13-5, Fig. 13-2 (July 2014) (Bristol Bay Watershed Assessment).

¹⁰⁸ 40 C.F.R. § 1502.14(a). See *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1229 (9th Cir. 1988) (“[NEPA] requires that alternatives. . . be given full and meaningful consideration.”).

¹⁰⁹ 40 C.F.R. § 1502.14.

¹¹⁰ 40 C.F.R. § 230.10(a). See *Hoosier Env'tl. Council v. U.S. Army Corps of Eng'rs*, 722 F.3d 1053, 1061 (“The duty of the Corps is ‘to determine the feasibility of the least environmentally damaging alternatives that serve the basic project purpose.’” (quoting *Utahns for Better Transp. v. U.S. Dep't of Transp.*, 305 F.3d 1152, 1188 (10th Cir. 2002))).

¹¹¹ 40 C.F.R. § 230.10(a)(2).

¹¹² See *id.* § 230.10(a)(3).

¹¹³ See DEIS at A-2 to A-3.

¹¹⁴ Cf. *Greater Yellowstone Coal. v. Flowers*, 321 F.3d 1250, 1262 n.12 (10th Cir. 2003) (“[U]nder the [Clean Water Act], it is not sufficient for the Corps to consider a range of alternatives to the proposed project: the Corps must rebut the presumption that there are practicable alternatives with less adverse environmental impact.”).

on wetlands than the proposed action,¹¹⁵ it never coherently explains how the project in its current configuration qualifies as the LEDPA.¹¹⁶ The DEIS also fails to directly assess the practicability of the proposed action, leaving out important considerations such as “the cost of closure, compensatory mitigation, and long-term water quality maintenance.”¹¹⁷ When considered in light of the foreseeable mine expansion, alternatives 2 and 3 would have fewer impacts to wetlands.¹¹⁸ Thus, given the near certainty that the mine will actually be much larger, the proposed project may not in fact be the LEDPA and “the range of practicable alternatives must be expanded to consider deposits that may have a similar lifespan.”¹¹⁹

In addition, the Corps improperly dismisses a number of alternatives.¹²⁰ For example, the Corps dismisses Pyramid Project because it would be “extremely expensive to conduct additional exploration” to determine if mining the copper and associated minerals in the Pyramid deposit is practicable, noting that the applicant has “spent approximately \$700 million to date on exploration.”¹²¹ However, sunk costs are not relevant to the question of whether another alternative is practicable¹²²; nor is the fact that the applicant has decided to pursue Pebble instead of Pyramid.¹²³

The Corps also “materially restricts the range of alternatives” to “ore deposits with the same mineralization as the Pebble deposit” by arbitrarily and narrowly defining the overall project purposes of the project,¹²⁴ even though PLP searched for copper porphyry deposits

¹¹⁵ See DEIS at B-11 (“Single TSF with Two Cells would have a smaller WMP, which would reduce the total footprint and impacts to wetlands.”); *id.* at B-47 (finding that Kokhanok East Ferry Terminal “appears to reduce impacts to wetlands and other waters”); *but see id.* at 4.22-16 (noting increased impacts to wetlands from Kokhanok East Ferry option); *id.* at B-53 (“USACE is evaluating an option for a pile-supported dock to satisfy requirements for minimization of impacts to wetlands and other waters”); *id.* at B-77 (“If the bulk TSF also contained the Operating Pond, there would be a reduction in impacts to wetlands and other waters.”); PLP 2018-RFI 059a (requesting PLP to provide information about the feasibility of a mine with a smaller throughput).

¹¹⁶ *Cf. Nw. Bypass Grp. v. U.S. Army Corps of Eng’rs*, 470 F. Supp. 2d 30, 44-45 (D.N.H. 2007) (noting that the Corps had evaluated the practicability and impacts to wetlands of several different routes in approving the construction of a road).

¹¹⁷ T. G. Yocom, Huffman-Broadway Group, Inc., *Determining the least damaging practicable alternative for the proposed Pebble Project: Potentially less damaging alternatives are improperly dismissed in the DEIS* at 4 (June 6, 2019) (Yocom, LEDPA Report).

¹¹⁸ DEIS at 4.22-40; *id.* at 4.22-41 (alt 2), 4.22-42 (alt. 3).

¹¹⁹ Yocom, LEDPA Report at 4, 8-9.

¹²⁰ *Id.* at 5-8.

¹²¹ DEIS at B-6 to B-7.

¹²² Yocom, LEDPA Report at 5 (“[PLP] could have chosen to expend those resources on alternative deposits with less well-defined mineralogy but far less potential impacts to wetland and aquatic resources.”).

¹²³ *Id.* at 5-6.

¹²⁴ *Id.* at 2.

throughout the Americas while copper deposits and associated minerals have been “successfully mined worldwide regardless of the presence of commercially viable molybdenum or gold deposits.”¹²⁵ This narrow definition of the project purposes removes the burden of proof on PLP to clearly demonstrate that LEDPA do not exist and “pre-emptively eliminate[s] alternatives in the DEIS.”¹²⁶

In addition, instead of imposing an “artificial geographic limit” on the range of alternatives,¹²⁷ the DEIS should analyze ore deposits outside of Alaska,¹²⁸ including deposits that were or have been available since the applicant entered the market in the late 1990’s, as well as those that have been practicable since the applicant acquired rights to the Pebble deposit and surrounding claims.¹²⁹ The DEIS also arbitrarily dismisses a mine with a smaller pit size and one with reduced throughput based on the fact that neither would be economically feasible,¹³⁰ even though the agency lacks an economic analysis of the project, and therefore cannot rationally make such a determination. The DEIS applies a double standard by rejecting smaller mines as infeasible without showing that the proposed action is feasible. Furthermore, without additional information, such as the extent and nature of the wetlands that would be saved by selecting one of these alternatives and the comparative technological feasibility of the alternatives, the Corps is unable to make a rationally based comparison of costs and benefits.¹³¹

The analysis of alternatives is based solely on the transportation routes, and not on the mine site,¹³² which makes up the vast majority of the area to be disturbed. The Corps thus avoids any analysis of alternatives to the component that will cause the vast majority of the project’s impacts. Given the scale of the project’s potential impacts on wetlands, the Corps must conduct

¹²⁵ *Id.* at 5.

¹²⁶ Yocom, Basic and Overall Project Purposes at 2; 40 C.F.R. § 230.10(a).

¹²⁷ Yocom, LEDPA Report at 1.

¹²⁸ *Id.* at 4 (“[T]here is nothing in the 404(b)(1) Guidelines that limit the search for alternatives to a single ore body, nor a single drainage or State.”).

¹²⁹ *Id.* at 3 (explaining that only applying the practicable alternatives analysis to the time of the application for a permit, not at the time the developer is entering the market to select a particular site, would remove its incentive “to avoid choosing wetlands when they could choose an alternative upland site” (citing *Bersani v. Robichaud*, 850 F.2d 36, 43-44 (2d Cir. 1988))).

¹³⁰ DEIS at B-13, B-22.

¹³¹ See *Friends of the Earth v. Hall*, 693 F. Supp. 904, 946–47 (W.D. Wash. 1988) (noting that “significant additional cost can prove determinative, in and of itself, only if the competing alternatives can reasonably be viewed as equivalent with respect to other factors.”).

¹³² Yocom, LEDPA Report at 10 (explaining that the DEIS makes no assessment of on-site alternatives and should consider “resized, relocated, or reconfigured” project areas as alternatives to reduce impacts to wetlands); see also R. H. Prucha, Integrated Hydro Systems, LLC, *Review of Groundwater Impacts in the Proposed Pebble Mine Draft EIS (February 2019) and Evaluation of Potential Impacts on the Coupled Hydrologic System* at 2 (June 6, 2019) (Prucha, Groundwater Comments) (finding that the DEIS does not evaluate hydrologic impacts for mine configurations).

a more thorough analysis of alternatives, including those that may qualify as the LEDPA. It should correct this deficiency in a supplemental DEIS.

TAILINGS DAM FAILURE AND SPILL RISKS

NEPA requires a “hard look” analysis of the environmental impacts of low-probability high-consequence events¹³³ unless the probability of the event is “infinitesimal.”¹³⁴ Stated differently, NEPA requires an agency to disclose the environmental consequences of a potential harmful event unless the chance of its occurrence is “remote and speculative,” even if there is a “reasonable assurance” that the event will not occur.¹³⁵ “Only if the harm in question is so ‘remote and speculative’ as to reduce the effective probability of its occurrence to zero may the agency dispense with the consequences portion of the analysis.”¹³⁶

Even the International Council on Mining and Metals (ICMM), and industry organization, recognizes “the risk of catastrophic failure of tailings facilities.”¹³⁷ ICMM believes that owners and operators can take steps to “minimise” the risk, but does not claim they can eliminate the risk because, among other things, “[s]ome extreme natural events are impossible to predict.”¹³⁸ In order to minimize the risk of catastrophic failure, ICMM states the “[p]otential for TSF failures must be considered and addressed through a facility’s life cycle, which includes design, construction, operation and closure.”¹³⁹ “Risk controls and their associated verification activities” must be “identified *based on failure modes and their associated consequences*, and evaluated on a TSF-specific basis considering all phases of the TSF life cycle.”¹⁴⁰ Finally, “[s]uitably qualified and experienced experts [must be] involved in TSF risk identification and analysis, as well as in the development and review of effectiveness of the associated controls.”¹⁴¹

¹³³ *San Luis Obispo Mothers for Peace v. Nuclear Regulatory Comm’n*, 449 F.3d 1016, 1030-32 (9th Cir. 2006) (concluding risk of terrorist attack was not so “remote and highly speculative” as to evade NEPA’s obligation to consider the potential environmental effects).

¹³⁴ *Ground Zero Ctr. for Non-Violent Action v. U.S. Dep’t of the Navy*, 383 F.3d 1082, 1090 (9th Cir. 2004) (finding NEPA analysis not required where risk is “between one and 100 million and one in one trillion”).

¹³⁵ *New York v. Nuclear Regulatory Comm’n*, 681 F.3d 471, 478-79, 482 (D.C. Cir. 2012).

¹³⁶ *Id.* at 482; *cf. Ground Zero Ctr. for Non-Violent Action v. U.S. Navy*, 383 F.3d 1082, 1090 (9th Cir. 2004) (holding NEPA did not require analysis of consequences of an event where probability of event was “infinitesimal,” between a one in one million or one in one trillion chance only if a one in 100 million threshold event occurred).

¹³⁷ Int’l Council on Mining & Metals, *Position statement on preventing catastrophic failure of tailings storage facilities* at 3 (Dec. 2016).

¹³⁸ *Id.* at 3-4.

¹³⁹ *Id.* at 4.

¹⁴⁰ *Id.* at 5 (emphasis added).

¹⁴¹ *Id.*

The DEIS analysis of TSF failures falls short of both NEPA's requirements for high-consequence events and the industry's own best practices to minimize the risk of catastrophic TSF failure.

I. THE DEIS'S ANALYSIS OF A TAILINGS DAM FAILURE IS INCOMPLETE AND INSUFFICIENT.

The Corps does not provide accurate scientific assessment of the potential impacts of a full tailings dam breach.¹⁴² The Corps notes that, "The probability of a full breach of the bulk or pyritic TSF tailings embankments was assessed to be extremely low".¹⁴³ As a result, "Massive, catastrophic releases that were deemed extremely unlikely were...ruled out for analysis in the EIS."¹⁴⁴ The decision to rule out a full tailings dam breach because it is unlikely is arbitrary.¹⁴⁵ The Corps' determination that a full TSF breach had a low level of risk relies on the outcomes of the "Failure Modes and Effects Analysis" (FMEA) workshop, which made this determination based only on whether a failure had a reasonable chance of occurring during the 20-year operational life of the mine.¹⁴⁶ Because the mine is likely to be in operation for much longer than 20 years, the decision to rule out consideration of a TSF failure after 20 years is arbitrary.

"Among the world's estimated 3,500 tailings dams the failure rate is roughly 10 times greater than the water dam failure rate, with an 'average' tailings dam having an estimated failure chance of ~0.1% every year."¹⁴⁷ In 2001, the International Commission of Large Dams and the United Nations Environmental Program concluded that, "on average, one major tailings dam incident occurs each year, although that figure doubled between 1995 to 2001."¹⁴⁸ In the ten years following that report, the failure rate of tailings dams remained at roughly one failure every eight months, or about three failures every two years.¹⁴⁹ In fact, failure rates increased

¹⁴² See generally Wobus Comments at 11-16.

¹⁴³ DEIS at 4.27-72.

¹⁴⁴ *Id.* at 4.27-75.

¹⁴⁵ See Wobus Comments at 15-16 (providing examples of the decision to roll out of consideration of a full tailings dam breach was driven by politics and a tight timeline, rather than by best available science).

¹⁴⁶ *Id.* at 11; U.S. Army Corps of Engineers, Pebble EIS—Phase Failure Modes and Effects Analysis Workshop Report at 5 (Dec. 2018) (2018 Phase Failure Report) (ruling out a full tailings breach as remote "during the 20-year operational life due to likelihood of successful detection and intervention.").

¹⁴⁷ A. Mattox *et al.*, *Understanding Dam Failure*, Ground Truth Trekking (Feb. 22, 2016), <http://groundtruthtrekking.org/Issues/OtherIssues/understanding-dam-failure.html>.

¹⁴⁸ G. Gavett, *Tailings Dams: Where Mining Waste Is Stored Forever*, Frontline (July 30, 2012), <http://www.pbs.org/wgbh/frontline/article/tailings-dams-where-mining-waste-is-stored-forever/>; see also International Commission of Large Dams, *Tailings Dams: Risk of Dangerous Occurrences, Lessons Learnt from Practical Experiences*, Bulletin 121, 19-20, 68, Fig. 2 (2001).

¹⁴⁹ Chambers, *Tailings Dam Failure Analysis* at 4-5.

dramatically in the early 2000s, matched only by statistics from the early to mid-1930s.¹⁵⁰ Historically, most tailings dam failures worldwide have occurred at operating mines and 39 percent of such failures have occurred in the United States.¹⁵¹ More recently, experts have concluded that despite a recent decline in the total number of failures, “the 100 years of [tailing storage facilities] failures shows an emerging and pronounced trend since 1960 toward a higher incidence of ‘Serious’ and ‘Very Serious’ failures. That is, the consequence of loss is becoming increasingly greater.”¹⁵² According to the authors, these failures are a direct result of the increasing prevalence of TSF’s with greater than a 5 million cubic meter total capacity necessitated by lower grades of ore and the higher volumes of ore production required to attain or expand a given tonnage of finished product.¹⁵³

Certain aspects of PLP’s plan are risky. For example, the northern embankment of the TSF north uses the centerline construction method, even though “dams designed with downstream construction methods are less likely to fail than dams using centerline construction methods, especially under seismic shaking.”¹⁵⁴ The bulk TSF is approximately ten times larger than the facilities that failed at Mt. Polley and Samarco,¹⁵⁵ the area receives high precipitation suggesting that the tailings and dam are likely to remain unstable after the mine closes,¹⁵⁶ and the risk of seismic activity.¹⁵⁷

The DEIS evaluates a spill scenario caused by a partial tailings dam failure.¹⁵⁸ This analysis is inadequate. A failure of the tailings dam would likely be much larger and could have

¹⁵⁰ M. P. Davies, *Tailings Impoundment Failures: Are Geotechnical Engineers Listening?*, *Geotechnical News* 31, 32 (Sept. 2002); *see also* WISE Uranium Project, *Chronology of Major Tailings Dam Failures*, <https://www.wise-uranium.org/mdaf.html> (June 5, 2019) (providing a list of major failures from 1960-2016).

¹⁵¹ Chambers *Tailings Dam Failure Analysis* at 5.

¹⁵² L. N. Bowker & D. M. Chambers, *The Risk, Public Liability, & Economics of Tailings Storage Facility Failures* 1, 1 (Jul. 21, 2015).

¹⁵³ *Id.*

¹⁵⁴ DEIS at 4.27-73.

¹⁵⁵ Lnyker Technologies, LLC, *A Model Analysis of Flow and Deposition from a Tailings Dam Failure at the Proposed Pebble Mine* at a (Mar. 12, 2019) (Lynker, *Tailings Dam Failure Analysis*).

¹⁵⁶ *Id.* (finding that the Pebble site receives more than 1.3 meters (52 inches) of precipitation each year).

¹⁵⁷ *Id.* (stating that the risk of seismicity could destabilize the facility via dam failure or liquefaction).

¹⁵⁸ DEIS at 4.27-93.

catastrophic effects on people and natural resources.¹⁵⁹ The harm from a much larger tailings dam failure is reasonably foreseeable and must be analyzed.¹⁶⁰

When tailings dams fail, they typically release on average between 20 and 40 percent of the tailings.¹⁶¹ Not surprisingly, there appears to be a direct, if not linear relationship between the tailings outflow from a tailings dam as compared to the volume of tailings stored at the dam at the time of the failure.¹⁶² One study found that for a significant portion of tailings dam failures, “29% for pre-2000 cases and 40% for post-2000 cases . . . dam failures released up to $0.5 \times 10^6 \text{ m}^3$ of tailings into the environment.”¹⁶³ The study concluded that:

[U]sually about one-fifth of the contained volume is released. Even such volumes are sufficient to cause extensive damage to life, property, and health. For example, $0.5 \times 10^6 \text{ m}^3$ of released tailings are enough to drown about 1200 North American style single-family homes.¹⁶⁴

Here, the Corps’ analysis of a tailings dam failure is grossly insufficient. The Corps analyzes a total release of 185 million cubic feet.¹⁶⁵ Yet even at a 10% breach, the volume of tailings would be nearly 3 billion cubic feet.¹⁶⁶ The DEIS should consider the impacts of a more realistic

¹⁵⁹ Lynker, Tailings Dam Failure Analysis at a-b (finding that the tailings from a dam breach would travel more than 75 kilometers (~50 miles) downstream, beyond the confluence with the Mulchatna River and even the Nushagak River, more than 130 kilometers (~80 miles) downstream); *id.* at b (providing that the impacts of such a failure could be catastrophic to salmon habitat in the Nushagak watershed).

¹⁶⁰ By way of illustration, prior to the *Deepwater Horizon* exploration drilling disaster, the Bureau of Ocean Energy Management consistently refused to conduct catastrophic oil spill risk and impacts analyses during its NEPA review processes, claiming such an event was not reasonably foreseeable. *See* Council on Environmental Quality, Report Regarding the Mineral Management Service’s National Environmental Policy Act Policies, Practices, and Procedures As They Relate to Outer Continental Shelf Oil and Gas Exploration and Development at 27 (Aug. 16, 2010) (“The agency did not [formerly] deem a catastrophic spill . . . to be a reasonably foreseeable impact.”). Following that disaster, the agency was widely criticized and is now conducting that review when analyzing proposed projects. *Id.* (“Since [the Deepwater Horizon spill on] April 20, 2010, that assumption will be revised, and BOEM will take steps to incorporate catastrophic risk analysis going forward.”).

¹⁶¹ A. Dalpatram, Estimation of Tailings Dam Break Discharges, Workshop on Dam Break Analysis at PDF 7 (Aug. 24-26, 2011) (volume of tailings released).

¹⁶² *Id.* at 8, Fig. 4.

¹⁶³ S. Azam & Q. Li, *Tailings Dam Failures: A Review of the Last One Hundred Years*, Geotechnical News 50, 52 (Dec. 2010).

¹⁶⁴ *Id.*

¹⁶⁵ DEIS at 4.27-93.

¹⁶⁶ Lynker, Tailings Dam Failure Analysis at 32.

analysis of a tailings dam failure, which could impact hundreds of miles of salmon-producing streams, with potentially catastrophic long-term consequences to salmon habitat.¹⁶⁷

In addition, PLP has not provided enough detail on the tailings dam designs to allow for a reasoned analysis of the risk.¹⁶⁸ The design of the dam is incomplete.¹⁶⁹ As noted in the FMEA workshop report, “The current Pebble Project embankment designs are at an early-phase conceptual level, with geotechnical investigations still under way at the major embankment sites. This current conceptual design level inherently results in uncertainties.”¹⁷⁰ The DEIS confirms that basic design features of the TSF remain to be developed.¹⁷¹

Because the TSF Dam designs are incomplete, it is not possible to conduct an adequate stability or failure analysis.¹⁷² PLP’s reliance on a 2011 study is inadequate, because that dam had an impermeable zone.¹⁷³ In addition, the probabilistic calculations used to determine the risk of an earthquake are based on outdated information,¹⁷⁴ and the DEIS should include additional information in its analysis of seismic risk.¹⁷⁵

By grossly understating the size of a realistic tailings dam failure, the DEIS presents an inaccurate and incomplete assessment of the impacts, necessary alternatives, and mitigation measures. These failings must be addressed in the FEIS.

MISSING INFORMATION

I. THE DEIS DOES NOT SATISFY CWA AND NEPA REQUIREMENTS FOR MISSING INFORMATION.

Both NEPA and the CWA require the Corps to address missing information. Discharging fill material into wetlands violates the 404(b)(1) Guidelines when there is insufficient information to make a reasonable judgment as to whether the proposed discharge will comply

¹⁶⁷ Wobus Comments at 13-14.

¹⁶⁸ *Id.* at 11-13.

¹⁶⁹ DEIS at K4.15-29 (stating that detailed design work will take place after EIS process is complete).

¹⁷⁰ 2018 Phase Failure Report at 1.

¹⁷¹ DEIS at 2-22. *See also* PLP 2018-RFI 006, Seepage Analysis (Sept. 12, 2006); PLP 2018-RFI 006a, Follow-up Questions on Seepage Analysis (Sept. 12, 2018) (requesting additional information about TSF design).

¹⁷² *See* PLP 2018-RFI 008 (noting that “[t]he Project Description provides limited information necessary to evaluate the stability of the TSF under static and seismic conditions”); Wobus Comments at 12-13 (finding that the DEIS discounts the cumulative probability of a dam failure and dismisses the risk of a full TSF breach).

¹⁷³ Knight Piesold, RE: RFI 008 Response—Embankment Static and Seismic Stability (2018).

¹⁷⁴ DEIS at K4.15-28 (noting that USGS seismic maps are to be updated).

¹⁷⁵ *See* B. Higman & N. Riordan, Comments on the 2019 Draft Environmental Impact Statement (DEIS) for the Pebble Mine at 2-12 (May 20, 2019).

with them.¹⁷⁶ Thus, the Corps must require applicants to provide sufficient information before authorizing a discharge. Similarly, when the agency confronts incomplete or unavailable information as part of the environmental review process, NEPA regulations dictate how the agency must address that information.¹⁷⁷ “[T]he agency shall include the information in the environmental impact statement,” if the missing information is: (1) “relevant to reasonably foreseeable significant adverse impacts;” (2) “essential to a reasoned choice among alternatives;” and (3) “the overall costs of obtaining [which] are not exorbitant.”¹⁷⁸ The Council on Environmental Quality (CEQ) has explained that “[t]he evaluation of impacts under § 1502.22 is an integral part of an EIS and should be treated in the same manner as those impacts normally analyzed in an EIS.”¹⁷⁹ If the information cannot be obtained, agencies must note that the information is incomplete or unavailable, explain its relevance, summarize existing credible scientific evidence, and evaluate impacts based on theoretical approaches or research methods generally accepted in the scientific community.¹⁸⁰

The DEIS lacks important information necessary to conduct an adequate NEPA analysis and to make a reasonable judgment as to whether the mine will comply with the 404(b)(1) Guidelines.¹⁸¹ These information gaps include, but are not limited to: an economic feasibility study, a detailed reclamation plan and description of financial assurances or bonding,¹⁸² geotechnical data, seismic analysis, and the design of the tailings dam,¹⁸³ a compensatory

¹⁷⁶ See 40 C.F.R. § 230.12(a)(3)(iv).

¹⁷⁷ See *Mont. Wilderness Ass’n v. McAllister*, 666 F.3d 549, 559-561 (9th Cir. 2011).

¹⁷⁸ 40 C.F.R. § 1502.22(a).

¹⁷⁹ 51 Fed. Reg. 15,618, 15,621 (Apr. 25, 1986).

¹⁸⁰ 40 C.F.R. § 1502.22(b).

¹⁸¹ See DEIS at 3.1-8 to 3.1-14. As explained in multiple places throughout this letter, available information compels the conclusion that the project will not comply with the 404(b)(1) Guidelines. Furthermore, information is missing without which it is impossible to conclude that the project *will* comply with the Guidelines.

¹⁸² DEIS at 2-18 (“Further detail would need to be developed in support of state permitting and the Reclamation Plan Approval requirements, and Closure Cost Estimate and bonding requirements.”); see also *id.* at 2-41 (“Prior to commencing construction, the project Reclamation and Closure Plan approval and associated financial assurance mechanisms would need to be in place.”).

¹⁸³ See, e.g., DEIS at 2-22 (“Locations, alignments, configurations, sizes, capacities, and other details of the underdrains would be developed following more detailed site-specific geotechnical and geological investigations and observations made during the preliminary and detailed designs”); *id.* at 4.27-71 (“The current level of embankment design for the proposed project is at a very early phase, considered a *conceptual* phase. Site investigation and engineering plans are still ongoing”) (emphasis added).

mitigation plan, a mine operations plan,¹⁸⁴ and a water management plan, including for an expanded mine.¹⁸⁵

The DEIS does not provide any analysis of the direct and cumulative impacts of road system fugitive dust,¹⁸⁶ even though the “risk of ecotoxic effects from trace metals, particularly impacts of copper on fish” is significant.¹⁸⁷ For example, the DEIS does not discuss the “contaminants that have a reasonable likelihood of entraining in fugitive dust, such as copper, zinc, mercury and hydrocarbons originating from vehicles and salts from dust suppression actions” and the effects of these chemical contaminants on the environment. The FEIS should account for dust deposition rates, potential bioaccumulation, and resulting cumulative impacts on wetlands and other water bodies, fish, and other aquatic resources.¹⁸⁸

In short, the DEIS fails to make the required findings that would justify proceeding without the missing information under NEPA and the CWA. The Corps must either require this information be provided or address the regulatory criteria in explaining why the information need not be included.

WATER QUALITY

I. THE DEIS DOES NOT ADEQUATELY DISCLOSE IMPACTS TO WATER QUALITY.

According to the DEIS, the 20-year mine plan will result in an annual average of 6.8 billion gallons of wastewater during operations and 11.8 billion gallons during phase 1 of

¹⁸⁴ See, e.g., DEIS at 2-31 (“Additional detail [for mine site operations and closure plans] would be developed and included in updates to these plans as the project proceeds through the state permitting process”).

¹⁸⁵ *Id.* at 4.18-8 (“Water quality of discharge from the open pit WTP is the subject of ongoing engineering analysis”); *id.* at 4.18-36 (finding that for mine expansion, “[a]dditional design features to capture and treat impacted water and waste streams would be necessary to manage mine site impacts”).

¹⁸⁶ See generally C. Frissell & S. O’Neal, Memo to S. McCoy, U.S. Army Corps of Engineers, Re: Direct and Cumulative Impacts of Road System Fugitive Dust in the Pebble Project Draft EIS (May 9, 2019) (Road System Fugitive Dust Memo); *id.* at 6 (explaining that fugitive dust refers to particulate matter suspended in air, originating from disturbed soils, waste piles, and unvegetated surfaces at mine sites construction sites, quarries, and roads).

¹⁸⁷ See generally K. Zamzow *et al.*, Memo to S. McCoy, U.S. Army Corps of Engineers, Re: Fugitive Dust Issues in the Pebble Project Draft EIS (May 30, 2019) (Fugitive Dust Issues Memo).

¹⁸⁸ See C. Frissell & S. O’Neal, Road System Fugitive Dust Memo at 2-3; Zamzow *et al.*, Fugitive Dust Issues Memo at 4 (“Discussion of impacts are fragmented across multiple chapters and not put in meaningful contest.”).

closure, requiring treatment.¹⁸⁹ This is unprecedented. No other U.S. hardrock mine treats such an enormous volume of wastewater for discharge to surface water.¹⁹⁰ An independent analysis estimates that the 78-year mine plan will result in an estimated annual average of 26.3 billion gallons post closure.¹⁹¹ This is an unfathomable amount of wastewater that must be managed and treated to prevent downstream impacts.

The DEIS fails to demonstrate that it is technically feasible to treat this volume of mine impacted wastewater. In fact, a white paper prepared for the Pebble Limited Partnership explicitly states that high capacity water treatment plants with hydraulic throughputs on the order of the predicted PLP WTP at year 20 are not in use in the mining industry.¹⁹²

Furthermore, the copper mining industry has failed to demonstrate – almost across the board - that it can effectively capture and treat its wastewater. A 2012 report reviewed the track record of 14 operating U.S. copper mines, accounting for 89% of U.S. copper production, and found that 92% failed to capture and treat wastewater resulting in significant water quality impacts.¹⁹³ A 2019 report found similar results. It reviewed the track record of 15 operating open pit copper mines, accounting for 99% of U.S. copper production, and found that 93% failed to capture and control wastewater, resulting in significant water quality impacts.¹⁹⁴

Based on the record of operating U.S. open pit copper mining operations, it is reasonable to assume that these types of failures will occur at the proposed Pebble Mine. The DEIS fails to take a hard look at the failure to capture and treat wastewater from the potential wastewater sources. The DEIS states that over the life of the mine it is possible that APDES permit conditions may be exceeded for various reasons (e.g., treatment process upset, record keeping errors) as has happened at other Alaska mines, but it dismisses the potential impacts. It states that “In these types of events, corrective action is typically applied in response to ADEC

¹⁸⁹ Average annual water treatment during operations, based on 50th percentile (29 cfs converted to billions of gallons per year). Knight Piesold Ltd., Pebble Project: Pebble Mine Site Operations Water Management Plan at 47 Tbl. 4.2 (July 6, 2018). Average annual water treatment during closure phase I (50 cfs converted to billions of gallons per year), based on 50th percentile. Knight Piesold, Pebble Mine Site – Closure Water Management Plan at 23 Tbl. 5.1 (September 21, 2018). The average annual water treatment plant discharge drops to 30 cfs in Phase 3 of closure and to 13 cfs at Phase 4. DEIS at 4.16-20, Tbl. 4.16-3).

¹⁹⁰ B. Gestring, Pebble Mine: Unprecedented Wastewater Capture and Treatment Requirements (May 2019).

¹⁹¹ Prucha, Groundwater Comments at 2 (finding nearly 50,000 gpm needing treatment, which is 26.3 billion gpy).

¹⁹² Water Engineering Technologies, Inc., White Paper on Water Treatment Processes prepared for the Pebble Limited Partnership at 8 (July 24, 2012).

¹⁹³ B. Gestring, U.S. Copper Porphyry Mines Report: The Track Record of Water Quality Impacts Resulting From Pipeline Spills, Tailings Failures and Water Collection and Treatment Failures (Nov. 2012 revision),

¹⁹⁴ B. Gestring, U.S. Operating Copper Mines: Failure to Capture & Treat Wastewater (May 2019) (May 2019).

oversight to bring the discharges into compliance.”¹⁹⁵ This is inadequate. None of the existing Alaska mining operations are comparable to the proposed Pebble Mine in size or discharge volumes. More importantly, the DEIS fails to analyze the potential impacts of the direct, indirect and cumulative effects of uncontrolled wastewater releases. More importantly, the permit cannot be issued if the proposed mine would cause or contribute to violations of any applicable water quality standards.¹⁹⁶

Furthermore, the DEIS fails to provide sufficient information to determine how wastewater will be managed to prevent impacts to surface and/or groundwater. The DEIS states that “water quality of discharge from the open pit WTP is the subject of *ongoing engineering analysis* (PLP 2019 – RFI-106).”¹⁹⁷ (emphasis added) Without this information it is impossible to determine whether the water treatment facilities are adequate to treat to standards.

The DEIS also acknowledges that an independent review of the WTP has raised concerns that salt and selenium could build up over time in the pyritic TSF, which has the potential to lead to increased total dissolved solids (TDS) concentrations that would require treatment in the main WTP (AECOM 2018i).¹⁹⁸ The DEIS inappropriately defers any analysis of potential impacts or identification of treatment and management until later – after the NEPA process.

An independent review by Sobolewski confirms that the WTP will almost certainly not perform as promised. “The proposed treatment systems at the Pebble Project are essentially experimental: no similar systems have ever been constructed and operated at any other mine anywhere in the world.”¹⁹⁹ After a thorough review of the treatment plans, Sobolewski concludes:

The two water treatment plants (WTPs) proposed for the Pebble Project are the largest, most complex plants proposed for any operating mine in the world. They are proposed to remove several contaminants to very low concentrations and discharge compliant water in an ecologically-sensitive part of the state. Given that they are unprecedented, have never been tested, and given that their design is poorly supported in the DEIS, this is tantamount to a giant, expensive experiment. There is a significant risk that they will not remove contaminants as effectively as claimed and that they will produce effluents that adversely impacts ecosystems downstream from the proposed mine site. This is especially true for selenium, but may be true as well for other contaminants.²⁰⁰

¹⁹⁵ DEIS at 4.18-4.

¹⁹⁶ 40 CFR 230.10(b)(1).

¹⁹⁷ DEIS at 4.18-8.

¹⁹⁸ *Id.* at 4.18-4, 4.18-5.

¹⁹⁹ Andre Sobolewski, “Review of water treatment plants proposed for Pebble Project” at 1 (May 20, 2019).

²⁰⁰ *Id.* at 13-14.

A separate expert review by Maest highlights the problem that the influent will likely be worse than projected, further straining the ability of the WTPs to treat the waste effectively.²⁰¹ Maest concludes that the DEIS “consistently underpredicts water quality risks related to development of the mine.”²⁰² Yet another independent review highlights in detail the particular risk the mine poses for toxic releases of selenium, a contaminant also highlighted specifically by Sobolewski and Maest.²⁰³ Given these multiple challenges, the EIS must disclose and discuss the significant risk that the plants will not perform as promised and the impacts that will result when they do not.

The DEIS also states that PLP will control seepage from the tailings impoundment, but fails to provide sufficient information to evaluate whether its seepage capture and containment systems are adequate. According to DEIS, the drainage and hydraulic containment systems are “*currently conceptual only, and would be further developed in final design.*” (emphasis added).²⁰⁴ Without this information it is impossible to determine whether the company can control tailings seepage, and prevent adverse impacts to water resources.

Similarly, the DEIS states that seepage from the main WMP could affect shallow groundwater, but fails to provide sufficient data to demonstrate that water quality will be effectively protected and mitigation measures will work. It states that “in terms of extent of impacts, without intervention, this water would be expected to mix with shallow groundwater and discharge into the NFK watershed.”²⁰⁵ To prevent this, the DEIS states that “a line of monitoring pumpback wells would be installed along the northern side and at the northeastern corner of the main WMP.”²⁰⁶ However, “based on the current mine plan, it is possible that gaps exist along the main WMP embankment that would allow potentially affected groundwater to flow through areas where wells are limited (e.g., along the southwestern side of the embankment)”²⁰⁷ Yet, it defers the collection of this hydrologic information, and the location and spacing of pumpback wells to some future time, outside of NEPA review: “As discussed in the EIS-Phase FMEA, the final location and spacing of pumpback wells would be determined based on additional hydrologic investigation as design progresses, to minimize the likelihood of this occurrence.”²⁰⁸ As such, the DEIS contains insufficient information to evaluate the potential or scale of leakage from the WMP, and whether it can be effectively mitigated.

²⁰¹ Ann Maest, “Pebble Project Mine Water Quality Predictions and Implications for Environmental Risk: Comments on the Pebble Project Draft Environmental Impact Statement” at 1 (May 20, 2019) (Maest, Pebble Report).

²⁰² *Id.*

²⁰³ Kendra Zamzow, et al., “Selenium Issues in the Pebble Project Draft EIS” (April 2019).

²⁰⁴ DEIS at 4.18-14.

²⁰⁵ *Id.* at 4.18-15.

²⁰⁶ *Id.*

²⁰⁷ *Id.*

²⁰⁸ *Id.*

Maest examines the problem of seepage from the tailings storage facilities, the seepage collection ponds, and the water management pond.²⁰⁹ She concludes, contrary to the DEIS, “It is not realistic to assume that the mine will be able to capture all mine-influenced water—especially in a fractured and faulted bedrock setting like that at the proposed Pebble Project.”²¹⁰

A 2016 study has demonstrated that more often than not, mitigation measures to reduce or eliminate impacts to water quality fail to operate as predicted.²¹¹ It found that EIS water quality predictions made after considering the effects of mitigations largely underestimated actual impacts to groundwater, seeps, and surface water. EIS water quality predictions made before the ameliorating effects of mitigations were considered were more accurate at predicting operational water quality.

The EIS must include an analysis of the failure rates of all mitigation measures identified as mechanisms to reduce or eliminate potential impacts from mine operations, including failure rates for mitigations required post-closure. For example, if a water treatment system is required to mitigate water quality impacts in perpetuity, the analysis must include the potential failure of that system to capture and control mine seepage in perpetuity. If failure rates are not available for certain mitigation measures, the EIS should disclose that information.

The EIS also fails to take a hard look at the potential impact of pipeline breaks or other accidental releases of tailings, wastewater, or other potential pollutants at the mine site. The DEIS asserts that if a spill occurs, clean-up efforts will quickly return the site to normal conditions, but it fails to provide supporting evidence for this assertion and it inappropriately limits its review to Alaska mines. A 2012 report that reviewed the track record of pipeline spills or other accidental releases at operating U.S. copper mines, accountable for 89% of U.S. copper production, found that 100% experienced pipeline spills or other accidental releases, and 28% experienced tailings impoundment failures. These types of major spills continue to occur. For example, in January 2019 the Chino open pit copper mine released 2 million gallons of tailings slurry due to a failed coupling on the pipeline that carries tailings from the concentrator to the tailings pond.²¹² The tailings flowed into a diversion of Whitewater Creek upstream from James Canyon Reservoir, and the report found that it was “likely that an unknown volume of the aqueous portion of the tailings slurry, some of the tailings solids entered the reservoir.”²¹³ The reservoir is being pumped down to determine what volume of tailings solids entered the reservoir.

²⁰⁹ Maest, Pebble Report at 34-36.

²¹⁰ *Id.* at 3.

²¹¹ A. Maest *et al.*, Predicted Versus Actual Water Quality at Hardrock Mine Sites: Effect of Inherent Geochemical and Hydrologic Characteristics (2006), <https://www.asmr.us/Portals/0/Documents/Conference-Proceedings/2006/1122-Maest.pdf>.

²¹² New Mexico Environmental Department, Corrective Action Response, DP-213, January 5, 2019, Unauthorized Discharge of Tailings Slurry from Tailings Spare Train Pipeline.

²¹³ *Id.*

The DEIS must take a hard look at the potential direct, indirect and cumulative effects of repeated small, medium and large spills over the course of mine construction, operations, closure and post-closure.

II. THE DEIS'S ANALYSIS OF SHIPPING HAZARDS AND OIL SPILL RISK IS INSUFFICIENT.

This EIS is grossly lacking in key information regarding navigational risks, spill risks, and tsunami hazards for the two proposed ocean port sites of Amakdedori and Diamond Point, as well as Lake Iliamna, to determine their environmental impacts.²¹⁴ For example, the analysis should acknowledge the fact existing Cook Inlet traffic does not overlap spatially with the proposed traffic, and that the project would add a high level of traffic to a remote area without current vessel traffic.²¹⁵

The analysis of spill risks is inadequate in various respects, as well, and should include more realistic scenarios.²¹⁶ For example, the DEIS considers only high volume spills, which occur less frequently.²¹⁷ The DEIS should include an analysis for small, medium and large spills, including the probability of occurring and the environmental damage that would result from each spill size on water and different wildlife groups.²¹⁸ The DEIS should also discuss response capabilities for all spill scenarios.²¹⁹

The DEIS must provide additional information about the risk of a tsunami, including the ability of the planned ports to withstand these events.²²⁰ The DEIS must also provide an analysis on the impact of pipeline leaks on the aquatic life and climate change.²²¹

²¹⁴ See generally Nuka Research and Planning Group, LLC, Letter to Cook Inlet Keeper and Salmon State, Re: Comments on Draft EIS for Proposed Pebble Mine (May 20, 2019) (Nuka Infrastructure Comments).

²¹⁵ *Id.* at 2.

²¹⁶ *Id.* at 7-8 (finding that oil spills may occur from ore carriers, supply barges, lightering vessels, and during fuel transfers at the port).

²¹⁷ S. C. Lubetkin, *A Critique of the Transportation Corridor Spill Risk Estimates of Diesel, Ore Concentrate, and Chemical Reagents in the Pebble Project Draft Environmental Impact Statement* at i (May 20, 2019) (“The largest spills are the most infrequent, and so the logic is circular: If the only scenarios that are considered are the really rare ones, the calculations who they don’t happen very often.”).

²¹⁸ *Id.* at i-ii.

²¹⁹ Nuka Infrastructure Comments at 8-9.

²²⁰ *Id.* at 10-11; B. Higman & N. Riordan, Comments on the 2019 Draft Environmental Impact Statement (DEIS) for the Pebble Mine at 14-17 (May 20, 2019).

²²¹ Nuka Infrastructure Comments at 11-12.

DESTRUCTION OF WETLANDS AND OTHER WATERS

Wetlands provide a number of important ecological functions and values.²²² These functions and values include fish and wildlife habitat, water quality improvement, flood storage, and many other benefits.²²³ It is therefore critical that the DEIS present a full picture of the project's potential impacts on wetlands and related aquatic ecosystems, one which will enable the Corps to fulfill its obligations under NEPA and Section 404 of the Clean Water Act. For the reasons discussed below, the DEIS fails to do so.²²⁴

Guidelines published under section 404(b)(1) of the Clean Water Act prohibit discharging fill material into wetlands when proposed filling would significantly degrade the aquatic ecosystem. Under these Guidelines, "degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts."²²⁵ Examples of effects contributing to significant degradation include loss of fish and wildlife habitat or loss of wetlands' capacity to filter water.²²⁶ "Fundamental to [the 404(b)(1)] Guidelines is the precept that . . . 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."²²⁷ Under the CWA, the Corps is also required to consider the value of wetlands and fisheries in its public interest determination.²²⁸ Finally, NEPA requires that environmental impact statements (EISs) discuss, in detail, the environmental impacts of both the proposed action and alternatives.²²⁹ The description of environmental consequences "forms the scientific and analytic basis for the comparisons" of alternatives,²³⁰ and a decision may be ruled invalid where the EIS supporting it does not present a sufficiently detailed statement of environmental impacts and alternatives.²³¹ The agency must take a hard look at the environmental consequences of its decision.²³² The DEIS's discussion of the project's impacts on wetlands and other waters falls short in several regards.

²²² See generally EPA, Wetland Functions and Values, <https://www.epa.gov/sites/production/files/2016-02/documents/wetlandfunctionsvalues.pdf>.

²²³ *Id.* at 2.

²²⁴ Schweisberg, Adverse Impacts to Wetlands at 3 ("The DEIS explains that the extent of wetlands and wetlands affected adversely by the mine project are likely under-estimated, perhaps significantly.").

²²⁵ 40 C.F.R. § 230.1(d).

²²⁶ See *id.* § 230.10(c)(3).

²²⁷ *Id.* § 230.1(c).

²²⁸ 33 C.F.R. § 320.4(b)&(c)

²²⁹ 42 C.F.R. § 4332(2)(C)(i), (iii); 40 C.F.R. § 1502.16(d).

²³⁰ 40 C.F.R. § 1502.16(d).

²³¹ See *Lands Council v. Powell*, 395 F.3d 1019, 1027 (9th Cir. 2004).

²³² *Conner v. Burford*, 848 F.2d 1441, 1446 (9th Cir. 1988) (citing *Kleppe v. Sierra Club*, 427 U.S. 390, 410 n.21 (1976); *California v. Block*, 690 F.2d 753, 761 (9th Cir. 1982)).

I. THE DEIS DOES NOT ADEQUATELY DISCUSS THE PROJECT’S IMPACTS ON WETLANDS AND OTHER WATERS

PLP’s proposed deposit “would likely result in the greatest net losses of wetland and aquatic areas of any copper mine ever proposed in the United States,”²³³ and yet the DEIS describes the magnitude of impacts solely according to the percentage of area that is degraded when compared to the overall area within the watershed.²³⁴ For example, the DEIS notes that the 236 acres of regionally important riverine wetlands that will be directly impacted by the mine site “represents roughly 5 percent of the riverine wetlands within the watershed.”²³⁵ Similarly, mine site activities would directly affect 1 percent of ponds, 4 percent of rivers and streams, and 17 percent of all stream channel length in the watershed.²³⁶ This approach is arbitrary because it fails to account for the unique role that different areas play.²³⁷ Above all, a description of the percentage of area lost ignores the important role that individual streams, wetlands, lakes, ponds, and other aquatic habitats can play in protecting Bristol Bay salmon fisheries.²³⁸ It also fails to explain “the position of the wetlands and the context of the position of the wetlands within the watershed as well as the relative functions provided.”²³⁹ Small headwater streams make up 65% of assessed stream length in the SFK, NFK, and UTC watersheds.²⁴⁰ These headwater streams—and their associated headwater wetlands—are key habitat features in this region and are particularly important in establishing and maintaining fish and wildlife diversity.²⁴¹ The mine

²³³ Yocom, LEDPA Report at 1; Albert, Loss of Salmon Streams and Wetlands Report at 1 (“[The loss of salmon streams, tributaries and wetlands] exceed the EPA thresholds for unacceptable adverse effects by more than half for the loss of documented salmon streams, up to fourfold for loss of tributaries and up to threefold for loss of wetlands.”).

²³⁴ Schweisberg, Adverse Impacts to Wetlands at 5 (“In the DEIS, PLP resorts to an argument based on percentages, that is, that impacts from the 20-year mine project represent only 0.05% of the streams and wetlands in the Bristol Bay watershed.”).

²³⁵ DEIS at 4.22-11; *cf* Schweisberg, Adverse Impacts to Wetlands at 1 (“Direct and secondary adverse impacts would affect at least 6,877 acres.”).

²³⁶ DEIS at 4.22-11.

²³⁷ *See* Schweisberg, Adverse Impacts to Wetlands at 5 (stating that the approach completely misuses the concept of percentages and thresholds, which primarily were developed to better understand the adverse effects on water quality in streams, ponds, and lakes located in urban and suburban setting).

²³⁸ PD at 2-12.

²³⁹ EPA, Wetlands Comments at 3.

²⁴⁰ PD at 3-8.

²⁴¹ Schweisberg, Adverse Impacts to Wetlands 2-3, 4 (“Unlike most other areas supporting Pacific salmon populations, the Bristol Bay watershed is undisturbed by significant human development and impacts as it is located in one of the last remaining virtually roadless areas in the United States.”); T.G. Yocom, *The Pebble Project DEIS Provides No Substantive Proposals of Compensatory Mitigation for Losses of Wetlands and Aquatic Areas* at 13 (June 6, 2019) (Yocom, Compensatory Mitigation Report).

would “completely destroy these wetlands and the ecological functions that they provide” in contrast with the DEIS’s incorrect conclusions based on its use of percentages.²⁴²

Describing the impacts in relation to the entire watershed is “precisely the kind of limited review of ‘piecemeal changes’ that the regulations forbid.”²⁴³ The EPA questioned the Corp’s use of percentages to describe the significance of impacts, and suggested instead, “the EIS describe the amount of different types of wetlands impacted across the alternatives without comparison to an arbitrary threshold.”²⁴⁴ The use of percentages is also arbitrary because it has no scientific basis and the Corps fails to explain how these thresholds are being used in the impacts analysis.²⁴⁵

The FEIS must adequately describe the significance of the impacts to wetlands and other waters, and how these effects will have an impact on fish.²⁴⁶ For example, some of the more critical issues are:²⁴⁷ the importance of contiguous wetlands, lakes, and ponds to salmon populations, both as habitat and as sources of groundwater inputs, nutrients, and other subsidies crucial to salmon productivity;²⁴⁸ the vulnerability of localized populations of coho, Chinook, and sockeye salmon in streams flowing through the lost wetlands or downstream of them;²⁴⁹ and the importance of such localized populations to the resilience of the Bristol Bay salmon fisheries.²⁵⁰ As the EPA explains, “By itself, the elimination, dewatering, or fragmenting of approximately 19 miles (30 km) of tributaries of anadromous fish streams as the result of a CWA Section 404 permit would be an unprecedented impact in Alaska,” and their loss would “reverberate to downstream habitats” due to “the vital role headwater streams play in maintaining diverse, abundant fish populations, via the provision of surface and groundwater inputs and food sources critical to the survival, growth, and spawning success of downstream

²⁴² Schweisberg, Adverse Impacts to Wetlands at 7 (“For PLP’s preferred alternative, direct adverse impacts for the mine site alone would cause the outright loss of 4900 acres of wetlands, including, 2665 acres of shrub and 690 acres of herbaceous wetlands.”).

²⁴³ *Buttrey v. United States*, 690 F.2d 1170, 1180–81 (5th Cir. 1982).

²⁴⁴ EPA, Wetlands Comments at 6.

²⁴⁵ *Id.*; see also EPA, Technical Review of a Threshold-Based Approach for Determining Significant Degradation in Alaska (July 5, 2018).

²⁴⁶ Schweisberg, Adverse Impacts to Wetlands at 7-8 (finding that the DEIS discounts the net effects of headwater stream and wetland losses on the capacity and productivity of stream habitats and on fish populations).

²⁴⁷ DEIS at 4-22.

²⁴⁸ PD at Section 3.2.3; see also EPA, Wetlands Comments at 1 (stating that the Corps needs to explain “the connection between the wetlands, streams and other waterbodies found across the Bristol Bay watershed, including those documented within the project area, and the world-class fishery resources”).

²⁴⁹ PD at Section 4.2.1.

²⁵⁰ PD at 3-53; see EPA, Fish Values Comments at 4 (noting that DEIS should address how potential loss of genetic diversity will affect populations and their ability to adapt to changing conditions).

fishes.”²⁵¹ The net effects of headwater stream and wetland losses would significantly reduce the capacity and productivity of stream habitats.²⁵²

The DEIS conclusions about impacts to fish are not based upon an adequate analysis of these issues.²⁵³ For example, the DEIS asserts that “Changes in riparian wetlands would likely not be detectable downstream from the mine site.”²⁵⁴ The DEIS must explain the underlying rationale for this assertion.²⁵⁵ Additionally, the DEIS only reports studies of fish distribution for a subset of all tributary streams within the mine site study area,²⁵⁶ so the extent of salmon streams and tributaries potentially affected by the proposed project remains uncertain.²⁵⁷ The FEIS must also directly compare potential impacts to the thresholds developed by EPA in its Proposed Determination for the loss of documented salmon streams, tributaries and wetlands that would constitute an unacceptable adverse effect to fisheries.²⁵⁸

Furthermore, the DEIS’s conclusions about the impacts to fish do not account for the “population structure and life history traits” of various populations of fish, rendering its analysis “insufficient to evaluate how proposed operations would affect salmon populations or commercial and subsistence harvest access.”²⁵⁹ Although the DEIS acknowledges that distinct populations exist in the Kvichak and Nushagak watersheds,²⁶⁰ its evaluation on fish values completely omits the loss of unique biodiversity and the loss to the fishery in terms of harvest access and processing capacity.²⁶¹ Moreover, the DEIS lacks an assessment of the direct, indirect, and cumulative impacts of the proposed ferry corridor (and resulted disturbances and contaminants) on fish use of the open-water habitat in Lake Iliamna,²⁶² the migration pathways “for the greatest majority” of the fish populations,²⁶³ and the aquatic food webs that support

²⁵¹ PD at 4-19.

²⁵² Schweisberg, Adverse Impacts to Wetlands at 7.

²⁵³ DEIS at 4.24-6 (concluding that the mine would have no measurable impacts on salmon populations, “considering the low quality and low use of coho and Chinook rearing habitat, the lack of spawning in SFK east reaches impacted, and the low level of coho spawning in NFK Tributary 1.190 [and] .. that indirect impacts associated with mine operations would occur at the individual level, and be attenuated upstream of the confluence of the NFK and SFK.”).

²⁵⁴ DEIS at 4.24-5; *cf.* Schweisberg, Adverse Impacts to Wetlands at 9 (“The losses of streams under the mine footprint also would result in an unquantified area of riparian floodplain wetland habitat that would either be lost or suffer substantial changes in hydrologic connectivity with streams because of reduced streamflow from the mine footprint.”).

²⁵⁵ See EPA, Fish Values Comments at 7-8.

²⁵⁶ DEIS at Fig. 4.24-1.

²⁵⁷ Albert, Loss of Salmon Streams and Wetlands Report at 12.

²⁵⁸ *Id.* at 1.

²⁵⁹ R. A. Hovel, *Assessment of Pebble Mine Draft EIS: Salmonid Life History Diversity and Impacts to Iliamna Lake* at 4 (May 2019) (Salmonid Life History Diversity Report).

²⁶⁰ DEIS at 3.24-24

²⁶¹ Hovel, Salmonid Life History Diversity Report at 3.

²⁶² *Id.* at 7.

²⁶³ *Id.* at 2, 13-14

salmon production,²⁶⁴ The assessment of potential losses to habitats also omits the effects of climate change in the future.²⁶⁵

The assessment of impacts to wetlands and other waters must be based on accurate and complete information.²⁶⁶ For example, the DEIS only provides a description of wetlands by general class and the percentage of that class that would be affected as compared to the total amount of wetlands, which is of little use in understanding the actual adverse impacts.²⁶⁷ The Corps should “include a description of the methodology for how the extent and type of the direct and indirect impacts to wetlands, streams, lakes, ponds and marine waters was estimated.”²⁶⁸ Additionally, the DEIS also fails to provide an accurate assessment of the hydrologic impacts due to inconsistencies in PLP’s baseline water balance analysis,²⁶⁹ discrepancies in the post-closure water balance analysis,²⁷⁰ non-integrated hydrologic modeling approach,²⁷¹ and underestimation of streamflow reduction impacts.²⁷² The FEIS must also include an assessment of the specific wetland ecological functions performed by the different types of wetlands found in the project area.²⁷³ The description of “High Quality Wetlands” is unclear, and the Corps should explain how these were defined. The DEIS should also incorporate the hydrogeomorphic mapping that was completed for wetlands for the entire mine site (and most of the rest of the project area).²⁷⁴

The FEIS should also assess the impacts to watersheds on a more site-specific basis, for example by analyzing impacts to the 12-digit HUCs. Impacts would cause significant degradations of wetlands and streams at this level. For example, 18% of the wetlands mapped by NWI in the Groundhog Mountain HUC would be unavoidably and permanently impacted, substantially above the 5% value for a 12-digit HUC cited in the guidance memo as “one method

²⁶⁴ *Id.* at 15-16.

²⁶⁵ *Id.* at 4.

²⁶⁶ Albert, Loss of Salmon Streams and Wetlands Report at 12-13 (identifying significant uncertainties in available data to evaluate the potential impact of project on loss of salmon streams, tributaries and wetlands and that the DEIS does not explain its rationale in selecting from a range of data).

²⁶⁷ Schweisberg, Adverse Impacts to Wetlands at 5.

²⁶⁸ EPA, Wetlands Comments at 5.

²⁶⁹ Wobus Comments at 4-6; *see* Prucha, Groundwater Comments at 2 (finding that assessment of water balance estimates are unreliable because methodologies used are over-simplistic, based on incorrect model inputs and assumptions).

²⁷⁰ Wobus Comments at 6-7.

²⁷¹ *Id.* at 7-8.

²⁷² *Id.* at 8-9; *see* Groundwater Comments at 28 (finding that the DEIS inaccurately describes the changes to the land surface and subsurface due to proposed mining and the resulted changes in the surface water, underestimating hydrologic impacts at downstream locations).

²⁷³ Schweisberg, Adverse Impacts to Wetlands at 4-5 (providing that the DEIS does not discuss how the actual ecological functions of the wetlands would be adversely affected by the project).

²⁷⁴ *See* EPA, Wetland Comments at 2.

to determine degradation” (USACE 2014).²⁷⁵ This HUC contains 31% of the length of headwater anadromous streams, and is one of only eight 12-digit headwater HUCs, that support the four salmon species in the Nushagak River Basin.²⁷⁶

Without an adequate analysis of the significance of the effects of the mine, the underlying assessment may be unable to support the Corp’s findings under the CWA’s public interest finding as well.²⁷⁷ The Corps should explain how the proposed mitigation would avoid significant degradation of wetlands, and it must account for any differences between the FEIS and the DEIS regarding impacts to these ecosystems.²⁷⁸

II. THE DEIS’S ANALYSIS OF MITIGATION IS INSUFFICIENT.

The DEIS must “consider appropriate mitigation measures that would reduce the environmental impact of the proposed action.”²⁷⁹ A reasonably complete discussion of mitigation is necessary for the public to properly evaluate the severity of the impacts.²⁸⁰ The 404(b)(1) Guidelines prohibit issuance of a permit “unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.”²⁸¹ Subpart H of the Guidelines provides examples of actions the Corps might take to minimize adverse effects,²⁸² which courts have viewed as the “correct factors” for the Corps to consider when making its determination.²⁸³ They include limiting the solid or liquid components of material to be discharged, using lined containment areas to reduce leaching of chemicals, and capping contaminated material in place with clean material, among other things.²⁸⁴ An adequate analysis of mitigation is necessary to support a permit conditioned on minimization of, or compensation for, unavoidable impacts.²⁸⁵

²⁷⁵ M. Gracz, *Is a Finding of Significant Degradation in a 404(b)1 Analysis of the Pebble Project Scientifically Supportable?* at 2 (May 24, 2019) (Gracz Degradation Report).

²⁷⁶ *Id.* at 6.

²⁷⁷ See *Friends of the Earth v. Hall*, 693 F. Supp. at 945-46. See also *Sierra Club v. Sigler*, 695 F.2d 957, 983 (5th Cir 1983) (find that an inadequate EIS can prevent the “careful weighing of all [relevant] factors” necessary in the “general balancing process” required by Corps regulations) (emphasis added).

²⁷⁸ Cf. *Sierra Club v. U.S. Army Corps of Eng’rs*, 614 F. Supp. 1475, 1495-96, 1517 (S.D.N.Y. 1985) (holding arbitrary the Corps’ decision to issue a landfill permit where its conclusions about impacts on a fishery differed dramatically from those in a draft EIS).

²⁷⁹ *Great Basin Res. Watch*, 844 F.3d at 1106 (quoting *Protect Our Cmtys. Found. v. Jewell*, 825 F.3d 571, 581 (9th Cir. 2016)).

²⁸⁰ *Robertson v. Methow Valley Citizens*, 490 U.S. 332, 353 (1989).

²⁸¹ 40 C.F.R. § 230.10(d).

²⁸² See *id.*

²⁸³ *Sierra Club v. U.S. Army Corps of Eng’rs*, No. Civ.-A-05-1724JAP, 2005 WL 2090028, at *17 (D.N.J. Aug. 29, 2005).

²⁸⁴ See 40 C.F.R. §§ 230.71(b), 230.72(a)(2) & (b).

²⁸⁵ See *City of Olmstead Falls, Ohio v. EPA*, 435 F.3d 632, 637-38 (6th Cir. 2006); *Ohio Valley Envtl. Coal. v. U.S. Army Corps of Eng’rs*, 674 F. Supp. 2d 783, 790 (S.D. W. Va. 2009).

Inadequacies in plans for minimization or compensation²⁸⁶ may invalidate the decision to allow discharge.²⁸⁷ If the Corps cannot determine if appropriate and practicable mitigation measures will be implemented to offset unavoidable project impacts, it should deny the permit application for causing or contributing to significant degradation of the aquatic ecosystem.²⁸⁸ An adequate analysis of mitigation also supports the public interest determination.²⁸⁹ In determining whether mitigation is reasonable and justified for a public interest determination, the Corps must consider the significance of the identifiable resource losses, the likelihood of the resource losses occurring, and the importance to the human or aquatic environment of the losses.²⁹⁰

As an initial matter, because the DEIS fails to properly characterize the nature and extent of the impacts of the direct and indirect effects of the mine, the agency is unable to determine whether mitigation is reasonable and appropriate.²⁹¹ Thus, for example, without more specific information, it is impossible to determine whether the mitigation plan will replace functional values to the point where the project does not cause or contribute to significant degradation.²⁹²

The DEIS fails to adequately assess mitigation options, and fails to describe how mitigation would be effective. First, the Corps identified no reasonable mitigation measures to protect wetlands during the DEIS process.²⁹³ Given the serious impacts to wetlands, the Corp must do more. Second, the Corp's analysis of PLP's proposed mitigation is inadequate. For example, the DEIS identifies a measure that would provide "Immediate treatment and release of excess water to mitigate flow impacts to fish habitat."²⁹⁴ But the Corps fails to explain how this measure would be accomplished. Given the significant impacts that are anticipated to fish from changes to the water hydrology,²⁹⁵ the Corps must do more to assess the adequacy of this measure. Similarly, the Corps states that "PLP would follow BMPs and industry standards required to comply with regulations, and standard permit requirements that are designed to reduce impacts to the environment."²⁹⁶ Yet the DEIS provides no discussion about the likelihood that BMPs and controls will be effective over the lifespan of the project.²⁹⁷

²⁸⁶ See *supra* pp. 32-36 (identifying deficiencies in the DEIS's discussion of minimization of wetlands impacts); *infra* pp. 39-41 (identifying issues with compensatory mitigation plan).

²⁸⁷ See *All. to Save the Mattaponi v. U.S. Army Corps of Eng'rs*, 606 F. Supp. 2d 121, 134 (D.D.C. 2009).

²⁸⁸ See 40 C.F.R. § 230.10(c).

²⁸⁹ 33 C.F.R. § 320.4(r)(1)(ii).

²⁹⁰ *Id.* § 320.4(r)(2).

²⁹¹ See EPA, Wetlands Comments at 4 (recommending that the DEIS include additional information about how the alternatives relate to potential impacts to wetland resources, because without further supporting information, it will be difficult to support avoidance and minimization analysis).

²⁹² *Cf. All. to Save the Mattaponi*, 606 F. Supp. 2d at 133.

²⁹³ DEIS at App M, Tbl. M-1.

²⁹⁴ *Id.* at 5-14

²⁹⁵ See *supra* pp. 32-36.

²⁹⁶ DEIS at 5-3.

²⁹⁷ See EPA, Fish Values Comments at 6.

A particularly flagrant example of the Corps' disregard for whether mitigation measures have any likelihood of being implemented is the fact that the DEIS lists, as a mitigation measure, the backfilling of the pit after 20 years,²⁹⁸ even though mine expansion is a reasonably foreseeable activity and backfilling is therefore highly unlikely. The DEIS also states, "At closure, the pit lake would be maintained at a level that promotes hydraulic containment of pit water during closure, protecting site groundwater."²⁹⁹ Especially in light of the significant cumulative impacts that are expected from an expanded mine, the DEIS must more adequately assess to what extent "Additional design features to capture and treat impacted water and waste streams," which the Corps acknowledges "would be necessary to manage mine site impacts," would be effective.³⁰⁰

The Corps also relies on hypothetical mitigation to be developed in the future, stating that an Aquatic Resources Monitoring Plan (ARMP) would be developed to monitor for changes to aquatic communities and would allow for an adaptive management approach to address any impacts defined.³⁰¹ Given the significant impacts to aquatic resources from the proposed mine, a proposal to develop a plan, without any discussion of how that plan will mitigate impacts, is insufficient.

The DEIS states that a final Reclamation and Closure Plan (RCP) would be developed during feasibility design work, and would document the plan for long-term closure of the site and would serve as the basis for the development of the closure cost estimate, including long-term post-closure monitoring and water treatment at the site.³⁰² The DEIS refers vaguely to aspirations for the reclamation plan: "Where feasible, mine facilities would be reclaimed in such a manner as to create new wetland areas and ponds."³⁰³ The Corps must provide more information about reclamation and closure now.³⁰⁴ "The information on reclamation and closure is necessary to support the analysis of impacts and consideration of mitigation measures in the EIS, pursuant to NEPA."³⁰⁵ Similarly, the DEIS should have included a financial surety estimate. The economic analysis suggests at least \$200M should be required to compensate for unavoidable impacts to

²⁹⁸ DEIS at 5-15.

²⁹⁹ *Id.* at 5-13.

³⁰⁰ *Id.* at 4.18-36.

³⁰¹ *Id.* at 5-9.

³⁰² *Id.* at 5-7.

³⁰³ *Id.* at 5-6.

³⁰⁴ *See, e.g.*, AECOM, Pebble Project-Final Data Gap Analysis at 3 (Nov. 19, 2018) (noting that "[a] detailed reclamation plan is potentially essential to a reasoned choice among the alternatives."); 40 C.F.R. § 1500.1(b) ("NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken.").

³⁰⁵ EPA, Wetlands Comments at 7.

wetlands, including risks of permanent loss and the temporal losses, if any but the No Action alternative were chosen.³⁰⁶

III. PLP'S COMPENSATORY MITIGATION PLAN DOES NOT SATISFY APPLICABLE REGULATORY REQUIREMENTS.

PLP has developed a conceptual Compensatory Mitigation Plan to offset unavoidable impacts to wetlands.³⁰⁷ The Corps intends to select specific compensatory mitigation measures in the record of decision based on the Final EIS.³⁰⁸ Under EPA regulations developed jointly with the Corps, “[w]hen evaluating compensatory mitigation options, the [Corps] will consider what would be environmentally preferable,” taking into account “the likelihood for ecological success and sustainability,” as well as “the location of the compensation site relative to the impact site and their significance within the watershed.”³⁰⁹ “In general, the required compensatory mitigation should be located in the same watershed as the impact site.”³¹⁰ When mitigation is weighed in the public interest determination, it must be “directly related to the impacts, appropriate to the scope and degree of those impacts, and reasonably enforceable.”³¹¹ PLP’s proposed plan is problematic for a number of reasons, and the Corps should require more-rigorous compensatory mitigation before issuing a permit.

PLP’s evaluation of compensatory mitigation options asserts that such options are “effectively non-existent in the Analysis Area.”³¹² While this conclusion applies to PLP’s assessment of watersheds at the HUC-10 scale, the CMP does not explain why PLP does not identify potential compensation options within larger watershed scales. As the 2018 Army/EPA AK Mitigation MOA explains, the use of larger watershed scales in Alaska (as compared to the lower 48) may be appropriate. Because the most commonly used watershed scale in the lower

³⁰⁶ See generally M. Gracz, *Potential Costs of Compensatory Mitigation for Lost Aquatic Resource Functions at the Site of the Pebble Deposit, Alaska* (May 24, 2019) (Gracz, Compensatory Mitigation Report).

³⁰⁷ DEIS App. M, Draft CMP; see also DEIS at 5-23 to 5-25 (disclosing that PLP has no specific actions proposed to offset its project impacts); Yocom, Compensatory Mitigation Report at 6-8 (documenting that PLP was fully aware of its need and had the capability of developing a comprehensive compensatory mitigation plan with specific actions to offset its project impacts).

³⁰⁸ DEIS at 5-2, Tbl. 5-1.

³⁰⁹ 40 C.F.R. § 230.93(a)(1); see also 33 C.F.R. § 320.4(r)(2) (“[A]ll mitigation will be directly related to the impacts of the proposal” and “appropriate to the scope and degree of those impacts.”).

³¹⁰ 40 C.F.R. § 230.93(b)(1).

³¹¹ 33 CFR § 320.4(r)(2)

³¹² DEIS App. M, Draft CMP at 26; Yocom, Compensatory Mitigation Report at 15 (“[T]he DEIS appears to be placing an overreliance on the mitigation flexibility between the Corps and EPA in order to actually offset physical losses of acreage, reasoning that there is an overabundance of habitat in Alaska.”).

48 is the HUC-8, the CMP should, at a minimum, assess potential in-kind options before moving to out of kind options.³¹³

After concluding that compensatory mitigation options are unavailable within the analysis area, the CMP concludes that it “will primarily focus on opportunities that benefit water quality and enhance or restore fish habitat through out-of-kind mitigation.”³¹⁴ These potential out-of-kind mitigation opportunities would “further enhance aquatic habitat by minimizing environmental impacts and future threats through water quality improvement projects, invasive species identification and eradication, and similar activities.”³¹⁵ The draft CMP asserts, “there are also opportunities for fish habitat restoration in the directly affected and neighboring watersheds (Upper and Lower Kenai Peninsula, Lower Susitna River, Matanuska) through culvert rehabilitation and other fish passage improvements that have the potential to benefit the greater Bristol Bay and Cook Inlet watershed areas.”³¹⁶ This language is so vague that it is impossible to determine what benefit would result to the aquatic ecosystem from its implementation.³¹⁷ It is therefore impossible to meaningfully comment on its adequacy, and the discussion cannot provide a basis for the Corps to determine that the project will not cause significant degradation and is not contrary to the public interest.³¹⁸ The Corps must describe how the scope and scale of the proposed impacts to the aquatic resources will be offset by culvert rehabilitation and fish passage improvements in other areas.

PLP’s evaluation entirely ignores the potential for the mine expansion. Although the DEIS identifies the expansion as a reasonably foreseeable activity and the draft CMP acknowledged that “[c]onsideration of development trends is a key component of a watershed approach, because areas where development is most likely to occur are also areas where compensatory mitigation will be most beneficial,”³¹⁹ the draft CMP denies the potential for expansion, asserting “preservation opportunities are limited due to the land status and

³¹³ Yocom, Compensatory Mitigation Report at 13 (“Defining the watershed scale [] 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.”); Gracz, Compensatory Mitigation Report at 1 (“Within-kind and within-watershed compensatory mitigation is practicable in the area of the Pebble Deposit.”).

³¹⁴ DEIS at App. M, Draft CMP at 26.

³¹⁵ *Id.*

³¹⁶ *Id.*

³¹⁷ Yocom, Compensatory Mitigation Report at 10 (“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.”).

³¹⁸ See U.S. Environmental Protection Agency, Comments—Pebble Project Preliminary Draft EIS, Chapter 5—Mitigation (Dec. 21, 2018) (Mitigation Comments) (noting that “The Draft CMP contains little information regarding the substance of potential compensation measures. No specific mitigation projects are proposed. As drafted, readers will not be able to provide meaningful comment on proposed compensation measures for the purposes of either NEPA or CWA 404.”).

³¹⁹ DEIS App. M, Draft CMP at 27

unjustifiable due to the lack of foreseeable development threat to existing wetlands and aquatic resources in the Analysis Area.”³²⁰ Without any support or analysis, the draft CMP also states, “the primary threats to these aquatic resources arises [sic] from impacts associated with contaminated sites and community sanitary systems.”³²¹ This statement completely disregards the threats that would occur with the mine’s expansion.³²² Rather, the primary threat to aquatic resources arises from the project itself.³²³ PLP asserts that the “watershed approach and on-site and in-kind compensatory mitigation are not practical to meet the project’s compensatory mitigation needs.” However, given the serious impacts from an expanded mine, PLP should consider, as one example of compensatory mitigation, securing preservation status in perpetuity of the surface and subsurface estate in the Upper Tularik Creek watershed, and other areas of the deposit that will not be exploited under the proposed project.³²⁴

The CMP must clearly identify the extent and magnitude of impacts that will be subject to compensatory mitigation, including the indirect, secondary, and cumulative impacts. Yet, the CMP fails to identify the “extensive and [] permanent” indirect impacts and trivializes the acreages of direct and temporary impacts.³²⁵ In addition to wetlands, the CMP must also include impacts to streams, open water, and tidal water.

Because compensatory mitigation is designed to offset lost aquatic resource functions, the CMP should also describe the type and magnitude of aquatic resource functions that will be lost or degraded, and assess whether the compensatory mitigation provides the same functions, including the lost wetland function of carbon sequestration.³²⁶ Without a functional assessment, the CMP must use a minimum one-to-one acreage or linear foot compensation ratio, and the Corps must require an even greater ratio if necessary.³²⁷ The CMP must also explain, in the absence of a functional assessment, the rationale behind any determination that the proposed compensatory mitigation would provide sufficient offset for the lost aquatic functions.³²⁸ Thus, the area that would need to be addressed by the CMP is around 12,000 acres for restoration or enhancement (to offset 5,906 acres of the mine’s direct and indirect impacts), or roughly 18,000 acres for preservation.³²⁹

³²⁰ DEIS App. M, Draft CMP at 26.

³²¹ DEIS App. M, Draft CMP at 27.

³²² *See supra* pp. 13-16; Yocom, Compensatory Mitigation Report at 15 (“[I]f 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 [] could be catastrophic.”).

³²³ *See* EPA, Mitigation Comments at 6.

³²⁴ Gracz, Compensatory Mitigation Report at 1.

³²⁵ Yocom, Compensatory Mitigation Report at 9.

³²⁶ *See generally* M. Gracz, *Estimates of the Cost of Mitigating the Carbon Sequestration Function of Wetlands at the Site of the Proposed Pebble Mine* (May 24, 2019).

³²⁷ 33 C.F.R. § 332.3(f).

³²⁸ *Id.*

³²⁹ Yocom, Compensatory Mitigation Report at 5-6.

WILDLIFE

I. MARINE MAMMALS

A. Legal Background

1. *The Marine Mammal Protection Act*

The Marine Mammal Protection Act (“MMPA”) was enacted by Congress in 1972 to prevent the extinction or depletion of marine mammal stocks as a result of man’s activities.³³⁰ “Such species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part, and consistent with this major objective, they should not be permitted to diminish below their optimum sustainable population.”³³¹

The MMPA generally prohibits the taking of marine mammals, with certain statutory exceptions.³³² “Take” is defined under the MMPA as “to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect or kill, any marine mammal.”³³³ The MMPA defines “harassment” as “any act of pursuit, torment or annoyance” that (1) has the potential to injure a marine mammal or marine mammal stock in the wild; or (2) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.”³³⁴

Those who engage in an activity other than commercial fishing within a specified region may petition the Secretary of Commerce to authorize the incidental, but not intentional, taking of small numbers of marine mammals within that region.³³⁵ Such authorization is limited to a period of not more than five consecutive years.³³⁶ The Secretary may allow the incidental taking if the Secretary finds that “the total of such taking during each five-year (or less) period concerned will have a negligible impact on such species or stock and will not have an unmitigable adverse impact on the availability of such species of stock for taking for subsistence uses.”³³⁷ If the Secretary allows the incidental taking, the Secretary also must prescribe regulations setting forth: (i) permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for subsistence uses; and (ii) requirements pertaining to the monitoring and reporting of such taking.³³⁸

³³⁰ 16 U.S.C. § 1361(1).

³³¹ *Id.* § 1361(2).

³³² *Id.* § 1371(a)(3).

³³³ 50 C.F.R. § 216.3; 16 U.S.C. § 1362(13).

³³⁴ 16 U.S.C. § 1362(18)(A).

³³⁵ *Id.* § 1371(a)(5)(A).

³³⁶ *Id.*

³³⁷ *Id.*

³³⁸ *Id.*

Thus, to receive a “small take” authorization, an activity must: (i) be limited to a “specified geographical region,” (ii) result in the incidental take of only “small numbers of marine mammals of a species or population stock,” and (iii) have no more than a “negligible impact” on species and stocks; and in issuing such authorization, the Secretary must: (iv) provide for the monitoring and reporting of such takings, and (v) prescribe methods and means of effecting the “least practicable adverse impact” on species and stock and their habitat.³³⁹

2. *The Endangered Species Act*

When Congress passed the Endangered Species Act (ESA) in 1973, it “represented the most comprehensive legislation for the preservation of endangered species ever enacted by any nation.”³⁴⁰ Congress enacted the ESA to provide “a program for the conservation of . . . endangered species and threatened species.”³⁴¹ Section 2(c) of the ESA establishes that it is “. . . the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act.”³⁴² The ESA defines “conservation” to mean “. . . the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary.”³⁴³ Similarly, Section 7(a)(1) of the ESA directs that all federal agencies “utilize their authorities in furtherance of the purposes” of the ESA.³⁴⁴

Section 7(a)(2) of the ESA requires each federal agency, in consultation with the U.S. Fish and Wildlife Service (FWS) and/or National Marine Fisheries Service (NMFS), to insure that any action authorized, funded, or carried out by the action agency is not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of the critical habitat of such species.³⁴⁵ Generally, where the listed species in question is marine or anadromous, the action agency must consult with NMFS, and for terrestrial and freshwater species, the action agency must consult with FWS. For the Pebble Mine proposal, the Corps, as the action agency, must consult with both NMFS and FWS. During the Section 7 consultation, the Corps, NMFS, and FWS must each use the best scientific data available.³⁴⁶

For the Pebble Mine proposal, the Corps was required to inquire of FWS and NMFS whether listed or proposed species may be present in the area of the proposed action.³⁴⁷ Because listed species are present in the action area, the Corps was required to prepare a “biological

³³⁹ *Id.* § 1371(a)(5)(A).

³⁴⁰ *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 179 (1978).

³⁴¹ 16 U.S.C. § 1531(b).

³⁴² *Id.* § 1531(c)(1).

³⁴³ *Id.* § 1532(3).

³⁴⁴ *Id.* § 1536(a)(1).

³⁴⁵ *Id.* § 1536(a)(2).

³⁴⁶ *Id.*

³⁴⁷ *Id.* § 1536(c)(1); 50 C.F.R. § 402.12.

assessment” (BA) to determine whether the listed species may be affected by the proposed action.³⁴⁸ If the Corps determines that the Pebble Mine proposal may affect any listed species or critical habitat, it must engage in “formal consultation” with FWS and NMFS.³⁴⁹

To complete formal consultation, FWS and NMFS must each provide the Corps with a “biological opinion” explaining how the proposed action will affect the listed species or habitat.³⁵⁰ If FWS and/or NMFS conclude in the biological opinion that the proposed action will jeopardize the continued existence of a listed species, or will result in the destruction or adverse modification of critical habitat, FWS and/or NMFS must outline “reasonable and prudent alternatives” to the proposed action that FWS and/or NMFS believe would not jeopardize listed species or result in the destruction or adverse modification of critical habitat.³⁵¹

If the biological opinion concludes that the proposed action is not likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of critical habitat, FWS and/or NMFS must provide an “incidental take statement” (“ITS”) along with the biological opinion, specifying the amount or extent of such incidental taking on the species, any “reasonable and prudent measures” that FWS and/or NMFS consider necessary or appropriate to minimize such impact, and setting forth the “terms and conditions” that must be complied with by the agency to implement those measures.³⁵² To monitor the impacts of incidental take, the Corps must report the impact of the action on the listed species to FWS and/or NMFS, as set forth in the biological opinion.³⁵³ If during the course of the action the amount or extent of incidental taking is exceeded, the agencies must reinstate consultation immediately.³⁵⁴

The biological opinion must be comprehensive and must consider the immediate and long-term impacts of all phases of the Pebble Mine proposal on listed species.³⁵⁵ Moreover, in considering the effects of the proposal on listed species, FWS and NMFS must consider the direct and indirect effects of the action, together with the effects of other activities that are interrelated or interdependent with that action, added to the environmental baseline.³⁵⁶ The environmental baseline includes the past and present impacts of all federal, state and private actions and other human activities in the action area, the anticipated impacts of all other proposed actions in the action area that have already undergone Section 7 consultation, and the impact of state and private actions that are contemporaneous with the consultation in process.³⁵⁷ Indirect impacts are those that are caused by the proposed action and later in time, and

³⁴⁸ 50 C.F.R. § 402.12.

³⁴⁹ *Id.* § 402.14.

³⁵⁰ 16 U.S.C. § 1536(b); 50 C.F.R. § 402.14.

³⁵¹ 16 U.S.C. § 1536(b)(3)(A).

³⁵² *Id.* § 1536(b)(4); 50 C.F.R. § 402.14(i).

³⁵³ 50 C.F.R. § 402.14(i)(3).

³⁵⁴ *Id.* § 401.14(i)(4); *Id.* § 402.16.

³⁵⁵ *Conner v. Burford*, 848 F.2d at 1453-54.

³⁵⁶ 50 C.F.R. § 402.02.

³⁵⁷ *Id.*

reasonably certain to occur.³⁵⁸ The biological opinion must also consider the cumulative effects of future state or private activities that are reasonably certain to occur within the action area.³⁵⁹

In considering the impacts of the Pebble Mine proposal on listed species, the Corps, NMFS, and FWS must include consideration of the best available science on climate change. As recently explained,

The best available information indicates that climate change will have a significant negative effect on the listed populations of endangered or threatened species. Climate change implications that are likely to have harmful effects on certain of the listed species include . . . warmer ocean temperatures; contracting ocean habitat; contracting island habitat; degradation of estuary habitat; . . . and large scale ecological changes.³⁶⁰

In considering climate change, the agencies must consider the additive harm that is anticipated from climate change, based on the best available scientific information, in addition to the proposed project, and how climate change will increase the chances of an event that would be catastrophic for the survival of any of the affected listed species.³⁶¹

In assessing potential jeopardy and impacts of the Pebble Mine proposal, the Corps, FWS and NMFS consider not only the impacts on the continued survival of the listed species, but also the impacts on the species' recovery. "Jeopardize the continued existence of" is specifically defined to include "both the survival and recovery" of a listed species.³⁶² And "destruction or adverse modification" is defined to consider the value of the critical habitat for the "conservation" of the species,³⁶³ which is defined as the use of all methods and procedures which are necessary to bring any listed species to the point at which the species is recovered.³⁶⁴

The reinitiation of Section 7 consultation is required and must be requested by the agencies where discretionary federal involvement or control over the action has been retained or is authorized by law, and (a) if the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that causes an effect to the listed species

³⁵⁸ *Id.*

³⁵⁹ *Id.*

³⁶⁰ *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 184 F. Supp. 3d 861, 873-74 (D. Or. 2016).

³⁶¹ *Id.* at 874.

³⁶² 50 C.F.R. § 402.02; *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 524 F.3d 917, 931 (9th Cir. 2008) (concluding that the jeopardy regulation requires the consideration of "both recovery and survival impacts").

³⁶³ *Id.*

³⁶⁴ 16 U.S.C. § 1532(3); *Nat'l Wildlife Fed'n*, 524 F.3d at 934 (holding that an adverse modification analysis that did not adequately consider recovery needs was deficient under the ESA).

or critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat designated that may be affected by the action.³⁶⁵

Section 9 of the ESA and its implementing regulations prohibit the unauthorized “take” of any endangered or threatened species of fish or wildlife.³⁶⁶ “Take” is defined broadly to include harming, harassing, trapping, capturing, wounding, or killing a protected species either directly or by degrading its habitat.³⁶⁷ Taking that is in compliance with the terms and conditions of an ITS in a biological opinion is exempt from the Section 9 take prohibition.³⁶⁸

3. *The National Environmental Policy Act*

Pursuant to NEPA, the Corps must take a hard look at the impacts of the proposed Pebble Mine on threatened and endangered species, and disclose these impacts to the public in the EIS.³⁶⁹ In evaluating the potential environmental consequences of the proposal under NEPA, the Corps must consider direct and indirect effects.³⁷⁰ The Corps must also consider the cumulative impacts of the proposed action along with all other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.³⁷¹ “To ‘consider’ cumulative effects, some quantified or detailed information is required.”³⁷² General statements about “possible” effects and “some risk” do not constitute a “hard look” under NEPA, and it is not appropriate to defer consideration of cumulative impacts to a later date.³⁷³ Additionally, the Corps must insure the scientific integrity of the discussions and analysis within the EIS.³⁷⁴

³⁶⁵ 50 C.F.R. § 402.16.

³⁶⁶ 16 U.S.C. § 1538(a)(1); *id.* § 1533(d); 50 C.F.R. § 17.31.

³⁶⁷ 16 U.S.C. § 1532(19).

³⁶⁸ 16 U.S.C. § 1536(o)(2).

³⁶⁹ 42 U.S.C. § 4332(C); 40 CFR §§1501-1508.

³⁷⁰ 40 C.F.R. §§ 1502.16; 1508.8.

³⁷¹ *Id.* §§ 1508.7, 1508.25(c).

³⁷² *Neighbors of Cuddy Mt. v. U.S. Forest Serv.*, 137 F.3d 1372, 1379 (9th Cir. 1998).

³⁷³ *Id.* at 1380.

³⁷⁴ 40 C.F.R. § 1502.24.

B. The Corps' analysis of impacts to marine mammals in the DEIS and BAs is inadequate.

The Corps acknowledges that the proposed action will likely have negative impacts on marine mammals.³⁷⁵

Activities of the proposed project that could affect the listed species include: noise from construction vessel propulsion, pile driving, and placement of fill; discharges associated with the placement of fill or trenching; collision with construction vessels; incidental spills of petroleum when fueling construction equipment and other operational spills; displacement from feeding sites; and contamination effects to prey and foraging habitat.³⁷⁶

Yet the Corps failed to adequately analyze these and other impacts to marine mammals in the DEIS or two BAs.

The Corps' analysis of impacts to marine mammals is vague and incomplete. The agency fails to address all relevant factors and impacts to marine mammal species, including the impacts of mine contamination, impacts in Bristol Bay, and impacts from a catastrophic spill, rupture, or tailings dam failure. The Corps also fails to comply with NEPA's requirements for situations lacking full information.³⁷⁷ The Corps must conduct a more thorough analysis of projected impacts to marine mammals in the DEIS and BAs, as discussed below. Furthermore, the findings within the BAs of "no effect" and "not likely to adversely affect" are unsupported, and the Corps must formally consult with both NMFS and FWS concerning the impacts of the proposed action on marine mammals that are listed as threatened or endangered.

³⁷⁵ See Owl Ridge Natural Resource Consultants, Inc., National Marine Fisheries Service Biological Assessment—Section 7 at 38 (Sept. 2018) (BA-NMFS); DEIS at 4.23-25. The Corps provided two Biological Assessments ("BAs") for the Pebble Mine proposal as appendices to the DEIS, one for threatened and endangered species under the jurisdiction of the National Marine Fisheries Service (hereinafter "BA-NMFS"), and one for threatened and endangered species under the jurisdiction of the U.S. Fish and Wildlife Service (hereinafter "BA-FWS"). Both of these BAs were prepared by "Owl Ridge Natural Resource Consultants, Inc.," and both are labeled "Draft."

³⁷⁶ BA-NMFS at 1.

³⁷⁷ 40 C.F.R. § 1502.22.

As a threshold matter, the Corps fails to adequately evaluate the possible impacts of mining-related and road-related contamination on marine mammals.³⁷⁸ In fact, the Corps completely excludes marine mammals from its analysis of mine site impacts.³⁷⁹ The fact that marine mammals do not exist within the proposed mine site itself does not mean these species will be spared from impacts flowing from the mine.³⁸⁰ The Corps must analyze how impacts from mining-related activities might travel to marine areas (*e.g.*, contamination traveling via groundwater or surface water)³⁸¹ and affect marine mammals, their prey, and their habitat.³⁸²

Additionally, the Corps neglects to discuss the impacts of contaminant bioaccumulation on marine mammals aside from situations involving accidental spills or in transport-related.³⁸³ It thus tacitly—and incorrectly—assumes that, absent a spill, fish and thus marine mammals will not be affected by contaminants at all when there are no spills.³⁸⁴

³⁷⁸ See generally DEIS at 4.23-25 to 4.23-29; C. A. Frissell, Frissell & Raven Hydrobiological and Landscape Sciences, Comments to S. McCoy, U.S. Army Corps of Engineers, Re: Failure to Address Cumulative and Long-Term Effects of Bioaccumulation and Biomagnification of Contaminants, Including Trace Metals and Hydrocarbons, in the Pebble Project DEIS (February 2019) (May 31, 2019) (Bioaccumulation Comments) (noting that the DEIS fails to address the environmental effects of bioaccumulation, biomagnification, and biotransport of several persistent pollutants); see generally Frissell & O’Neal, Road System Fugitive Dust Memo (noting that the DEIS lacks an analysis of contaminant sources, deposition rates, chemistry and the environmental consequences resulting from road system fugitive dust).

³⁷⁹ See DEIS at 3.23-1, Tbl. 3.23-1.

³⁸⁰ See Frissell, Bioaccumulation Comments at 1 (“Bioaccumulated toxins will predictably cause any such effects to extend over large areas of the region, far beyond the localized source of the pollutants.”).

³⁸¹ See DEIS at 3.17-21 (stating that “[t]he region surrounding the mine site has significant groundwater-surface water interactions”); *id.* at 4.27-104 (noting that “[t]here is potential for some fluid with elevated metals from the pyritic release to permeate shallow groundwater aquifers in losing stretches of the [South Fork Koktuli] watershed. If this were to occur, there is potential for some of this contaminated groundwater to flow into the [Upper Talarik Creek] watershed”);

³⁸² See *id.* at 3.23-57 (acknowledging that mammalian species rely on habitat indices including “water quality”); *id.* at 4.27-20 to 4.27-26 (acknowledging that “[a] 300,000-gallon spill of diesel into Lower Cook Inlet would cause high-magnitude, direct impacts to marine water quality from hydrocarbon contamination”); BA-NMFS at 23 (noting that even “[t]he accumulation of a number of small spills can lead to impaired marine waters”); BA-NMFS at 24 (discussing potential for prey contamination to lead to toxin bioaccumulation or biomagnification).

³⁸³ Frissell, Bioaccumulation Comments at 2.

³⁸⁴ *Id.*

1. *The Corps fails to address potential impacts to marine mammals in Bristol Bay in the DEIS and BAs.*

The Corps must expand the geographic scope of its marine mammal analysis within the DEIS and BAs to include Bristol Bay. As currently drafted, the DEIS myopically focuses its marine mammal analysis on “non-ESA-listed whales, porpoises, seals, and sea otters that occur in the marine waters *in Cook Inlet* surrounding the project components of Alternative 1.”³⁸⁵ As for listed species, “[t]he EIS analysis area . . . for [threatened and endangered species] includes all marine components of the project *in Cook Inlet* plus a surrounding buffer.”³⁸⁶ The DEIS thus excludes from analysis non-ESA and ESA-listed marine mammals occurring in Bristol Bay.³⁸⁷ The two BAs similarly neglect to include any consideration of potential impacts to marine mammals in Bristol Bay.

Yet the Corps describes in its discussion of surface water hydrology that “[m]ost of the mine site is hydrologically connected to Bristol Bay via the [North Fork Koktuli] and [South Fork Koktuli] rivers,” which join the Mulchatna River and, subsequently, the Nushagak River that flows into Bristol Bay.³⁸⁸ In its analysis of spill risk, the Corps further shows how contaminated wastewater will travel westward via the Nushagak watershed to Bristol Bay. While at one point acknowledging that there may be “a correlation between reduced salmonid populations and marine mammal populations in Nushagak Bay,”³⁸⁹ the Corps largely ignores the presence of marine mammals in this region, arbitrarily drawing a line of impact at some undefined Nushagak River Estuary boundary.³⁹⁰ In so doing, the agency fails to meaningfully consider impacts to the

twenty [marine mammal] species [that] occur in Bristol Bay in significant numbers and regularity . . . including “[t]hree species of baleen whale (fin, right and humpback whales) and one pinniped species (Western DPS Steller sea lion) found in Bristol Bay [that] are recognized by federal or state agencies as threatened, endangered, or listed as species of concern.”³⁹¹

³⁸⁵ DEIS at 3.23-38 (emphasis added).

³⁸⁶ *Id.* at 3.25-1 (emphasis added).

³⁸⁷ *See id.* at 4.27-3 to 4.27-4; *id.* at 4.27-17 (implying that “Cook Inlet” is the only place “where marine mammals occur”); *id.* at 4.27-48 (stating that “[i]n the analysis area, [threatened and endangered species] are only found in the marine environment of Cook Inlet”).

³⁸⁸ *Id.* at 3.16-1.

³⁸⁹ Even where the Corps acknowledges the presence of marine mammals in Bristol Bay, it dismisses potential impacts of a spill on such species’ prey by saying that “[t]he magnitude would be low, because marine mammals would have other species to feed on.” *Id.* at 4.27-125. This conclusory statement fails to appreciate the energetic costs of feeding and that prey species are not necessarily fungible for marine mammal species.

³⁹⁰ *Id.* at 4.27-3.

³⁹¹ National Oceanic and Atmospheric Administration, Biological Characterization: Bristol Bay Marine Estuarine Processes, Fish and Marine Mammal Assemblages at 8-9 (Dec. 2013) (NOAA Biological Characterization).

The Corps fails to explain why it omitted from the DEIS an analysis of the impacts of mine-related contamination on Bristol Bay's marine mammal species. The agency must discuss in more detail the ways in which pollutants unleashed during a mine-related spill or release would harm marine mammals, their prey species, and their habitat. The DEIS also must consider the pristine nature of the ecosystems in Bristol Bay Region and the catastrophic consequence of the food webs exposed to persistent mine-related contaminants.³⁹²

2. *The Corps fails to consider the effects of a large tailings dam failure on marine mammals in the DEIS or BAs.*

In addition to including Bristol Bay's marine mammals in its analysis of spill-related impacts generally, the Corps must expressly consider the potentially catastrophic impacts to marine mammals both in Bristol Bay and Cook Inlet of releases resulting from a seismic rupture or tailings dam failure. The agency's attempt to dismiss such events as unlikely and thus not worthy of consideration³⁹³ are misleading, erroneous, and unacceptable given the devastating consequences of such an event in this remote, pristine region.³⁹⁴ The Corps acknowledges that even in the event of a smaller spill during operations, "personnel ... [might] not necessarily have training to respond to such a release" and that "[i]n the event of a very large release, spill response, recovery of tailings, and remediation would be difficult."³⁹⁵ A release on the scale of a massive tailings dam failure likely would be uncontainable, and the Corps must discuss how this eventuality would impact marine mammals in the region.

Even under the truncated (*i.e.* 20-year) mining operations scenario considered by the DEIS, a tailings dam failure would be catastrophic. The 20-year capacity for the "pyritic [tailings storage facility] would [allow] stor[age of] approximately 155 million tons of pyritic tailings, 160 million tons of [potentially acid generating] waste rock, and an operating supernatant pond" in the North Fork Kaktuli and South Fork Kaktuli watersheds.³⁹⁶ In the event of a release, the pyritic supernatant would contain levels of antimony, arsenic, beryllium, cadmium, cobalt, copper, lead, manganese, mercury, molybdenum, selenium, silver, and zinc in exceedance of water quality criteria.³⁹⁷ These acids and heavy metals would "accumulate in streambed sediments, wetland soils, or isolated waterbodies" and could leach from unrecovered

³⁹² Frissell, Bioaccumulation Comments at 10-15.

³⁹³ See DEIS at 4.27-70, 4.27-75 ("Massive, catastrophic releases that were deemed extremely unlikely were ... ruled out for analysis in the EIS").

³⁹⁴ See generally C. Wobus *et al.*, *Modeling the Impacts of a Tailings Dam Failure at the Pebble Mine*, http://fishermenforbristolbay.org/wp-content/uploads/2019/03/Lynker_2019_PebbleTailingsDam.pdf (Feb. 28, 2019); DEIS at 3.15-1 (noting that "[t]he Pebble Project is in a tectonically active region of southern Alaska"); *id.* at 3.15-3, 3.15-4, 3.15-10 (noting the project sits near faults capable of producing magnitude 9.2 earthquakes as well as numerous volcanoes, and that areas of the mine site are prone to liquefaction).

³⁹⁵ DEIS at 4.27-72.

³⁹⁶ *Id.* at 2-19, 2-21, 4.27-64.

³⁹⁷ *Id.* at 4.27-64.

tailings, affecting water quality for decades.³⁹⁸ The tailings contamination hazard would not disappear when mine activities cease; rather, “the pyritic tailings would be pumped into the open pit, which would then be allowed to fill with water, so that the pyritic tailings would be permanently stored subaqueously.”³⁹⁹ As proposed, this pit will contain more contaminated water than the famed and much-maligned Berkeley Pit in Butte, Montana—a Superfund site that is visible from space and continues to host catastrophic wildlife mortality events.⁴⁰⁰ Under mine expansion, additional tailings dams would be constructed, compounding the potential for devastating ecosystem harm.

The Corps completely fails to grapple with the catastrophic consequences that would flow from a seismic rupture underneath the pit, as well as any slow and insidious damage (including bioaccumulation)⁴⁰¹ that might occur from ongoing contaminant leaching. In short, the toxic waste produced by the Pebble Mine will persist in perpetuity, with grave implications for regional wildlife and fisheries.⁴⁰² The Corps must analyze the full spatial and temporal scope of contaminant-related impacts of the Pebble Mine on affected wildlife and fisheries including marine mammals.

The Corps further must analyze how contaminant impacts may interplay with other stressors such as climate change to affect marine mammals in the region.⁴⁰³ The Corps acknowledges that “[c]limate change may have synergistic adverse effects on marine mammals, and may include ... increased bioavailability of contaminants.”⁴⁰⁴ Both climate change and contamination may also affect “density and distribution of prey species” and facilitate “habitat changes.”⁴⁰⁵ The Corps must discuss how such impacts, alone and in concert, might affect marine mammal species in both Cook Inlet and Bristol Bay. The agency also must describe possible “means of reducing, minimizing, or mitigating” such harms.⁴⁰⁶

³⁹⁸ *Id.* at 4.27-64 to 4.27-65.

³⁹⁹ *Id.* at 4.27-64.

⁴⁰⁰ See Ben Guarino, Thousands of Montana Snow Geese Die After Landing in Toxic, Acidic Mine Pit, WASH. POST (Dec. 7, 2016), <https://www.washingtonpost.com/news/morning-mix/wp/2016/12/07/montana-snow-geese-searching-for-pond-land-in-toxic-mine-pit-thousands-die/>.

⁴⁰¹ Frissell, Bioaccumulation Comments at 3 (finding that the release of even low levels of persistent contaminants over long periods of time into an ecosystem that has previously has been only minimally affected by such industrial pollutants, can result in long-term build-up of large and potentially irreversible biological effects).

⁴⁰² *Id.*

⁴⁰³ *Id.* at 15-16 (finding that climate change might have adverse effects on the pathways by which metals are mobilized and become entrained and magnified in food webs).

⁴⁰⁴ DEIS at 3.23-57 (internal citation omitted).

⁴⁰⁵ *Id.* at 3.23-57.

⁴⁰⁶ Frissell, Bioaccumulation Comments at 15.

3. *The Corps fails to adequately consider the cumulative impacts of mine expansion on marine mammals in the DEIS and BAs.*

Finally, the Corps must conduct a more meaningful analysis in both the DEIS and the BAs of the cumulative impacts of the proposed Pebble Mine project, expansion of the mine,⁴⁰⁷ and other projects that are likely to occur during the mine's entire life cycle.⁴⁰⁸ While the Corps purports to carry forward certain reasonably foreseeable future actions based on their potential impacts to marine mammals,⁴⁰⁹ the agency's "analysis" in the DEIS consists merely of a list of potential impacts stated elsewhere.⁴¹⁰ NEPA is designed to ensure that decision-makers look before they leap.⁴¹¹ In year twenty, when mining is projected to "continue ... for 58 years and mill throughput is expanded to 250,000 tons per day" and "[t]he mine pit ... expanded," the agency already will have leapt.⁴¹² Any further analysis at that time will be pro forma; environmental impacts including impacts to marine mammals will be trumped by the Pebble Partnership's irreversible and irretrievable commitment of monetary and physical resources. The Corps must conduct a more thorough and complete analysis of the impacts on marine mammals of the full scale and scope of Pebble Mine and other regional development; such analysis may not be relegated to the cursory attention given these "cumulative impacts" in the DEIS.

C. Beluga Whale

The population of Cook Inlet beluga whales (*Delphinapterus leucas*) has declined precipitously over the last 30 years. In 1979, the estimated population of Cook Inlet beluga whales was 1,300.⁴¹³ At present, scientists estimate the population consists of only 327 individuals—a 75% drop.⁴¹⁴ Despite a cessation of subsistence hunting in 2006, the population of Cook Inlet beluga whales has not rebounded. In fact, it continues to decline at an average rate of 0.5 percent per year.⁴¹⁵ In response to the precarious situation and in acknowledgement of the fact that this population lives in an area of high human activity, NMFS listed the Cook Inlet beluga whale distinct population segment (DPS) as endangered in 2008.⁴¹⁶ Designated critical habitat for the Cook Inlet beluga occurs within the DEIS's area of analysis.⁴¹⁷ The Corps' analysis of impacts to beluga whales in both the DEIS and NMFS draft BA is incomplete and its

⁴⁰⁷ As currently drafted, the DEIS only considers an operations phase of 20 years. DEIS at 2-12.

⁴⁰⁸ See *id.* at 4.1-8, Tbl. 4.1-1.

⁴⁰⁹ See *id.* at 4.23-43,

⁴¹⁰ *Id.* at 4.23-43 to 4.23-44.

⁴¹¹ 40 C.F.R. § 1500.1(b).

⁴¹² DEIS at 4.1-23.

⁴¹³ Nat'l Marine Fisheries Serv., Conservation Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*), <https://repository.library.noaa.gov/view/noaa/18275> (Oct. 2008) (Beluga Whale Conservation Plan).

⁴¹⁴ BA-NMFS at 12.

⁴¹⁵ *Id.* at 12-13. Note this is a slightly higher rate of decline than the 0.4% identified by the Corps in the DEIS at 3.25-2.

⁴¹⁶ DEIS at 3.25-2.

⁴¹⁷ *Id.* at 3.25-2; BA-NMFS at 12.

conclusion that the Pebble Mine will not adversely affect the species is arbitrary.⁴¹⁸ The agency must thoroughly discuss the issues identified below.

The Cook Inlet beluga recovery plan lists three significant threats to beluga whale recovery: catastrophic events, cumulative effects of multiple stressors, and noise.⁴¹⁹ The Corps notes in the draft NMFS BA that “[b]ecause the Cook Inlet stock is a relatively small and isolated population living in a both geologically dynamic landscape coupled with offshore oil and gas activity, its vulnerability to these threats is compounded.”⁴²⁰ The Pebble Mine stands to exacerbate all three of these primary threats.

Catastrophic events include, but are not limited to, major spills, climate change, and failure of key salmon runs.⁴²¹ As mentioned above, the Corps must discuss in more depth the degree to which the Pebble Mine might lead to increased pollutant exposure via groundwater-surface water connections, trophic transfer and bioaccumulation/biomagnification, spills, dam failure, and seismic rupture.⁴²² Scientists have posited that exposure to polycyclic aromatic hydrocarbons (PAHs) in particular—compounds carcinogenic to belugas and found in fossil fuel compounds like diesel—might be hindering the Cook Inlet population’s recovery.⁴²³ Beluga whales accumulate high concentrations of lipophilic contaminants like PAHs because they are long-lived, have a high body lipid content, and sit at the top of the food chain.⁴²⁴ Beluga whales may be exposed to such compounds through ingestion of contaminated prey, inhalation, or absorption. The agency must discuss in detail what additional contaminants Cook Inlet belugas might be exposed to as a result of the Pebble Mine, both as the result of routine and catastrophic events, and how those contaminant exposures might affect this endangered whale population and its prey species.

Cumulative impacts from multiple stressors can threaten Cook Inlet belugas at both the individual and population level.⁴²⁵ NMFS has acknowledged the importance of cumulative stressors to Cook Inlet beluga whales; it even proposed issuing a programmatic environmental

⁴¹⁸ See DEIS at 4.25-4 to 4.25-9; BA-NMFS at 33-34.

⁴¹⁹ Nat’l Marine Fisheries Serv., Recovery Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*) at xiii, <https://repository.library.noaa.gov/view/noaa/15979> (Dec. 2016) (Beluga Whale Recovery Plan); BA-NMFS at 13.

⁴²⁰ BA-NMFS at 13.

⁴²¹ *Id.* at 13.

⁴²² *Id.*

⁴²³ J. Reynolds & D. Wetzel, *Polycyclic Aromatic Hydrocarbon (PAH) Contamination in Cook Inlet Belugas*, http://52.20.14.83/sites/default/files/8_cib_contamination_reynolds.pdf.

⁴²⁴ D. Martineau, Contaminants and Health of Beluga Whales of the Saint Lawrence Estuary, Ch. 17 at 139-41, in L. Norrgren & J. M. Levenson (eds.), *ECOSYSTEM HEALTH AND SUSTAINABLE AGRICULTURE 2* (2012); P. H. Albers & T. R. Loughlin, Effects of PAHs on Marine Birds, Mammals and Reptiles, Ch. 13 at 249, in P.E.T. Douben (ed.), *PAHs: AN ECOTOXICOLOGICAL PERSPECTIVE* (2003); P. Albers, Petroleum and Individual Polycyclic Aromatic Hydrocarbons, Ch. 14 at 257, in D. J. Hoffman *et al.* (eds.), *HANDBOOK OF ECOTOXICOLOGY* (2d ed. 2002).

⁴²⁵ BA-NMFS at 13.

impact statement to analyze the synergistic effects of myriad anthropogenic activities on the population, expressing “concern” about the “lack of recovery” of the whales.⁴²⁶ NMFS also has admitted that “[i]t is not known what specific factor or combination of factors continue to limit [the Cook Inlet beluga] population’s growth.”⁴²⁷

The Pebble Mine will subject this imperiled beluga whale population to additional stressors, including contamination and increased levels of underwater noise. As the Corps recognizes, such noise may lead to a suite of adverse impacts to belugas including “tolerance, masking of natural sounds, behavioral disturbance, temporary or permanent hearing impairment, or non-auditory physical effects.”⁴²⁸ The Corps also states that additional noise from the Pebble Project—in particular noise from tugboats, pile driving, aircraft operations, and causeway construction—may reduce the belugas’ “communication space.”⁴²⁹ Vessel impacts are of particular concern given the overall acoustic environment of Cook Inlet, and pile driving noise may exceed injury thresholds.⁴³⁰

The Corps acknowledges in its Acoustic Analysis that “[p]er the ESA and the MMPA, applicants are required to evaluate the number of marine mammals potentially exposed to sound levels exceeding the thresholds from Table K4.25-2.”⁴³¹ The agency then fails to require exactly that, stating that “[o]nce project specific details are finalized, details such as pile type and size, size of hammer and number of strikes per pile to install, number of piles per day, and duration of the pile strike will be used to calculate the appropriate number of potential marine mammal exposures.”⁴³² The agency also fails to indicate how many marine mammals potentially will be exposed to the other noise sources identified in Table K4.25-2 (*e.g.*, general vessel operations, general aircraft operations). The agency must rectify this omission and draft a robust analysis of acoustic impacts on beluga whales, providing numbers on which the public can comment. This is particularly important as this information contributes to mitigation and monitoring zone establishment.⁴³³ It is also crucial in light of the Marine Mammal Commission’s strong stance that NMFS “defer issuance” of any “take authorizations until it has better information on the cause or causes of the ongoing decline and has a reasonable basis for determining that authorizing additional takes by harassment would not contribute to or exacerbate that decline.”⁴³⁴

⁴²⁶ 79 Fed. Reg. 61616, 61617 (Oct. 14, 2014).

⁴²⁷ Beluga Whale Conservation Plan at 2; Beluga Whale Recovery Plan at 82 (noting that “little is known about the mechanisms impeding recovery” of the beluga).

⁴²⁸ DEIS at 4.23-26. *See also* BA-NMFS at 18-21 (listing effects of anthropogenic noise on marine mammals).

⁴²⁹ BA-NMFS at 13; DEIS at K4.25-2 to 4.25-3.

⁴³⁰ DEIS at 4.23-26; *id.* at K4.25-3.

⁴³¹ *Id.* at K4.25-4.

⁴³² *Id.* at K4.25-5.

⁴³³ *Id.*

⁴³⁴ R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re: Seismic Surveys in Cook Inlet (Sept. 4, 2014); *see also* R. Lent, Marine Mammal Commission, Comment Letter to P. M. Payne, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Apache

This admonition extends to vessel collision risk as “any mortality for these extremely small populations poses a population-level risk.”⁴³⁵

The Corps must discuss in more detail how impacts from the Pebble Mine will interface with climate change to result in habitat loss or alteration for Cook Inlet beluga whales. As a non-migratory population that occupies a small, constricted range, Cook Inlet beluga whales may be

Alaska Corp. Seismic Survey (Oct. 21, 2011); R. Lent, Marine Mammal Commission, Comment Letter to P. M. Payne, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Apache Alaska Corp. Seismic Survey (Jan. 9, 2013); R. Lent, Marine Mammal Commission, Comment Letter to P. M. Payne, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Apache Alaska Corp. Seismic Survey (Jan. 31, 2014); R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Supervisor, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Furie Operating Alaska LLC Seismic Survey (Apr. 4, 2014); R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Supervisor, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Buccaneer Alaska Operation, LLC Seismic Survey (May 9, 2014); R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. SAExploration Inc. Seismic Survey (April 20, 2015); R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Annual Incidental Take Authorizations (Sept. 11, 2015); R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. ExxonMobil Alaska LNG LLC Seismic Survey (Mar. 7, 2016); R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. BlueCrest Alaska Operating, LLC (July 13, 2016); R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Annual Incidental Take Authorizations EIS (Oct. 5, 2017). Those letters are hereby incorporated by reference.

⁴³⁵ BA-NMFS at 23.

particularly vulnerable to climate-induced habitat alteration⁴³⁶ and reduction of their prey base.⁴³⁷ This population of belugas relies largely on Pacific salmon (*Oncorhynchus* spp.) runs in Cook Inlet, yet these runs are threatened by increasing water temperatures both in marine waters of Alaska and freshwater spawning habitat.⁴³⁸ Water temperature is known to have a strong effect on the abundance and health of anadromous fish populations, with warmer than usual temperatures associated with increases in disease, depressed oxygen levels, reduced growth and reduced survival.⁴³⁹ While the full impact of warming waters on beluga whales is difficult to predict, these changes appear overwhelmingly negative, and the MMPA requires the agency to take a precautionary approach to consideration of additional stressors, including the Pebble Mine, on this beluga population.

D. Humpback Whale

The humpback whale (*Megaptera novaeangliae*) occurs in the analysis area during the summer and fall.⁴⁴⁰ These whales come from three distinct population segments (DPSs) found in U.S. waters: the endangered Western North Pacific DPS, the recently delisted (but declining) Hawai'i DPS, and the threatened Mexico DPS.⁴⁴¹ Humpback whales inhabit both Cook Inlet and Bristol Bay, and the Corps must rectify its failure to analyze in the DEIS and BAs potential Pebble Mine-related impacts to these whales in both marine regions.

NMFS has identified multiple threats to humpback whales that may be exacerbated by the Pebble Mine, including entanglement, ship strike, acoustical disturbance, physical structures,

⁴³⁶ In addition to the impacts on prey base, increased siltation in Cook Inlet as a result of faster glacier melt and runoff has the potential to result directly in habitat loss or alteration for Cook Inlet beluga whales. University of Alaska, Fairbanks, Center for Global Climate Change and Arctic System Research, *The Potential Consequences of Climate Variability and Change—Alaska* (Dec. 1999), <http://www.besis.uaf.edu/regional-report/regional-report.html>.

⁴³⁷ Increasing ocean acidification is also likely to impact coastal Alaskan fish populations and ultimately the marine mammals that depend on them, including Cook Inlet beluga whales. Ocean acidification is occurring more rapidly in the coastal and pelagic waters of Alaska than in tropical climates, and is likely to result in a decrease in abundance of pteropods and other shelled planktonic species, which are unable to grow as rapidly in acidic waters. V.J. Fabry *et al.*, *Impacts of Ocean Acidification on Marine Fauna and Ecosystems Processes*, ICES J. MAR. SCI. 65: 414-432 (2008). These species represent an important food source for pink salmon and other species; given the short life cycle of salmon, prey quality and availability during the juvenile stage strongly affect salmon biomass and abundance. K.Y. Aydin *et al.*, *Linking Oceanic Food Webs to Coastal Production and Growth Rates to Pacific Salmon (*Oncorhynchus* spp.), Using Models on Three Scales*, DEEP SEA RES. II 52: 757-780 (2005). Studies estimate that a 10% reduction in pteropods could result in a 20% decrease in the weight of adult salmon.

⁴³⁸ See generally R. E. Kyle and T. P. Brabets, *Water Temperature of Streams in the Cook Inlet Basin, Alaska, and Implications of Climate Change* (2001).

⁴³⁹ See, e.g., *id.*

⁴⁴⁰ DEIS at 3.25-5.

⁴⁴¹ *Id.*; BA-NMFS at 7.

industrial activities and byproducts, dredging and disposal, and mining runoff.⁴⁴² The DEIS and BAs must discuss and quantify⁴⁴³ these threats in more detail, especially given the “lethal consequences” of entanglements, the vulnerability of humpback whales to ship strikes, and the many negative consequences of anthropogenic noise on this species.⁴⁴⁴ For example, projected pile driving noise associated with the Pebble Mine may exceed the injury threshold for humpback whales; such noise is believed to have displaced humpbacks around the island of O‘ahu in Hawai‘i.⁴⁴⁵ While, as a result of these activities, “the actual physical loss of habitat may be small in comparison to the total habitat available, secondary effects associated with the initial habitat modification may have negative consequences on the distribution and reproductive success of humpback whales.”⁴⁴⁶

As NMFS has noted, humpback whale habitats may become unsuitable “by insignificant stages, each too small to command notice or action,” and cautions that “[e]valuation . . . should . . . take into consideration the possibility of cumulative or synergistic interactions between

⁴⁴² See Nat’l Marine Fisheries Serv., Final Recovery Plan for the Humpback Whale, *Megaptera novaeangliae* at 40 (Nov. 1991), <https://repository.library.noaa.gov/view/noaa/15993> (Humpback Whale Recovery Plan); see also BA- NMFS at 9-10.

⁴⁴³ The Corps must quantify expected acoustic impacts to humpback whales. While acknowledging that “[p]er the ESA and the MMPA, applicants are required to evaluate the number of marine mammals potentially exposed to sound levels exceeding the thresholds from Table K4.25-2,” the agency fails to require exactly that, stating that “[o]nce project specific details are finalized, details such as pile type and size, size of hammer and number of strikes per pile to install, number of piles per day, and duration of the pile strike will be used to calculate the appropriate number of potential marine mammal exposures.” DEIS at K4.25-4 to K4.25-5. The agency also omits discussion of the number of marine mammals potentially exposed to the other sources identified in Table K4.25-2 (e.g., general vessel operations, general aircraft operations). The agency must rectify this omission and draft a robust analysis of acoustic impacts on humpback whales, providing numbers on which the public can comment. This is particularly important as this information contributes to mitigation and monitoring zone establishment. See DEIS at K4.25-5.

⁴⁴⁴ BA-NMFS at 9-10, 23; Humpback Whale Recovery Plan at 25-27. Noise effects associated with the Pebble Project may come from, *inter alia*, vessel operations, aircraft overflights, causeway construction, and pile driving. See DEIS at K4.25-2 to 4.25-3. The Corps stated in the NMFS BA that, for humpback whales, “anthropogenic noise can result in social disturbance, physical discomfort, and masking of intraspecific . . . communication” and that noise has caused humpbacks to leave or avoid the impacted area. BA-NMFS at 10. See also Humpback Whale Recovery Plan at 27 (stating that “[o]bserved responses to vessels included attempts to move away, changes in patterns of breathing and diving and occasional displays of possibly agonistic behavior,” as well as “horizontal avoidance[,]’ . . . ‘vertical avoidance[,]’ . . . trumpeting[,] . . . breaching, lobtailing, or flipper slapping” and that “the extra energetic costs incurred by whales responding in these ways is not known”) (internal citations omitted). See also BA-NMFS at 18-21 (listing effects of anthropogenic noise on marine mammals); DEIS at 4.23-26 (same).

⁴⁴⁵ DEIS at 4.23-26; *Id.* at K4.25-3; Humpback Whale Recovery Plan at 31.

⁴⁴⁶ Humpback Whale Recovery Plan at 31.

various factors.”⁴⁴⁷ Thus the cumulative impacts of Pebble Mine-related stressors to which the humpbacks will be exposed, as well as additional stressors such as climate change, must better be assessed and discussed by the Corps. For example, “[c]limate change may have synergistic adverse effects on marine mammals, and may include ... increased ocean noise levels”⁴⁴⁸

In addition, and as noted above, the Corps must conduct an analysis on the impacts of mining-related contaminants on humpback whales. As NMFS has noted, “[i]ntroduction and/or persistence of ... pollution from ... mineral exploration and production” can harm humpback whales.⁴⁴⁹ NMFS has stated that “[c]ontaminants such as pesticides, PCB’s, hydrocarbons (e.g. crude oil), heavy metals and others, could affect [the whales’] survival.”⁴⁵⁰ This concern is not just theoretical. Recent evidence shows high levels of heavy metals in humpback whales off the coast of Maine, suggesting that whales are assimilating and bioaccumulating these toxins.⁴⁵¹

The Corps also must better describe potential impacts of the Pebble Mine on humpback whale prey species and habitat. “Local depletion of food resources [including euphausiids and other crustaceans, herring, capelin, sand lance, and anchovies] may occur as a result of displacement and mortality of food species,” which may result from mine-related activities and contamination impacts.⁴⁵² The Corps may not simply point to existing water quality standards and suggest that compliance will adequately protect the whales. As NMFS noted in the Humpback Whale Recovery Plan, “[b]etter compliance with existing environmental laws is ... needed to reduce potential impacts on habitat quality.”⁴⁵³ The Corps must discuss the history of mining industry compliance with water quality law and fully describe all possible contamination-related impacts—from routine operations to catastrophic spills—on humpback whales in Cook Inlet and Bristol Bay.

E. Fin Whale

Little is known about the use of the analysis area by fin whales (*Balaenoptera physalus*), as abundance surveys for this species have not been done in Cook Inlet.⁴⁵⁴ The species’ exhibits “complex” migratory behavior in the eastern North Pacific, utilizing areas in both Cook Inlet and

⁴⁴⁷ *Id.* at 40; *id.* at 30 (discussing cumulative impacts of pollution with other stressors including industrial development).

⁴⁴⁸ DEIS at 3.23-57 (internal citation omitted).

⁴⁴⁹ Humpback Whale Recovery Plan at 25.

⁴⁵⁰ *Id.* at 41. *See also id.* at 28, 41 (noting that exposure to such pollutants may “affect individual reproductive success, alter survival, and/or limit availability of needed habitat” and that pollution is believed to be a factor “contributing to the changing distribution of [humpback] whales around Maui.”).

⁴⁵¹ *See J. P. Wise Jr. et al., Metal Levels in Whales from the Gulf of Maine: A One Environmental Health Approach*, 216 CHEMOSPHERE 653 (Feb. 2019).

⁴⁵² Humpback Whale Recovery Plan at 30.

⁴⁵³ *Id.* at 40.

⁴⁵⁴ DEIS at 3.25-6.

Bristol Bay.⁴⁵⁵ In the DEIS, the Corps uses this lack of information to dismiss the potential significance of the area to the whale, stating that “[f]in whales are rare in Cook Inlet, and they are not expected to be encountered in the analysis area due to the relatively shallow water depths, compared to their preference for deeper waters.”⁴⁵⁶ In the BA, however, the Corps found that the Pebble Mine is likely to adversely affect the fin whale.⁴⁵⁷

Specifically, the Corps found that the noise disturbance (including low-frequency sound) associated with the proposed Pebble Mine project (from, *inter alia*, vessel operations, aircraft overflights, causeway construction, and pile driving) is likely to adversely affect fin whales.⁴⁵⁸ Increasing anthropogenic noise was listed as a current threat to fin whale recovery in the species’ recovery plan.⁴⁵⁹ Such noises may lead to a suite of adverse impacts to fin whales including “tolerance, masking of natural sounds, behavioral disturbance, temporary or permanent hearing impairment, or non-auditory physical effects.”⁴⁶⁰ According to NMFS,

[t]he potential effects of continuous or impulse noise sources on fin whales are of particular concern. Intense sound transmissions in the marine environment (*i.e.*, explosives) may impact whales by causing damage to body tissue or gross damage to ears, causing a permanent threshold shift (PTS) or a temporary threshold shift (TTS) if the animal is in close range of a sound source or exposed for a long duration.”⁴⁶¹

Vessel impacts also are of concern given the overall acoustic environment of Cook Inlet.⁴⁶²

The Corps acknowledges in its Acoustic Analysis that “[p]er the ESA and the MMPA, applicants are required to evaluate the number of marine mammals potentially exposed to sound levels exceeding the thresholds from Table K4.25-2.”⁴⁶³ The agency then fails to require exactly that, stating that “[o]nce project specific details are finalized, details such as pile type and size, size of hammer and number of strikes per pile to install, number of piles per day, and duration of the pile strike will be used to calculate the appropriate number of potential marine mammal exposures.”⁴⁶⁴ The agency also omits any discussion of the number of marine mammals

⁴⁵⁵ Nat’l Marine Fisheries Serv., Final Recovery Plan for the Fin Whale (*Balaenoptera physalus*) at I-12, <https://repository.library.noaa.gov/view/noaa/4952> (July 2010) (Fin Whale Recovery Plan); DEIS at 3.25-6; NOAA Biological Characterization at 8-9.

⁴⁵⁶ DEIS at 3.25-6.

⁴⁵⁷ BA-NMFS at 38, Tbl. 4.

⁴⁵⁸ *Id.*; *id.* at 12; DEIS at K4.25-2 to 4.25-3.

⁴⁵⁹ Fin Whale Recovery Plan at v, I-1.

⁴⁶⁰ DEIS at 4.23-26. *See also* BA-NMFS at 18-21 (listing effects of anthropogenic noise on marine mammals); Fin Whale Recovery Plan at I-19 to I-25 (discussing sound impacts).

⁴⁶¹ Fin Whale Recovery Plan at I-20.

⁴⁶² DEIS at K4.25-3.

⁴⁶³ *Id.* at K4.25-4.

⁴⁶⁴ *Id.* at K4.25-5.

potentially exposed to the other noise sources identified in Table K4.25-2 (e.g., general vessel operations, general aircraft operations). The agency must rectify these omission and draft a robust analysis of acoustic impacts on fin whales, providing numbers on which the public can comment. This is particularly important as this information contributes to mitigation and monitoring zone establishment.⁴⁶⁵

In addition to noise, ship strikes and climate change were identified as important threats to fin whale recovery.⁴⁶⁶ Fin whales are the most common vessel-killed whale species,⁴⁶⁷ and “[c]ollisions with vessels is considered a high threat.”⁴⁶⁸ The Corps should conduct a more thorough analysis of the types of vessels that will be used by the Pebble Project and the risks they pose to fin whales.⁴⁶⁹

As the Corps points out, threats may act synergistically and cumulatively to impede recovery of this endangered species. For example, climate change may lead to reductions and/or range redistributions in fin whale prey species including euphausiids, large copepods, and schooling fish—species that may also be affected by pollution from the Pebble Mine.⁴⁷⁰ Arctic and sub-arctic ecosystems already are experiencing profound effects from climate change, and “[t]he potential impacts of climate and oceanographic change on fin whales will likely affect habitat availability and food availability.”⁴⁷¹ Climate change may further affect fin whales by “increase[ing] ocean noise levels.”⁴⁷² The agency thus must engage in a more thorough cumulative impact discussion.

Finally, and as discussed above, the Corps must conduct a more robust analysis of potential contamination impacts on fin whales and their prey across Cook Inlet and Bristol Bay. Contaminants from mining-related activities may negatively affect fin whales, and NMFS has identified “long-term and transgenerational effects of various contaminants” on fin whales as a research priority.⁴⁷³

⁴⁶⁵ *Id.* at K4.25-5.

⁴⁶⁶ Fin Whale Recovery Plan at I-26; BA-NMFS at 11.

⁴⁶⁷ BA-NMFS at 21.

⁴⁶⁸ Fin Whale Recovery Plan at I-1. *See also id.* at I-26 (discussing ship strikes).

⁴⁶⁹ *See, e.g.,* BA-NMFS at 22 (noting that many, but presumably not all, “tugboats used in the towing operations will have their propellers recessed into the vessel hull to prevent bottom-strike in shallow waters and inside protective nozzles”).

⁴⁷⁰ Fin Whale Recovery Plan at v, I-1, I-13, I-35. *See also id.* at I-1 (stating that size and distribution of fin whale populations may be strongly affected by downward trends in fish populations from “human-caused environmental deterioration”).

⁴⁷¹ Fin Whale Recovery Plan at I-35.

⁴⁷² DEIS 3.23-57 (internal citation omitted).

⁴⁷³ Fin Whale Recovery Plan at IV-14.

F. Steller Sea Lion

The Steller sea lion (*Eumetopias jubatus*) was listed as a threatened species by NMFS in 1990, with critical habitat designated in 1993.⁴⁷⁴ New information resulted in a western DPS of Steller sea lion being designated in 1997, and this DPS was reclassified as endangered due to persistent decline.⁴⁷⁵ NMFS issued a revised Recovery Plan for the Steller sea lion in 2008.

According to the BA, although there is no designated critical habitat for the Steller sea lion within the action area, the area falls within the range of the endangered Western DPS for the sea lion.⁴⁷⁶ “Steller sea lions breed on the Barren Islands at the mouth of Cook Inlet and can be found feeding throughout the lower inlet and have been observed as far north as the Port of Anchorage, Alaska.”⁴⁷⁷ Moreover, “[s]ome Steller sea lions use areas around Amakdedori port, particularly near the mouth of Kamishak Bay.”⁴⁷⁸

The potential impacts of the proposed action on endangered Steller sea lions includes disturbance from the construction of the Amakdedori Port.⁴⁷⁹ As stated in the BA, “while several mitigation measures will be in place to limit noise impacts, sea lions could still be exposed to harassing levels of underwater noise during construction activities (e.g., pile driving) construed as take.”⁴⁸⁰ Similarly, the Corps recognizes in the DEIS that Steller sea lions near Amakdedori port “could be disturbed by project activities,” with additional potential impacts from “project vessels,” and that the duration of these impacts is expected to be “long term, lasting for the life of the project.”⁴⁸¹

Importantly, NMFS acknowledged in the 2008 Recovery Plan that the “possible impacts of various types of disturbance on Steller sea lions have not been well studied.”⁴⁸² “[T]here is insufficient information about the potential sub-lethal effects of repeated disturbance on the health, reproduction and survival of Steller sea lions, especially females and pups,” and “insufficient information about seasonal and environmental factors that might modulate physiological and behavioral reaction to disturbance and the resulting biological significance of any effects.”⁴⁸³ In considering these potential impacts, including but not limited to the impacts

⁴⁷⁴ See generally 55 Fed. Reg. 12,645 (Apr. 5, 1990); 58 Fed. Reg. 45,269 (Aug. 27, 1993).

⁴⁷⁵ 62 Fed. Reg. 24,345 (May 5, 1997).

⁴⁷⁶ BA-NMFS at 17.

⁴⁷⁷ *Id.* at 7.

⁴⁷⁸ DEIS at 4.25-14 to 4.25-15.

⁴⁷⁹ BA-NMFS at 18.

⁴⁸⁰ *Id.* at 34.

⁴⁸¹ DEIS at 4.25-15.

⁴⁸² Nat’l Marine Fisheries Serv., Final 2008 Revised Recovery Plan for Steller Sea Lions at III-22, <https://repository.library.noaa.gov/view/noaa/15974> (Mar. 2008) (Steller Sea Lion Recovery Plan).

⁴⁸³ *Id.* at III-23.

of ocean noise and other construction- and vessel-related traffic, the benefit of the doubt must be given to protecting the endangered sea lions.⁴⁸⁴

The 2008 Recovery Plan also emphasizes the importance of considering climate change impacts along with the potential impacts of the proposed action on the Steller sea lion. While our understanding of the impacts of climate change has continued to strengthen and evolve since 2008, NMFS was correct to recognize that increases in temperatures will “have profound impacts on arctic and sub-arctic ecosystems.”⁴⁸⁵

Specifically, (1) winter temperatures in Alaska and western Canada have increased as much as 3-4 C over the past half century, (2) precipitation, mostly in the form of rain, has increased primarily in winter resulting in faster snowmelt, (3) sea ice extent has decreased about 8% over the past 30 years, with a loss of 15 to 20% of the late-summer ice coverage in the arctic, and (4) glacial retreat, particularly in Alaska, has accelerated contributing to sea level rise (ACIA 2004). These impacts, and others, are projected to accelerate during this century.⁴⁸⁶

While the magnitude and extent of the impacts of climate change on Steller sea lions is uncertain,⁴⁸⁷ the Corps and NMFS must both consider the best available scientific information as it considers this proposal,⁴⁸⁸ and continue to give the benefit of the doubt to protecting the sea lion.⁴⁸⁹

The Corps and NMFS must also continue to assess in greater detail the potential impacts of all other proposed activities that comprise the proposed action on the Steller sea lion and its habitat, including pipeline construction, vessel traffic and strikes, impacts to the sea lion’s prey, impacts on water quality, the risk and potential for spills and accidental discharges, and indirect and cumulative impacts. In doing so, the Corps and NMFS must again consider the best available science, and the potential impacts on both the survival and recovery needs of the species.⁴⁹⁰

G. Northern Sea Otter

The southwest Alaska sea otter (*Enhydra lutris kenyoni*) was once the most abundant population of sea otters. Now, it has nearly vanished from its range. This otter population has

⁴⁸⁴ *Conner*, 848 F.2d at 1454; *see also Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 174 (1978) (“Congress intended endangered species to be afforded the highest of priorities.”).

⁴⁸⁵ Steller Sea Lion Recovery Plan at III-31.

⁴⁸⁶ *Id.*

⁴⁸⁷ *Id.* at III-32.

⁴⁸⁸ 16 U.S.C. § 1536(a)(2).

⁴⁸⁹ *Conner*, 848 F.2d at 1454.

⁴⁹⁰ 16 U.S.C. § 1536(a)(2).

declined more than 50% since the 1980s.⁴⁹¹ As a result, the Service listed the southwest Alaska DPS—which “stretches from the western shoreline of lower Cook Inlet to the western end of the Aleutian Islands”—as threatened in 2005.⁴⁹² FWS designated the entire range of this DPS as critical habitat in 2009, and a Recovery Plan was finalized in 2013.⁴⁹³

The Recovery Plan identifies five “management units” within the DPS: (1) Western Aleutian Islands; (2) Eastern Aleutian Islands; (3) South Alaska Peninsula; (4) Bristol Bay; and (5) Kodiak, Kamishak, Alaska Peninsula.⁴⁹⁴ Since listing, there has been no evidence of recovery.⁴⁹⁵ Critical habitat Management Unit 5, Kamishak Bay, overlaps with the analysis area.⁴⁹⁶ This unit includes the entire nearshore marine environment, ranging from the mean high tide line to the 66-foot depth contour, as well as waters occurring within 328 feet of the mean high tide line.⁴⁹⁷ This unit contains all four of the “primary constituent elements” (“PCEs”) that are essential to the conservation of the species.⁴⁹⁸ Northern sea otters reside year-round throughout lower Cook Inlet.⁴⁹⁹ “Sea otters forage in nearshore waters at depths of up to 131 feet in the nearshore benthos of rocky and soft-sediment communities (Marshall 2014), which includes all of Kamishak Bay and Amakdedori Port.”⁵⁰⁰

For the proposed action, northern sea otters “have the potential to be affected by underwater noise associated with construction activities at the Amakdedori Port and natural gas pipeline, with vessel operations at the port and at lightering locations, and from project aircraft using the airstrip near the port site.”⁵⁰¹ High intensity noise can contribute to a range of damaging impacts on wildlife including hearing impairment; physiological changes like stress; behavioral impacts such as avoidance or displacement from important habitats; and masking that

⁴⁹¹ Owl Ridge Natural Resource Consultants, Inc., U.S. Fish & Wildlife Serv. Biological Assessment—Section 7 at 7 (Dec. 2018); *see also* U.S. Fish & Wildlife Serv., Southwest Alaska Distinct Population Segment of the Northern Sea Otter (*Enhydra lutris kenyoni*) Recovery Plan at iii (Aug. 2, 2013) (Northern Sea Otter Recovery Plan); J. A. Estes *et al.*, *Continuing Sea Otter Population Declines in the Aleutian Archipelago*, 21 MARINE MAMMAL SCI. 169, 169 (2005).

⁴⁹² BA-FWS at 7.

⁴⁹³ *Id.*

⁴⁹⁴ Northern Sea Otter Recovery Plan at iii.

⁴⁹⁵ U.S. Fish and Wildlife Serv., *Southwest Alaska DPS of the Northern Sea Otter (Enhydra lutris kenyoni) 5-Year Review: Summary and Evaluation* at 14 (Aug. 2013).

⁴⁹⁶ DEIS at 3.25-8. As discussed elsewhere in these comments, the Corps arbitrarily failed to analyze potential impacts to marine mammals, including the sea otter, in Bristol Bay.

⁴⁹⁷ *Id.*

⁴⁹⁸ *Id.*

⁴⁹⁹ *Id.*

⁵⁰⁰ *Id.*

⁵⁰¹ *Id.* at 4.25-16.

impairs their ability to communicate, find prey, or detect predators.⁵⁰² Sea otters are affected by masking, and they have difficulty distinguishing signals from background noise.⁵⁰³ Sea otters' auditory profile is similar to sea lions,⁵⁰⁴ which have been found to have fatigue when exposed to longer duration noise and require longer periods of recovery than 24 hours.⁵⁰⁵ Sea otters are extremely vulnerable to disturbance from noise, and interruption of foraging or displacement from feeding areas can have adverse impacts on this species—as well as their prey species.⁵⁰⁶ Sea otters need to spend ample time foraging because of their high metabolic rates, and they also need periods of undisturbed rest.⁵⁰⁷ Increasing energetic costs to sea otters can be especially problematic for reproductive females.⁵⁰⁸

In the BA, the Corps more specifically recognizes that pile driving and fill placement can harass sea otters, that the sea otters in Kamishak Bay have had little exposure to vessels and therefore may react strongly to their presence and might be displaced from feeding or resting areas, and that over 10 acres of critical habitat would be permanently buried during the earthen causeway and wharf construction, which would be a loss of potential foraging and escape habitat.⁵⁰⁹ The Corps then arbitrarily concludes, however, that the proposed action is “not likely to adversely affect” the northern sea otter.⁵¹⁰

FWS explained in the 2013 Recovery Plan that northern sea otters appear to be “highly vulnerable” to disturbance by vessels because they are slow swimmers and spend much of their

⁵⁰² See J. A. Hildebrand, *Impacts of Anthropogenic Sound on Cetaceans*, in *Marine Mammal Research: Conservation Beyond Crisis*, in MARINE MAMMAL RES.: CONSERVATION BEYOND CRISIS 101, 102 (J.E. Reynolds III *et al.*, eds. 2005). See generally L. S. Weilgart, *The Impacts of Anthropogenic Ocean Noise on Cetaceans and Implications for Management*, 85 CANADIAN J. ZOOLOGY 1091 (2007); National Research Council, OCEAN NOISE AND MARINE MAMMALS (2003).

⁵⁰³ See generally A. Ghoul & C. Reichmuth, *Hearing in the Sea Otter (Enhydra lutris): Auditory Profiles for an Amphibious Marine Carnivore*, 200 J. COMP. PHYSIOLOGY 967 at PDF 12 (2014); B. L. Southall *et al.*, *Marine Mammal Noise Exposure Criteria : Updated Scientific Recommendations for Residual Hearing Effects*, 45 AQUATIC MAMMALS 125 (2019).

⁵⁰⁴ Ghoul, *Hearing in the Sea Otter* at PDF 8.

⁵⁰⁵ D. Kastak *et al.*, *Onset, Growth, and Recovery of In-Air Temporary Threshold Shift in a California Sea Lion (Zalophus californianus)*, 122 J. ACOUSTICAL SOC'Y 2916 (2007).

⁵⁰⁶ Ghoul, *Hearing in the Sea Otter* at PDF 13.

⁵⁰⁷ *Id.*; A. N. Popper, & M. C. Hastings, *The Effects of Anthropogenic Sources of Sounds on Fishes*, J. FISH BIOLOGY 455 (2009); L. Weilgart, *The Impact of Ocean Noise Pollution on Fish and Invertebrates* at 18-19 (2018).

⁵⁰⁸ Ghoul, *Hearing in the Sea Otter* at PDF 13.

⁵⁰⁹ BA-FWS at 25-26; see also DEIS at 4.25-18 to 4.25-19 (finding that “[t]he magnitude, extent and duration of impacts from construction to the port would be a direct loss and permanent modification of 10.7 acres of northern sea otter critical habitat,” and that “38.8 acres of temporary impacts to critical habitat through installation of the natural gas pipeline,” with all PCEs directly affected).

⁵¹⁰ BA-FWS at 30.

time at the surface resting, grooming, and nursing their young.⁵¹¹ Since “there have been no studies of the effects of disturbance on stress levels, energy expenditures, foraging efficiency, or reproductive success,” the Corps cannot rationally conclude that vessel disturbance will not adversely affect the sea otter.⁵¹² Due to the lack of scientific data and information, the Corps and FWS must again err on the side of caution in protecting the northern sea otter from the activities associated with the proposed action.

Sea otters also are incredibly vulnerable to oil spills. Oil coats their fur and destroys the essential insulation they need to survive. In addition, sea otters are threatened by contaminants in their environment and the Corps failed in the BA to evaluate how a dam failure, seismic rupture, or other mine-related contaminant exposure might affect this species both in Cook Inlet and in Bristol Bay. Moreover, as with the other listed species, in evaluating the impacts of the proposed action on the northern sea otter, the Corps and FWS must include consideration of the impacts in combination with the ongoing impacts of climate change on the species and its habitat; must consider the impacts of the proposal on both the recovery and survival of the species; and must consider the direct, indirect, and cumulative impacts of the proposed action.

H. Iliamna Lake Seal

At 75 miles long by 22 miles wide, Iliamna Lake is Alaska’s largest lake.⁵¹³ The lake is even more notable as the home of a unique and isolated population of approximately 400 freshwater harbor seals (*Phoca vitulina richardii*)—one of only two known freshwater seal populations in the world.⁵¹⁴ These endemic seals differ in many ways from their Bristol Bay counterparts. They have a different diet, one more reliant on freshwater lake species and spawning salmon.⁵¹⁵ They also differ from Bay seals in their behavior, using underwater ice formations as winter habitat. Genetic information reveals reproductive isolation and some evidence of a bottleneck, placing the Iliamna Lake seal at an increased risk of extinction. Given the unique ecology of this small population and its proximity to the proposed Pebble Mine, the Corps must conduct a more thorough review of potential mine-related impacts on the Iliamna Lake seal.

The proposed Pebble Mine stands to have significant deleterious impacts both to the Iliamna Lake Seal’s habitat and to the seal itself. For example, the applicant’s preferred alternative includes construction of a natural gas pipeline across Iliamna Lake, construction of a

⁵¹¹ Northern Sea Otter Recovery Plan Recovery Plan at 3-27; *see also* DEIS at 4.25-17 (noting that “female sea otters, particularly those with pups, are sensitive to disturbance.”).

⁵¹² Northern Sea Otter Recovery Plan Recovery Plan at 3-27.

⁵¹³ DEIS at 3.16-35.

⁵¹⁴ *Id.* at 3.23-41.

⁵¹⁵ *See generally* S. R. Brennan *et al.*, *Isotopes in Teeth and a Cryptic Population of Coastal Freshwater Seals*, CONSERVATION BIOLOGY 1 (2019).

ferry terminal on the lakeshore, and year-round use of an ice-breaking ferry⁵¹⁶ across this water body.⁵¹⁷ The noise associated with such activities would produce underwater noise, which may lead to “tolerance, masking of natural sounds, behavioral disturbance, temporary or permanent hearing impairment, or non-auditory physical effects” on the seals.⁵¹⁸ Pile-driving, in particular, may lead to noise exceeding injury thresholds.⁵¹⁹ Aircraft noise (both airplanes and helicopters) associated with mine operations also may disrupt seal behavior and physiology.⁵²⁰ For example, aircraft may displace seals that use surface haul-out areas, resulting in energetic costs and stress responses.⁵²¹ Both vessel and aircraft activity stand to disrupt seal behavior, leading to abandonment of preferred breeding habitats, avoidance, vigilance, or masking behaviors.⁵²² The Corps dismisses the significance of these behaviors, asserting that “marine mammals typically avoid known high-vessel areas.”⁵²³ However, the Corps cannot state with certainty that the “high vessel areas” associated with Pebble Mine activity are not crucial for Iliamna Lake seal survival. Avoidance or abandonment of such areas may have significant individual and population-level consequences (*e.g.*, avoidance of high-quality foraging areas, abandonment of preferred pupping grounds).

In addition to noise, ice-breaker ferry use may displace Iliamna Lake seals from preferred habitats (*e.g.*, overwintering sites, pupping grounds) or destroy important habitat (*e.g.*, ice caves) outright.⁵²⁴ While the Corps states that “implementation of industry-standard mitigation measures required through [ESA and MMPA] consultation would reduce impacts” to the seal,⁵²⁵ it will be difficult to evaluate the effectiveness of such mitigation measures given how little is known about the seals’ behavior and habitat needs (*e.g.*, winter use of dry platforms for haul-out and air pockets for breathing). The Corps dismisses the significance of ice-breaker activity by stating that “there is a high level of use of Iliamna Lake by recreational and subsistence watercraft” and that “harbor seals are known for vessel tolerance.”⁵²⁶ The agency states that “although long term, occurring throughout the life of the project, impacts would not be expected

⁵¹⁶ See DEIS at 2-50 (“The one-way ferry trip is about 18 miles and would take approximately 3 hours to complete in ice conditions, or 1.5 hours in open water. Ferry transit speeds would range from 6 knots (approaching landing) to 11 knots (in open water). On average, one round trip per day across the lake would be required.”).

⁵¹⁷ *Id.* at 2-2, 2-50, 4.23-25.

⁵¹⁸ *Id.* at 4.23-26.

⁵¹⁹ *Id.*

⁵²⁰ *Id.*

⁵²¹ *Id.* at 4.23-27.

⁵²² *Id.*

⁵²³ *Id.* at 4.23-28.

⁵²⁴ DEIS at 4.23-26.

⁵²⁵ *Id.*

⁵²⁶ *Id.* at 4.23-27; Hovel, Salmonid Life History Diversity Report at 17-18 (finding that “the DEIS must also consider interactions between resident seal populations and the ice-breaking ferry, with regard to how maintaining open water ferry channels may increase the potential for seal-vessel interactions”).

to have a detrimental effect on harbor seals.”⁵²⁷ However, recreational and subsistence use⁵²⁸ is different both in season and in kind than an ice breaker ferry, which by definition will destroy lake ice—something this seal population relies upon for survival during the winter months.⁵²⁹ The potential exists for significant impacts to seal habitat and behavior, which may have disastrous individual- and population-level consequences for this small seal population.

Iliamna Lake seals also stand to lose foraging habitat from the construction of the Iliamna Lake ferry terminal.⁵³⁰ The terminal site and immediate vicinity will no longer be available to the seal, and their prey species stand to be impacted by “[h]abitat alteration, turbidity, and discharge from routine activities” associated with terminal construction and use.⁵³¹ Again, the Corps dismisses such impacts as irrelevant because the seals “are highly mobile and feed near river mouths.”⁵³² This cursory and short-sighted statement neglects to appreciate the importance of displacement, energetic costs, and associated sublethal impacts on the Iliamna Lake seal. The agency must conduct a more meaningful assessment of the ways in which construction and use of the Iliamna Lake ferry terminal may affect the seals and their prey species.⁵³³

The Corps also fail to adequately consider the impacts of contaminant exposure on the Iliamna Lake seal.⁵³⁴ One potential source of contamination is a spill from the ice-breaker ferry, which “would transit Iliamna Lake, carrying inbound supplies from Amakdedori port to the mine site, and returning with copper-gold and molybdenum concentrates, backhauled waste, and empty shipping containers.”⁵³⁵ The agency states that “[f]uel and other potential contaminants would be stored in tanks inside the hull and away from the shell to prevent spills,” but fails to discuss the ecological implications of such a spill should this precaution fail.⁵³⁶

In its discussion of the impacts from a potential diesel spill, the agency reasons that

[b]ecause this spill scenario does not include transport on Iliamna Lake, no impacts to Iliamna Lake seals are anticipated, apart from impacts to foraging habitat in river mouths that empty into Iliamna Lake. If a diesel spill were to occur near a waterbody that empties into Iliamna Lake, there is a potential for

⁵²⁷ DEIS at 4.23-27.

⁵²⁸ The Corps also fails to evaluate the impact of ice-breaking ferries on transportation corridors for human access to hunting areas or on seal distribution and availability to harvesters. Hovel, Salmonid Life History Diversity Report at 18 (noting that “seals occupy openings in the ice during the winter, and may actively maintain these breaks in the ice through their activities”).

⁵²⁹ *Id.* at 17.

⁵³⁰ DEIS at 4.23-29.

⁵³¹ *Id.*

⁵³² *Id.*

⁵³³ See Brennan *et al.*, *Isotopes in Teeth and a Cryptic Population of Coastal Freshwater Seals* at 5-9 (discussing prey species of the Iliamna Lake seal).

⁵³⁴ Hovel, Salmonid Life History Diversity Report at 17.

⁵³⁵ DEIS at 2-50.

⁵³⁶ *Id.*

Iliamna Lake seals to be temporarily disturbed while cleanup activities occur; however, the lake seals are anticipated to avoid the area (or be hazed)⁵³⁷ while cleanup is occurring.⁵³⁸

The agency does not even mention impacts to lake seals in its discussion of a tailings spill, while noting potentially significant impacts to the seals' prey species.⁵³⁹ The Corps also disregards the potential impacts of copper toxicity from, *e.g.*, a concentrate pipeline break on the Iliamna Lake seal, reasoning that “the copper would take years to decades to become bioavailable” and the seals “*may temporarily avoid areas where the concentrate is spilled.*”⁵⁴⁰

The agency must connect the dots, providing a more comprehensive and reasoned analysis of the ways in which a spill—whether small or catastrophic—might impact Iliamna Lake seal habitat, prey,⁵⁴¹ and the small, isolated population of seals itself. This discussion must include a reasoned analysis of the possible individual- and population-level impacts of behavioral and sublethal responses of seals to such disturbances. It also must discuss the impacts from a seismic rupture and from a tailings dam failure. As it stands, the Corps inappropriately

⁵³⁷ The agency's casual mention of hazing techniques fails both to describe those techniques and to discuss potential responses of seals to such hazing, particularly given that they are unaccustomed to human presence.

⁵³⁸ DEIS at 4.27-16. *See also id.* at 4.27-49 (providing a similarly cursory analysis and conclusion in the context of a concentrate spill); *id.* at 4.27-55 (noting that in the event of a concentrate pipeline break, “[t]here may be a limited loss of prey species for Iliamna Lake seals where the concentrate covers up and smothers eggs”).

⁵³⁹ *See id.* at 4.27-87 (“The tailings may smother salmonid eggs and alevins, and reduce the quality of spawning habitat in the direct footprint of the spill in the NFK, and to some extent further downstream. This would impact species that feed on these life stages of salmonids, and may cause lower salmon populations in future years, depending on the extent of the spill. Additionally, contact water in the tailings slurry may cause acute toxicity in fish.”); *id.* at 4.27-90 (“A bulk tailings release may potentially impact the habitat and occurrence of marine mammal prey species that inhabit the [North Fork Koktuli]. Changes to salmon spawning and rearing habitat and impacts to salmon due to acute and chronic toxicity from the bulk tailings failure may reduce the prey base for several marine mammals.”); *id.* at 4.27-106 (finding that in the event of a pyritic tailings spill, “the impacts to salmonid populations would be high intensity [and high magnitude]” and “salmonid spawning habitat, close to 9 river miles downstream of the release location, may be impacted”; such impacts would include “egg smothering at spawning locations, . . . alter[ation of] spawning substrates[,] . . . acute toxicity to fish . . . [leading to] wildlife species seeking other locations for feeding.”).

⁵⁴⁰ *Id.* at 4.27-55 (emphasis added). *See also id.* at 4.27-89 (noting that, in the event of a tailings spill, “if the tailings are not recovered, the minerals would slowly dissolve, leaching metals into the water, some of which could bioaccumulate in the food chain”).

⁵⁴¹ The agency neglects to discuss in any detail how foraging habitat might be affected and how, given the seals' unique foraging ecology. *See Brennan et al., Isotopes in Teeth and a Cryptic Population of Coastal Freshwater Seals* at 6-8.

and inaccurately dismisses potential contamination-related impacts from a spill, release, pipeline break, rupture, or dam failure on the Iliamna Lake seal.

Finally, the Corps must discuss how climate change could interact with mine development to affect the Iliamna Lake seal population. The agency acknowledges that some lakes in Alaska have decreased in size due to climate change, while others are becoming larger.⁵⁴² The agency must expound upon this generalization, discussing changes to Iliamna Lake specifically (including changes in ice cover) and also how such changes may impact lake seal habitat, particularly in conjunction with the proposed Pebble Mine.

II. BIRDS

A. Steller's Eider

The Corps' erroneously concludes that the proposed Pebble Project will have no adverse effects on the Steller's eider (*Polysticta stelleri*). The DEIS analysis contains inconsistencies and the BA-FWS artificially circumscribes its analysis of potential impacts to this species. The agency must conduct a more meaningful analysis of potential impacts to the Steller's eider and better explain internal inconsistencies in the DEIS.

The U.S. Fish and Wildlife Service (FWS) listed the Stellar's eider as threatened in 1997 and designated critical habitat in 2001.⁵⁴³ In addition to protection under the ESA, take of this species is prohibited under the Migratory Bird Treaty Act.⁵⁴⁴

Steller's eiders are diving ducks that prefer shallow, nearshore marine waters, where they feed on molluscs and crustaceans.⁵⁴⁵ Molting and wintering eiders gather on exposed shoals, rocky headlands and islets, and in protected lagoons and bays.⁵⁴⁶ The Corps acknowledges in the DEIS that the Steller's eider occurs in the analysis area from fall through spring, including in Kamishak Bay and near the proposed Amakdedori port.⁵⁴⁷ Western Cook Inlet and its adjacent nearshore coastal waters provide molting, wintering, and staging habitat.⁵⁴⁸ In addition, migration corridors take eiders over the mine site, transportation corridor, natural gas corridor, and Iliamna Lake.⁵⁴⁹

⁵⁴² DEIS at 3.22-24.

⁵⁴³ U.S. Fish and Wildlife Serv., Threatened and Endangered Species: Steller's Eider (*Polysticta stelleri*) (Mar. 2014), <https://www.fws.gov/migratorybirds/pdf/education/educational-activities/Stellerseiderfactsheet.pdf>.

⁵⁴⁴ *Id.*

⁵⁴⁵ *Id.*

⁵⁴⁶ *Id.*

⁵⁴⁷ DEIS at 3.25-9 to 3.25-10.

⁵⁴⁸ *Id.* at 3.25-9, 3.25-10, 3.25-12.

⁵⁴⁹ *Id.* at 3.25-9, 3.25-12.

The applicant's preferred alternative would lead to the permanent loss of 103.3 acres of Steller's eider habitat and the temporary loss of an additional 25.8 acres.⁵⁵⁰ Vessels and aircraft may displace Steller's eiders, forcing them to swim, dive, or fly away from disturbance.⁵⁵¹ Steller's eiders also face collision risk with standing structures and vessels (both stationary and moving). Nonetheless, the Corps concludes that impacts to Steller's eiders will be insignificant. This conclusion is not well-supported.

For example, the Corps initially states that Steller's eiders may fly over the mine site.⁵⁵² The Corps then concludes that "mine site activities ... are anticipated to have no direct or indirect impacts on Steller's eider (*Polysticta stelleri*), because the species is not known to ... migrate through the mine site."⁵⁵³ The Corps must better explain this internal inconsistency and how, should Steller's eiders indeed fly over the mine site, they might be impacted. As part of this analysis, the Corps should consider whether, to what degree, and to what effect Steller's eiders might alight on the contaminated open pit.⁵⁵⁴

The Corps also acknowledges that collisions with moored vessels at lightering locations pose a known and expected risk to low- and fast-flying eiders,⁵⁵⁵ but dismisses the risk of collisions with moving vessels, citing the slow speeds at which vessels will be traveling when coming into port.⁵⁵⁶ However, based on the Corps earlier discussion of the potential for collisions with moored vessels and other stationary, elevated structures, it appears that the flight patterns of the bird—in addition to or perhaps even more than the speed of the vessel—would place the eider at risk.⁵⁵⁷ The Corps further relies on the possibility of eiders habituating to port and vessel activity to minimize the significance of collision risk,⁵⁵⁸ yet habituation might place the birds at increased risk of collision and other habituation- or human-related harms (*e.g.*, feeding, poaching). Finally, despite this discussion of the myriad risk posed by vessels to eiders, the BA-FWS arbitrarily limits its analysis to "construction vessels." The resulting finding of "No Effect" is unsubstantiated and unwarranted.

⁵⁵⁰ *Id.* at 4.25-8, Tbl. 4.25-2.

⁵⁵¹ *Id.*

⁵⁵² *Id.* at 3.25-9.

⁵⁵³ *Id.* at 4.25-19.

⁵⁵⁴ *See generally* Guarino, *supra* note 400.

⁵⁵⁵ DEIS at 4.25-19, -21-22.

⁵⁵⁶ *Id.* at 4.25-20 ("Vessel speeds would be slow (*i.e.*, less than 10 knots) while approaching and departing the port, providing time for any Steller's eiders in the immediate vicinity to move out of harm's way.").

⁵⁵⁷ *See, e.g., id.* at 4.25-21 ("Because Steller's eiders tend to fly low and fast over water, they are susceptible to collisions with stationary *or slow-moving objects*, especially during periods of poor visibility. The chance of collision increases with fog or darkness, especially in areas that have lights that could attract and disorient birds. Steller's eiders are believed to be attracted to artificial light, which may increase their risk of collision with structures and vessels.") (emphasis added).

⁵⁵⁸ *Id.* at 4.25-22.

The Corps also acknowledges that vessel and aircraft traffic “can cause Steller’s eiders to fly away from preferred foraging and resting sites, thereby disrupting foraging or resting periods. Disturbance of sufficient frequency, duration, or severity can lower individual fitness through increased time spent in flight, and reduced time spent feeding or resting.”⁵⁵⁹ Such behavioral and stress effects may be amplified during the fall molt, when eiders lose their flight feathers and are unable to fly away from acute threats or stressors.⁵⁶⁰ The cumulative effects of such stressors on Steller’s eiders during the winter season also are likely to be significant, particularly since “small ducks wintering in northern latitudes ... do so at the edge of their energetic limits.”⁵⁶¹ The Corps must discuss in more depth the insidious effects of cumulative, non-lethal stressors, particularly during sensitive life stages.

The Corps also must discuss in more detail how available Steller’s eider prey resources might be impacted by project activities. Impacts to eider prey were dismissed as insignificant because “less than 1 percent of the available foraging habitat in Kamishak Bay would be impacted.”⁵⁶² This conclusion assumes a uniform distribution of prey over all foraging habitat—an assumption not grounded in reality. The Corps should conduct a more fine-scale assessment of prey resources in the region and then determine whether and to what degree Steller’s eiders will be affected. Further, the Corps should consider how habitat loss and prey availability will interface with climate change (*e.g.*, habitat modification and impacts to the eider’s prey base through, *e.g.*, warming temperatures and ocean acidification).⁵⁶³

Finally, the Corps must conduct more meaningful analysis on the variety of spills (including tailings dam failure and seismic rupture) that might affect Steller’s eiders and discuss other routes of contaminant exposure to the species and its prey (*e.g.*, transfer of contaminants through hydrological connectivity; “internal oiling” via ingestion of petroleum products through preening in the event of a spill). According to the Alaska Department of Fish and Game, contaminants threaten the Steller’s eider and “[c]ontamination, such as an oil spill, *in a wintering or molting area*, could have a major impact on the entire population.”⁵⁶⁴ As currently drafted, the Corps’ discussion of spills in the NMFS-BA is woefully inadequate and its discussion of contaminant-related impacts and water quality nonexistent. These shortcomings must be remedied.

⁵⁵⁹ *Id.* at 4.25-20.

⁵⁶⁰ *Id.* at 3.25-9.

⁵⁶¹ BA-FWS at 11.

⁵⁶² *Id.* at 4.25-22.

⁵⁶³ *Id.* at 3.25-12.

⁵⁶⁴ Alaska Dept. of Fish & Game, Steller’s Eider (*Polysticta stelleri*), <http://www.adfg.alaska.gov/index.cfm?adfg=stellerseider.printerfriendly> (emphasis added). *See also* U.S. Fish and Wildlife Serv., Threatened and Endangered Species: Steller’s Eider (*Polysticta stelleri*) at 2 (Aug. 2011) (“Impaired water quality may also threaten the health of Steller’s eiders; marine pollutants from point and non-point sources are believed to directly and indirectly cause harm to Steller’s eiders. Exposure to contaminants such as petroleum oils and wastewater discharges can have short and long-term effects, especially when incorporated into the food chain.”).

B. Short-Tailed Albatross

The FWS listed the short-tailed albatross (*Phoebastria albatrus*) as endangered in 2000. Once the most abundant albatross in the North Pacific, numbering in the millions, the species teetered on the brink of extinction in the early 19th century after being exploited by humans for their feathers.⁵⁶⁵ The population now hovers around 4300 individuals.⁵⁶⁶ FWS lists bycatch of short-tailed albatross in commercial fisheries as a continuing conservation concern.⁵⁶⁷ Other threats include, *inter alia*, environmental events (*e.g.*, volcanoes, erosion), contaminants (*e.g.*, organochlorines, heavy metals, and oil), small population size and limited breeding distribution.⁵⁶⁸ In addition, climate change is altering seabird and prey distribution, though the overall impact of such changes on short-tailed albatrosses remains uncertain.⁵⁶⁹

The Corps acknowledges in the DEIS that the short-tailed albatross has “known or potential occurrence in the analysis area.”⁵⁷⁰ It then summarily dismisses further discussion of possible impacts to the species, stating that “based on a review of biological data for the region, all components of the project and alternatives are outside of the geographic range of the short-tailed albatross. The species is not known to occur in Cook Inlet, and therefore short-tailed albatross will not be further discussed in this document.”⁵⁷¹ The Corps offers a similar rationale in the BA, stating that while they “occur ... in the Gulf of Alaska,” specifically along the “shelf edges,” “no albatross are expected to occur in the Action Area [and] potential project effects on albatross are not specifically addressed further in this BA.”⁵⁷² The Corps ultimately concludes that “the determination for all accounts of potential impacts (disturbance, collision, incidental spill, loss of critical habitat) is **No Effect** due to a lack of confirmed presence of this pelagic seabird in the Action Area.”⁵⁷³

The Corps cites Piatt *et al.* (2006) in support of its conclusion, specifically the authors’ finding that short-tailed albatross “associate with upwelling in Aleutian passes and along continental shelf margins in Alaska”—although the publication also notes that the species historically “may have been reasonably common nearshore ... where upwelling ‘hotspots’

⁵⁶⁵ R. A. Orben *et al.*, *Ontogenetic changes in at-sea distributions of immature short-tailed albatrosses* *Phoebastria albatrus*, 35 *Endangered Species Research* 23, 24 (2018).

⁵⁶⁶ *Id.*

⁵⁶⁷ U.S. Fish & Wildlife Serv., 5-Year Review: Summary and Evaluation Short-tailed Albatross (*Phoebastria albatrus*) at 14,

<https://www.st.nmfs.noaa.gov/Assets/nationalseabirdprogram/doc4445.pdf> (2014).

⁵⁶⁸ *Id.* at 15-27.

⁵⁶⁹ *Id.* at 15-16, 27.

⁵⁷⁰ DEIS at 3.25-1.

⁵⁷¹ *Id.* at 3.25-2.

⁵⁷² BA-FWS at 6, 13.

⁵⁷³ *Id.* at 27 (emphasis in original).

occurred in proximity to the coast.”⁵⁷⁴ For example, non-shelf associated areas of high productivity occur along “intense upwelling of west-ward flowing currents at the mouth of Cook Inlet and on the east coast of Kodiak Island.”⁵⁷⁵ While acknowledging that their “picture of short-tailed albatross distribution . . . is . . . probably biased towards shelf-edge records,” Piatt *et al.* “conclude that if short-tailed albatross were foraging regularly in coastal and shelf waters of Alaska, the data compiled here would have revealed that pattern.”⁵⁷⁶

Even if the Corps’ conclusions sufficiently account for present-day short-tailed albatross habitat use, the agency must analyze how the species’ distribution might change over the Project timeline with (1) further recovery and population growth, and (2) climate change. For example, if the population continues to grow, might the species again become more associated with nearshore habitats? And how might the climate change-related shifts in currents and high-productivity zones affect short-tailed albatross distribution and habitat use? In addition, the Corps must describe how contamination from the Pebble Project—whether through routine spill, seismic rupture, catastrophic tailings dam failure, or other means—might affect short-tailed albatross prey, and, in turn, the birds themselves. The Corps must conduct a reasoned analysis on these and other factors before determining that the Pebble Project will have no effect on the species.

CLIMATE CHANGE

Global warming is the most pressing environmental problem of our time, and nowhere are its effects more visible than in Alaska.⁵⁷⁷ The Pebble project will emit nearly one million tons of greenhouse gases every year.⁵⁷⁸ Its design will have to anticipate—and its effects would likely be exacerbated by—a shifting climate.⁵⁷⁹ It is therefore imperative that the FEIS thoroughly discuss both (I) the project’s contribution to climate change and (II) the ways in which climate change could alter the project’s other impacts.

⁵⁷⁴ Piatt *et al.*, *Predictable Hotspots and Foraging Habitat of the Endangered Short-tailed Albatross (Phoebastria albatrus) in the North Pacific: Implications for Conservation*, 53 DEEP SEA RESEARCH II 387, 388, 393.

⁵⁷⁵ *Id.* at 394.

⁵⁷⁶ *Id.* at 395.

⁵⁷⁷ See C. Markon *et al.*, *Alaska*, in U.S. GLOBAL CHANGE RESEARCH PROGRAM, IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME II 1185 (D. R. Reidmiller *et al.* eds., 2018) (noting that Alaska is among the fastest warming regions on Earth and is warming faster than any other state).

⁵⁷⁸ DEIS at 4.20-6 (discussing mine site operations); *id.* at 4.20-10 (discussing transportation corridor operations), *id.* at 4.20-14 (discussing port operations), *id.* at 4.20-17 (discussing compressor station operations).

⁵⁷⁹ See, e.g., *id.* at 4.20-21, N-57.

I. THE DEIS DOES NOT ADEQUATELY ADDRESS THE PROJECT'S CONTRIBUTION TO CLIMATE CHANGE.

NEPA requires agencies to discuss cumulative impacts, i.e., “the incremental impact[s] of the action when added to other past, present, and reasonably foreseeable future actions.”⁵⁸⁰ “Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”⁵⁸¹ Climate impacts fit this description well because they are caused by the incremental additions of greenhouse gases to the atmosphere from numerous sources.⁵⁸² An EIS must therefore address the proposed action’s and alternatives’ contribution to climate change.⁵⁸³ Rather than predicting particular effects, however, an agency may use projected greenhouse gas emissions as a proxy. Doing so allows agencies to present a meaningful evaluation of impacts and to facilitate a reasoned choice among alternatives, including no action.

A. The DEIS does not fully assess the proposed action’s contribution to climate change.

1. *The project’s emissions*

NEPA requires that agencies discuss not only a proposed action’s environmental effects, but also their significance.⁵⁸⁴ The Corps declines to address the significance of the project’s effects on climate change, explaining “it is the aggregation of project emissions with all other global emissions past and present that have the potential to translate into impacts in the analysis area” and noting that “no standard methodology currently exists to assess how a proposed project’s GHG emissions would translate into physical effects in the analysis area.”⁵⁸⁵ Thus, the “magnitude of the impacts from [the project’s direct] emissions is not addressed.”⁵⁸⁶

The Corps may use applicable federal, state, tribal, or local goals for greenhouse gas emissions reductions as a frame of reference. For example, the Climate Action for Alaska Leadership Team recommends that the state reduce oil, gas, and mining industry greenhouse gas emissions in Alaska by 30% (over 2005 levels) by 2030.⁵⁸⁷ Alternatively, the Mitigation

⁵⁸⁰ 40 C.F.R. § 1508.7.

⁵⁸¹ *Id.*

⁵⁸² *See Ctr. for Biological Diversity v. Nat’l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1216-17 (9th Cir. 2008) (“The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct.”); *cf. Massachusetts v. EPA*, 549 U.S. 497, 524 (2007).

⁵⁸³ *Ctr. for Biological Diversity*, 538 F.3d at 1217.

⁵⁸⁴ *See* 40 C.F.R. § 1502.16(a), (b).

⁵⁸⁵ DEIS at 4.20-3.

⁵⁸⁶ *Id.*

⁵⁸⁷ Climate Action for Alaska Leadership Team, *Alaska Climate Change Action Plan Recommendations to the Governor* at 20 (Sept. 2018), https://inletkeeper.org/wp-content/uploads/2019/01/Ak_Climate_Action_Plan_brochure_final_web.pdf

Advisory Group of the Governor’s Climate Change Sub-Cabinet developed a series of recommendations, which, if implemented, would reduce statewide emissions of greenhouse gases by 11.7 million metric tons in 2025.⁵⁸⁸ The FEIS should use a benchmark such as one of these to put the GHG impacts of the project in context.⁵⁸⁹

Another approach to assessing the significance of climate impacts is using the social cost of carbon. Developed by a federal interagency working group, the social cost of carbon is an estimate of the monetized damages from an incremental increase in carbon emissions in a given year, which includes—but is not limited to—climate-related changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services.⁵⁹⁰ Although NEPA does not require a cost-benefit analysis, where an agency chooses to quantify the economic advantages of the proposed action, it is arbitrary to ignore the social cost of carbon emissions.⁵⁹¹

The DEIS anticipates several economic benefits from the project, including \$1-1.5 million in right-of-way acquisitions, \$27 million annually in state taxes (2011) during construction, \$69 million annually from state corporate taxes and \$44 million annually from state mining license taxes, and \$21 million annually (2011) from state royalty payments during the operations phase, \$29 million annually in severance taxes for the Lake and Peninsula Borough, and annual property taxes to Kenai Peninsula Borough based on the assessed value of project related real property.⁵⁹²

In contrast, the DEIS provides no analysis of the socioeconomic effects from climate change.⁵⁹³ Given that expected damages from each ton of carbon dioxide emitted are available in the form of the social cost of carbon, and that the mine site alone could emit nearly one million tons of carbon-dioxide equivalent annually,⁵⁹⁴ the FEIS should monetize the project’s potential climate-related harms.

⁵⁸⁸ See Alaska Climate Change Strategy’s Mitigation Advisory Group, *Final Report: Greenhouse Gas Inventory and Forecast and Policy Recommendations Addressing Greenhouse Gas Reduction in Alaska* at 1-9 to 1-10, Tbl. 1-1 (Aug. 2009).

⁵⁸⁹ See *WildEarth Guardians v. Zinke*, No. CV 16-1724 (RC), 2019 WL 1273181, at *22 (D.D.C. Mar. 19, 2019) (stating that agency must place those emissions in the context of local and regional oil and gas consumption).

⁵⁹⁰ Interagency Working Group on Social Cost of Greenhouse Gases, U.S. Government, Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 at 3 (August 2016 revision).

⁵⁹¹ See *High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1191 (D. Colo. 2014) (noting that the agency had estimated the revenues, royalties, payroll, and local payment for goods and services that would be forgone under the no-action alternative but failed to account for the costs of carbon emissions).

⁵⁹² DEIS at 4.3-8 to 4.3-10, *see also id.* at 4.3-14, Tbl. 4.3-1.

⁵⁹³ *See id.*, Chapters 3.3 & 4.3.

⁵⁹⁴ *See id.* at 4.20-6 (mine site operations), 4.20-10 (transportation corridor operations), 4.20-14 (port operations), 4.20-17 (compressor station operations).

The DEIS quantifies the GHG emissions only from the mine site, transportation corridor, pipeline, and the Amakedori port,⁵⁹⁵ which “includes marine transport within the project boundary.”⁵⁹⁶ Yet, this calculation does not include a quantification of GHG emissions during closure of the transportation corridor,⁵⁹⁷ the port,⁵⁹⁸ or the natural gas pipeline.⁵⁹⁹ These must also be included in the analysis of direct impacts from emissions. Additionally, the DEIS disregards potential emissions from a pipeline rupture or leak,⁶⁰⁰ even though recent experience shows that natural-gas releases are not uncommon and can have major climate impacts.⁶⁰¹ The FEIS should fully discuss these foreseeable emissions.

The Corps must also consider additional GHGs and their effects, as discussed below.

2. *Related emissions*

In addition to estimating a proposed action’s direct contributions to climate change, agencies must analyze its indirect effects.⁶⁰² These effects include emissions that may occur as a predicate for the proposal (“upstream emissions”) or as a consequence of the proposal (“downstream emissions”). An EIS for an open-pit mine should analyze the downstream effects of using the mined resources, as well as upstream effects such as natural gas development. Agencies must also assess the emissions of connected actions.⁶⁰³

The DEIS identifies indirect impacts from emissions as those that “would result from emissions associated with transporting supplies and construction materials beyond the project

⁵⁹⁵ DEIS at Chapter 4.19

⁵⁹⁶ *Id.* at 4.20-11.

⁵⁹⁷ *Id.* at 4.20-11

⁵⁹⁸ *Id.* at 4.20-14

⁵⁹⁹ *Id.* at 4.20-17

⁶⁰⁰ *See id.* at 4.27-33 (noting only that “Potential natural gas releases from the pipeline would have a low-intensity impact on air quality by introducing dominantly methane, a GHG, into the air.”)

⁶⁰¹ *See* Nuka report, at 11-12 (PLP needs to analyze the climate change consequences of a natural gas pipeline leak scenario, including the amount of gas that might be released, the CO₂ equivalent values of that gas, and its contribution to the total climate change impact of the Pebble project); *see also* E. Ponsot, *California Natural Gas Leak Just One of Thousands Across Country*, PBS (Jan. 18, 2016), <http://www.pbs.org/newshour/updates/california-natural-gas-leak-just-one-of-thousands-across-country/>; J. Warrick, *California Gas Leak Was the Worst Man-Made Greenhouse-Gas Disaster in U.S. History, Study Says*, Wash. Post (Feb. 25, 2016), <https://www.washingtonpost.com/news/energy-environment/wp/2016/02/25/california-gas-leak-was-the-worst-man-made-greenhouse-gas-disaster-in-u-s-history-study-says/>.

⁶⁰² *See* 40 C.F.R. § 1508.8(b) (defining indirect effects as those that are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable”).

⁶⁰³ *See* 40 C.F.R. § 1508.25 (defining connected actions as those that are “closely related and therefore should be discussed in the same impact statement”).

boundary in Cook Inlet.”⁶⁰⁴ However, the Corps does not quantify the air pollution impacts for any of these activities, and simply points to the conclusion in the Lease Sale 244 FEIS that found minimal impacts in Cook Inlet from purportedly similar or even greater activity, and concludes, “it is likely the Pebble Project indirect impacts would also be minimal.”⁶⁰⁵ The emissions from marine and air support activities must be quantified.⁶⁰⁶ The DEIS also ignores related emissions such as those that could result from public use of road or other infrastructure.⁶⁰⁷

In addition, the DEIS fails to recognize or calculate GHGs and other air emissions from bulk carriers traveling to their ultimate destination. The analysis also omits an assessment of emissions from additional processing and transportation that will occur before the metals reach the consumer. The DEIS must quantify these downstream impacts.

Several upstream emissions go unmentioned as well, such as those caused by—and by extracting—natural gas. The DEIS explains that the source of and production methods of natural gas “are beyond the scope of this EIS because they are not a component of any federal permit required for this project. Additionally, the project proposes to purchase natural gas on the open market by linking with the existing pipeline system near Anchor Point, Alaska. Gas for the project would not be from a specific source.”⁶⁰⁸ This is not a valid basis for disregarding these upstream emissions.

The DEIS also fails to consider GHGs from reasonably foreseeable future activities, such as the proposed mine expansion, which would include additional sources of GHGs such as an expanded power plant, an additional compressor station at Amakdedori port, an additional 100 million gallons of diesel fuel per year later in the mine life, the construction and operation of a diesel fuel pipeline and a concentrate pipeline, a deep water loading facility in Iniskin Bay, and other infrastructure additions.⁶⁰⁹ Should any of this infrastructure remain for other uses after

⁶⁰⁴ DEIS at 4.20-11.

⁶⁰⁵ *Id.* at 4.20-11

⁶⁰⁶ The DEIS does not quantify upstream GHGs, but acknowledges “many of the workers and supplies would be transported to the region by air, the Iliamna Airport and local airfields”. *Id.* at 4.3-5

⁶⁰⁷ *See, e.g., id.* at 4.3-4 (noting that transportation costs for community could be reduced “should arrangements be made to allow some controlled public use of the mine and port access roads and spur roads.”); *id.* (noting that “communities situated along the corridor of the natural gas pipeline . . . may develop infrastructure to take advantage of the supply of natural gas or experience reduced costs of goods and services through access to the project transportation system.”); *id.* at 4.3-5 (anticipating controlled use of the access roads and ferry for community transportation needs); *id.* at 5-12 (“natural gas pipeline design has been oversized to allow for regional access to gas”).

⁶⁰⁸ *Id.* at 4.1-27

⁶⁰⁹ PLP 2018-RFI 062 at PDF 4.

closure, the GHGs resulting from such use must also be analyzed. The agency's failure to quantify these emissions renders the analysis inadequate.⁶¹⁰

Finally, the FEIS should acknowledge that the use of these GHGs is an irreversible and irretrievable commitment of resources, especially in light of the planet's finite capacity for GHGs while still maintaining a habitable environment.

B. The DEIS fails to disclose the emissions of the alternatives and explore options that would decrease emissions.

Under NEPA, agencies must "rigorously explore and objectively evaluate all reasonable alternatives," giving each of them "full and meaningful consideration."⁶¹¹ This should include alternatives with different levels of greenhouse gas emissions and should address mitigation and the use of renewable energy. If an agency ignores an alternative that is reasonably related to the project's purpose, its NEPA analysis may be held invalid.⁶¹²

The DEIS does not compare the alternatives' greenhouse gas emissions. The FEIS should present greenhouse gas emissions under all the alternatives, and it should clearly identify the source of that information.

Further, the Corps eliminated from consideration, without a satisfactory explanation, options that would have reduced the project's climate impacts. For example, it rejected solar, wind power, and run-of-the river hydroelectricity, supposedly because such technologies are infeasible at the scale necessary to power the mine.⁶¹³ Yet the DEIS does not explain why these and other renewable energy options, perhaps used in combination, could not provide at least some of the power the mine needs. It simply states that, "These options would not provide a significant or consistent amount of energy. They are not reasonable or practicable options."⁶¹⁴ It also omits efficiency measures from the design features most important to reducing climate impacts.⁶¹⁵ Under NEPA, agencies must discuss "[e]nergy requirements and conservation potential of various alternatives and mitigation measures";⁶¹⁶ and this discussion is required even where a particular technique offers only a partial solution to the problem.⁶¹⁷ By disregarding

⁶¹⁰ See *WildEarth Guardians v. Zinke*, No. CV-16-1724- RC, 2019 WL 1273181, at *21 (D.D.C. Mar. 19, 2019).

⁶¹¹ *Ctr. for Biological Diversity*, 538 F.3d at 1217 (internal quotation marks and citations omitted).

⁶¹² See *id.* at 1219.

⁶¹³ DEIS at B-26.

⁶¹⁴ *Id.* at B-27.

⁶¹⁵ See *id.* at M-2 to M-5.

⁶¹⁶ 40 C.F.R. § 1502.16(e).

⁶¹⁷ See *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 235 F. Supp. 2d 1143, 1154-55 (W.D. Wash. 2002) (citing *Nat. Res. Def. Council, Inc. v. Morton*, 458 F.2d 827, 836 (D.C. Cir. 1972)).

options and design features that would reduce the project's greenhouse gas emissions, the Corps violates NEPA's command to consider reasonable alternatives.

II. THE DEIS DOES NOT EXPLAIN HOW CLIMATE CHANGE WOULD ALTER THE PROJECT'S IMPACTS.

NEPA requires that an EIS describe the environment that would be affected by the proposed action.⁶¹⁸ This necessarily includes reasonably foreseeable changes in the environment that will result from climate change without the proposed action. Depending on anticipated conditions, full NEPA review may disclose climate-related hazards and thus reveal more-resilient alternatives that should be considered. In addition, communities and ecosystems that are already experiencing climate-related stresses may be more susceptible to environmental harms. The Corps must therefore explain how climate change could exacerbate the project's impacts.

A. The DEIS disregards or downplays climate-related hazards.

Studies analyzing daily precipitation in Alaska generally indicate that extreme precipitation events will increase in frequency and intensity over the coming decades.⁶¹⁹ The frequency of these outlier events may respond more to warming than the frequency of average precipitation events because the atmosphere can hold exponentially greater amounts of moisture as temperatures rise.⁶²⁰ Because water management and mine infrastructure must be designed to be resilient to future temperature and precipitation variations decades into the future, these data need to be placed into the context of the expected range of variability that could occur over those coming decades. This means that PLP needs to consider long-term trends in precipitation, temperature, and other parameters that might influence operations over the long term.⁶²¹ Recent experience shows that abnormally high levels of precipitation and ensuing flooding can: destroy waste dumps, seepage capture systems, and mine access roads; cause impoundments to overflow and dams to be breached; and push water treatment costs over-budget or cause releases of untreated water.⁶²² These impacts underscore the need to plan for worst-weather events throughout a project's lifetime and closure.⁶²³

⁶¹⁸ See 40 C.F.R. § 1502.15.

⁶¹⁹ See K. E. Bennett, Changes in Extreme Hydroclimate Events in Interior Alaskan Boreal Forested Watersheds at 197 (Dec. 8, 2014) (unpublished Ph.D. dissertation, University of Alaska Fairbanks).

⁶²⁰ *Id.* at 198.

⁶²¹ Wobus Comments at 9.

⁶²² See W. McCullough, W. Jepson & B. Maehl, *Zortman: Dealing with Extreme Weather Events* at 5, 9-11, 15-16, 19, 26-28 (2011); T. D. Pearce *et al.*, *Climate Change and Mining in Canada*, 16 *Mitigation & Adaptation Strategies for Global Change* 347, 357-58, 360 (2011).

⁶²³ R. D. Williams, *Climate Change – Extreme Conditions: Do Plans of Operations Need to Include an Ark?* at 29-44 (2012).

Despite the future predicted changes in Alaska’s climate, the design for infrastructure for the mine,⁶²⁴ including the water management plan,⁶²⁵ is based on historical precipitation and temperature data.⁶²⁶ Indeed, PLP entirely rejects information from the Fourth National Climate Assessment Report, which represents definitive data about future climate change in the US, explaining that the report’s predictions for increasing temperatures and precipitation in the Pebble Project area do not comport with the historical climate datasets for Iliamna.⁶²⁷ This rationale is flawed because it assumes that the changes that have occurred during the historical period examined are predictive of future changes.⁶²⁸

With respect to precipitation, the DEIS asserts that, given the uncertainty as to whether long-term climatic change is influencing the surface water hydrology of the area, and if so, what the magnitude of the change might be, and due to a lack of a common trend in precipitation and discharge, “the use of historic data collected in the vicinity of the Pebble site, without a specific adjustment to account for possible long-term climatic change, seems reasonable at this time, as long as the risk of an event that is larger or smaller than anticipated (based on the historic data) is addressed.”⁶²⁹

Not only should the Corps consider predicted increases in temperature and precipitation in light of their impacts on project infrastructure, including roads, the Corps must also consider these changes in the winter, as well as the summer. The design of water management facilities at the Pebble Mine, as described in the DEIS, is based only on extreme precipitation events that currently occur during “non-winter” months.⁶³⁰ However, for example, the research conducted by Wobus *et al.* (2015) showed that “even under a moderate emissions scenario, by the end of mine operations the fraction of winter storms falling as rain rather than snow is projected to more

⁶²⁴ DEIS at 4.16-6.

⁶²⁵ Knight Piesold, Pebble Mine Site Operations Water Management Plan at 8 (July 6, 2018) (noting that historical (1942-2017) temperature and precipitation data from Iliamna Airport form the basis for assumptions about temperature and precipitation for the Pebble analysis.); *see also* DEIS at 3.16-19 (stating that climate variability was accounted for in water balance model by examining historical data)

⁶²⁶ *See, e.g.*, DEIS at 4.17-3 (explaining “[t]he rates of estimated groundwater inflow to the pit described above are based, in part, on a wide range of climate scenarios using a historical 40-year record of data”).

⁶²⁷ Knight Piesold, Pebble Project Hydrometeorology Report at A-5 (Sept. 6, 2018) (Pebble Project Hydrometeorology Report).

⁶²⁸ Wobus Comments at 10 (“PLP’s assumption that past climate variability is a reasonable proxy for expected future variability—an assumption that is at odds with the vast majority of the scientific community—could be quite risky.”).

⁶²⁹ DEIS at 4.16-24

⁶³⁰ Pebble Project Hydrometeorology Report at 41 (noting “[f]or this analysis, mean monthly temperature and monthly maximum daily precipitation data from the Western Regional Climate Center (WRCC) were used to develop a non-winter annual maximum precipitation series and a corresponding “non-winter” IDF curve for Iliamna Airport”).

than double.”⁶³¹ As Wobus *et al.* explains, “This change would fundamentally influence the DEIS assumptions regarding mine impacts to site hydrology, including the amount and timing of water requiring treatment, the impacts of treatment discharges on downstream hydrology, and the magnitude of extreme precipitation.”⁶³²

The DEIS should also consider the likelihood that an extreme precipitation event will exceed the capacity of the mine infrastructure. As shown by Wobus *et al.* (2015), for example, a warmer climate results in far more extreme precipitation events.⁶³³ Because the mine is designed based on historical climate information, there is a risk that extreme precipitation events or other climate changes could result in failure in the mine infrastructure and water management. The Corps must analyze this hydrologic risk and the potential impacts to the mine, and resulting environmental effects, that would result.⁶³⁴

PLP’s reliance on historical weather data to design the mine is particularly arbitrary in light of the fact that future climate predictions are relevant to an analysis of impacts elsewhere in the DEIS.⁶³⁵ As the 9th Circuit has noted, even an analysis based on climate change models looking nearly 100 years into the future is consistent with the agency’s obligations, provided the model accounts for any shortcomings in its projections.⁶³⁶ The analysis of impacts to both infrastructure and the environment should be based on the same future climate change projections.

There are an increasing number of reports from industry, regulatory agencies and academia that relate the impacts of climate change to the mining industry and the need to incorporate these changes into mine plans and practices.⁶³⁷ This is evident at the Zortman Landusky Mine in north central Montana, where the U.S. Bureau of Land Management determined that designing the stormwater facilities for a 24-hour/100-year storm event was inadequate, given the increased rate and severity of storm events due to climate change.⁶³⁸ A major storm event resulted in the washout of a waste rock facility and the loss of a seepage containment system, with severe downstream effects. The presentation stated that “the reality is

⁶³¹ Wobus Comments at 10.

⁶³² *Id.*

⁶³³ *Id.*

⁶³⁴ *Id.* (noting that the DEIS underestimates the hydrologic risks associated with development of the Pebble Mine).

⁶³⁵ *See, e.g.*, DEIS at 3.20-9 (analyzing future climate impact on wetlands); *id.* at 3.26-15 (analyzing invasive species); *see also id.* at 3.20-11, Tbl. 3.20-7. The DEIS acknowledges that temperature has been increasing, both near the mine site and throughout Alaska. *Id.* at 3.16-20; *see also id.* 3.26-15.

⁶³⁶ *Alaska Oil & Gas Ass’n v. Ross*, 722 F. App’x 666, 669 (9th Cir. 2018)

⁶³⁷ *See, e.g.*, Ontario Ctr. For Climate Impacts & Adaptation Res., *Mining: In A Changing Climate* at 1-2 (last visited June 24, 2019),

<http://climateontario.ca/doc/factsheets/Mining%20Factsheet%20--%20Final.pdf>

⁶³⁸ Williams, *supra* note 623, at 33-42.

the industry is making closure, reclamation and drainage treatment predictions based on a historic climate that no longer exists.”⁶³⁹

According to the DEIS, stormwater features will be designed to attenuate a 10 year, 24-hour rainfall runoff volume and safely manage a 100-year, 24-hour rainfall event.⁶⁴⁰ However, as noted above, designing for a 10-year or 100-year, 24-hour storm event may not be adequate and the DEIS fails to consider the potential effects of inadequate engineering, management, design and planning in the face of climate change.

B. The DEIS does not adequately discuss how climate change could render the environment more susceptible to the project’s impacts.

As an initial matter, the DEIS does not explain why it limits its analysis of climate change to subsistence, surface and groundwater hydrology, water and sediment quality, air quality, wetlands, wildlife values, threatened and endangered species, wildfire, and fish values.⁶⁴¹ Climate change will alter all aspects of the affected environment, including, in particular, socio-economic systems, environmental justice, and recreational and commercial fishing. Any discussion of the project’s impacts that does not recognize this altered baseline is incomplete.

The analysis of how climate change impacts make the environment more susceptible to impacts from the project is inadequate. For example, with respect to fish values, the DEIS states, “Detailed analysis of long-term climate change and how it relates to aquatic habitats is discussed in Sections 3.16 and 4.16, Surface Water Hydrology.”⁶⁴² However, section 3.16 does not discuss the impact of climate change on fish values or aquatic habitats, concluding only that “there does not seem to be a common trend in either precipitation or streamflow at long-term monitoring sites in the vicinity of the mine site.”⁶⁴³

Finally, the DEIS ignores potential climate-related cumulative effects that could worsen the project’s impacts, such as the albedo effect.⁶⁴⁴ Without a more complete picture of the effects of climate change on the affected environment, it is impossible for the Corps and the public to evaluate the consequences of the proposed action.⁶⁴⁵

⁶³⁹ *Id.* at 43.

⁶⁴⁰ DEIS at 4.16-3.

⁶⁴¹ *Id.* at 3.1-7 (noting that “Climate change trends are integrated into discussion if appropriate.”).

⁶⁴² *Id.* at 3.24-44.

⁶⁴³ *Id.* at 3.16-21.

⁶⁴⁴ *See, e.g.*, EPA, Red Dog Mine Expansion Final Supplemental EIS at 3-88 (Oct. 2009).

⁶⁴⁵ *See* 40 C.F.R. § 1502.15 (requiring agencies to include in an EIS a description of the affected environment sufficient to understand the effects of the alternatives).

PUBLIC INTEREST REVIEW

Under the required public interest review,⁶⁴⁶ the Army Corps should deny PLP's permit. That regulation requires the Army Corps to balance the minimal benefits of the proposed project against its legion adverse effects on—among other things—conservation, economics, wetlands, fish and wildlife values, recreation, water quality, safety, food production, and the needs and welfare of the people.⁶⁴⁷ To grant the permit, the district engineer would have to conclude “that the benefits of the proposed alteration outweigh the damage to the wetlands resource.”⁶⁴⁸ That would be a preposterous conclusion for the Pebble Project. Nor can the agency reasonably conclude that the project will comply with state water quality standards.⁶⁴⁹ PLP's failure to demonstrate a reliably safe tailings impoundment further precludes a permit.⁶⁵⁰ Given the strong evidence that the mine cannot be economically and practicably developed as proposed, the district engineer must conduct an independent review of the economics of the project.⁶⁵¹

CONCLUSION

The permit application, the analysis currently in the record, and the Bristol Bay Watershed Assessment make clear both individually and in combination that it will not be possible to issue a permit that would comply with the 404(b)(1) Guidelines. Under any scenario, the proposed project would cause significant degradation of waters of the United States. For this reason, it is not necessary to continue the NEPA process. The Army Corps should simply deny the application. There is no point in continuing to pour public resources into a permit that plainly must be denied. At a minimum, the Corps should suspend the permitting process until PLP submits a realistic proposal and the necessary information to allow sufficient review. That would change the proposal and record so radically that the Corps would need to prepare a supplemental DEIS. Should the Corps decide to continue the permitting process now with no substantial changes to the proposal and without significantly more information from PLP, the only lawful choice is the no action alternative.

Thank you for your careful attention to these comments.

⁶⁴⁶ 33 C.F.R. § 320.4(a).

⁶⁴⁷ *Id.*

⁶⁴⁸ 33 C.F.R. § 320.4(b)(4).

⁶⁴⁹ 33 C.F.R. § 320.4(d).

⁶⁵⁰ 33 C.F.R. § 320.4(k).

⁶⁵¹ 33 C.F.R. § 320.4(q).

Sincerely,

Thomas S. Waldo
Erin Whalen
EARTHJUSTICE
325 Fourth Street
Juneau, AK 99801
E: twaldo@earthjustice.org
ewhalen@earthjustice.org

Bonnie Gestring
EARTHWORKS
140 South 4th Ave., West
Missoula, MT 59801
E: bgestring@earthworks.org

Kristen Carden
Marc Fink
CENTER FOR BIOLOGICAL DIVERSITY
1212 Broadway, Suite 800
Oakland, CA 94612
E: kcarden@biologicaldiversity.org
mfink@biologicaldiversity.org

**DOCUMENTS CITED IN EARTHJUSTICE *ET AL.*'S COMMENTS ON THE PEBBLE
PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT
(JULY 1, 2019)**

Alaska Climate Change Strategy's Mitigation Advisory Group, *Final Report: Greenhouse Gas Inventory and Forecast and Policy Recommendations Addressing Greenhouse Gas Reduction in Alaska* (Aug. 2009)

Alaska Dept. of Fish & Game, Steller's Eider (*Polysticta stelleri*)

P. Albers, Petroleum and Individual Polycyclic Aromatic Hydrocarbons, Ch. 14, in D. J. Hoffman *et al.* (eds), HANDBOOK OF ECOTOXICOLOGY (2d ed. 2002)

P. H. Albers & T. R. Loughlin. Effects of PAHs on Marine Birds, Mammals and Reptiles, Ch. 13 at 249, in P. E.T. Douben (ed.), PAHS: AN ECOTOXICOLOGICAL PERSPECTIVE (2003)

K.Y. Aydin *et al.*, *Linking Oceanic Food Webs to Coastal Production and Growth Rates to Pacific Salmon (*Oncorhynchus spp.*), Using Models on Three Scales*, DEEP SEA RES. II 52: 757-780 (2005)

S. Azam & Q. Li, *Tailings Dam Failures: A Review of the Last One Hundred Years*, Geotechnical News 50, 52 (Dec. 2010).

K. E. Bennett, *Changes in Extreme Hydroclimate Events in Interior Alaskan Boreal Forest Watersheds* (Dec. 8, 2014) (unpublished Ph.D. dissertation, University of Alaska Fairbanks)

L. N. Bowker & D. M. Chambers, *The Risk, Public Liability, & Economics of Tailings Storage Facility Failures 1* (Jul. 21, 2015)

S. R. Brennan *et al.*, *Isotopes in Teeth and a Cryptic Population of Coastal Freshwater Seals*, CONSERVATION BIOLOGY 1 (2019)

D. M. Chambers, *Long-term Risk of Tailings Dam Failure*, 13 ALASKA PARK SCI-2, 1 (2011) (Chambers, Tailings Dam Failure Analysis)

CIM Council, *CIM Definition Standards for Mineral Resources and Mineral Reserves* (Nov. 27, 2010) (CIM Definition Standards)

Climate Action for Alaska Leadership Team, *Alaska Climate Change Action Plan Recommendations to the Governor* (Sept. 2018)

Council on Environmental Quality, *Report Regarding the Mineral Management Service's National Environmental Policy Act Policies, Practices, and Procedures As They Relate to Outer Continental Shelf Oil and Gas Exploration and Development* (Aug. 16, 2010)

A. Dalpatram, Estimation of Tailings Dam Break Discharges, Workshop on Dam Break Analysis (Aug. 24-26, 2011)

M. P. Davies, *Tailings Impoundment Failures: Are Geotechnical Engineers Listening?*, Geotechnical News 31, 32 (Sept. 2002)

Diaz v. Northern Dynasty Minerals Ltd., et al., No. 17-CV-1241-PSG-SS, Doc. 56-13 at 8 (C.D. Cal. Aug. 24, 2018)

Diaz v. Northern Dynasty Minerals Ltd., et al., No. 17-CV-1241-PSG-SS, Pls.' First Amended Complaint, Doc. 43 (C.D. Cal. Oct. 11, 2017)

J. A. Estes *et al.*, *Continuing Sea Otter Population Declines in the Aleutian Archipelago*, 21 MARINE MAMMAL SCI. 169, 169 (2005)

V.J. Fabry *et al.*, *Impacts of Ocean Acidification on Marine Fauna and Ecosystems Processes*, ICES J. MAR. SCI. 65: 414-432 (2008)

G. Gavett, *Tailings Dams: Where Mining Waste Is Stored Forever*, Frontline (July 30, 2012)

B. Gestring, *Pebble Mine: Unprecedented Wastewater Capture and Treatment Requirements* (May 2019)

B. Gestring, *U.S. Copper Porphyry Mines Report: The Track Record of Water Quality Impacts Resulting From Pipeline Spills, Tailings Failures and Water Collection and Treatment Failures* (Nov. 2012 revision)

B. Gestring, *U.S. Operating Copper Mines: Failure to Capture & Treat Wastewater* (May 2019)

H. P. Ghaffari *et al.*, *Preliminary Assessment of the Pebble Project, Southwest Alaska* (2011 Preliminary Assessment)

A. Ghoul & C. Reichmuth, *Hearing in the Sea Otter (Enhydra lutris): Auditory Profiles for an Amphibious Marine Carnivore*, 200 J. COMP. PHYSIOLOGY 967 (2014)

Ben Guarino, *Thousands of Montana Snow Geese Die After Landing in Toxic, Acidic Mine Pit*, WASH. POST (Dec. 7. 2016)

J. A. Hildebrand, *Impacts of Anthropogenic Sound on Cetaceans, in Marine Mammal Research: Conservation Beyond Crisis*, in MARINE MAMMAL RES.: CONSERVATION BEYOND CRISIS 101, 102 (J.E. Reynolds III *et al.*, eds. 2005)

Interagency Working Group on Social Cost of Carbon, U.S. Government, *Technical Support Document: - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866* (August 2016 revision)

International Commission of Large Dams, Tailings Dams: Risk of Dangerous Occurrences, Lessons Learnt from Practical Experiences, Bulletin 121 (2001)

Int'l Council on Mining & Metals, *Position statement on preventing catastrophic failure of tailings storage facilities* (2016)

D. Kastak *et al.* *Onset, Growth, and Recovery of In-Air Temporary Threshold Shift in a California Sea Lion (Zalophus californianus)*, 122 J. ACOUSTICAL SOC'Y 2916 (2007)

Kerrisdale Capital, Cu at Zero (Feb. 2017) (Kerrisdale Report),

R. E. Kyle and T. P. Brabets, Water Temperature of Streams in the Cook Inlet Basin, Alaska, and Implications of Climate Change (2001)

R. Lent, Marine Mammal Commission, Comment Letter to P. M. Payne, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Apache Alaska Corp. Seismic Survey (Oct. 21, 2011)

R. Lent, Marine Mammal Commission, Comment Letter to P. M. Payne, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Apache Alaska Corp. Seismic Survey (Jan. 9, 2013)

R. Lent, Marine Mammal Commission, Comment Letter to P. M. Payne, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Apache Alaska Corp. Seismic Survey (Jan. 31, 2014)

R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Supervisor, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Furie Operating Alaska LLC Seismic Survey (Apr. 4, 2014)

R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Supervisor, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Buccaneer Alaska Operation, LLC Seismic Survey (May 9, 2014)

R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re: Seismic Surveys in Cook Inlet (Sept. 4, 2014)

R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. SAExploration Inc. Seismic Survey (April 20, 2015)

R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Annual Incidental Take Authorizations (Sept. 11, 2015)

R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. ExxonMobil Alaska LNG LLC Seismic Survey (Mar. 7, 2016)

R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. BlueCrest Alaska Operating, LLC (July 13, 2016)

R. Lent, Marine Mammal Commission, Comment Letter to J. Harrison, Chief, Permits and Conservation Division, NMFS Office of Protected Resources, Re. Annual Incidental Take Authorizations EIS (Oct. 5, 2017)

A. Maest *et al.*, Predicted Versus Actual Water Quality at Hardrock Mine Sites: Effect of Inherent Geochemical and Hydrologic Characteristics (2006)

C. Markon *et al.*, *Alaska*, in U.S. GLOBAL CHANGE RESEARCH PROGRAM, IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME II 1185 (D. R. Reidmiller *et al.* eds., 2018)

D. Martineau, Contaminants and Health of Beluga Whales of the Saint Lawrence Estuary, Ch. 17, in L. Norrgren & J. M. Levenson (eds.), ECOSYSTEM HEALTH AND SUSTAINABLE AGRICULTURE 2 (2012)

A. Mattox *et al.*, *Understanding Dam Failure*, Ground Truth Trekking (Feb. 22, 2016)

W. McCullough, W. Jepson & B. Maehl, *Zortman: Dealing with Extreme Weather Events* (2011)

National Oceanic and Atmospheric Administration, Biological Characterization: Bristol Bay Marine Estuarine Processes, Fish and Marine Mammals Assemblages (Feb. 2013) (NOAA Biological Characterization)

Nat'l Marine Fisheries Serv., Conservation Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*) (Oct. 2008)

Nat'l Marine Fisheries Serv., Final Recovery Plan for the Fin Whale (*Balaenoptera physalus*) (July 2010) (Fin Whale Recovery Plan)

Nat'l Marine Fisheries Serv., Final Recovery Plan for the Humpback Whale, *Megaptera novaeangliae* (Nov. 1991)

Nat'l Marine Fisheries Serv., Final 2008 Revised Recovery Plan for Steller Sea Lions (Mar. 2008) (Steller Sea Lion Recovery Plan)

Nat'l Marine Fisheries Serv., Recovery Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*) (Dec. 2016) (Beluga Whale Recovery Plan)

National Research Council, OCEAN NOISE AND MARINE MAMMALS (2003)

New Mexico Environmental Department, Corrective Action Response, DP-213, January 5, 2019, Unauthorized Discharge of Tailings Slurry from Tailings Spare Train Pipeline

Northern Dynasty Minerals Ltd., *Annual Information Form for the Year Ended December 31, 2018* (Mar. 20, 2019)

Northern Dynasty Minerals Ltd., *Consolidated Financial Statements for the Years Ended December 31, 2018 and 2017* (Apr. 1, 2019) (Northern Dynasty, Consolidated Financial Statements)

Northern Dynasty Minerals Ltd., *Project Economics*

Northern Dynasty Minerals Ltd., *Technical Report on the Pebble Project, Southwest Alaska, USA* (Feb. 22, 2018) (Northern Dynasty, Technical Report)

Ontario Ctr. For Climate Impacts & Adaptation Res., *Mining: In A Changing Climate*,

Ontario Securities Comm'n, National Instrument 43-101 Standards of Disclosure for Mineral Projects, Form 43-101F1 Technical Report and Related Consequential Amendments (June 24, 2011)

R. A. Orben *et al.*, *Ontogenetic changes in at-sea distributions of immature short-tailed albatrosses* *Phoebastria albatrus*, 35 *Endangered Species Research* 23 (2018)

Owl Ridge Natural Resource Consultants, Inc., National Marine Fisheries Service Biological Assessment—Section 7 (Sept. 2018) (BA-NMFS)

Owl Ridge Natural Resource Consultants, Inc., U.S. Fish & Wildlife Serv. Biological Assessment—Section 7 at 7 (Dec. 2018)

T. D. Pearce *et al.*, *Climate Change and Mining in Canada*, 16 *Mitigation & Adaptation Strategies for Global Change* 347, 357-58, 360 (2011).

Piatt *et al.*, *Predictable Hotspots and Foraging Habitat of the Endangered Short-tailed Albatross (Phoebastria albatrus) in the North Pacific: Implications for Conservation*, 53 *DEEP SEA RESEARCH II* 387, 388, 393.

E. Ponsot, *California Natural Gas Leak Just One of Thousands Across Country*, PBS (Jan. 18, 2016)

A. N. Popper, & M. C. Hastings, *The Effects of Anthropogenic Sources of Sounds on Fishes*, *J. FISH BIOLOGY* 455 (2009)

J. Reynolds & D. Wetzel, *Polycyclic Aromatic Hydrocarbon (PAH) Contamination in Cook Inlet Belugas*

B. L. Southall *et al.*, *Marine Mammal Noise Exposure Criteria : Updated Scientific Recommendations for Residual Hearing Effects* 45 AQUATIC MAMMALS 125 (2019)

U.S. Environmental Protection Agency, Bristol Bay Watershed Assessment and Proposed Determination (July 2014) (PD)

U.S. Environmental Protection Agency, Red Dog Mine Expansion Final Supplemental Environmental Impact Statement (Oct. 2009) (excerpt)

EPA, Technical Review of a Threshold-Based Approach for Determining Significant Degradation in Alaska (July 5, 2018)

U.S. Environmental Protection Agency, Wetland Functions and Values

U.S. Fish & Wildlife Serv., 5-Year Review: Summary and Evaluation Short-tailed Albatross (*Phoebastria albatrus*) (2014)

U.S. Fish and Wildlife Serv., Southwest Alaska Distinct Population Segment of the Northern Sea Otter (*Enhydra lutris kenyoni*) Recovery Plan (Aug. 2, 2013) (Northern Sea Otter Recovery Plan)

U.S. Fish and Wildlife Serv., *Southwest Alaska DPS of the Northern Sea Otter (Enhydra lutris kenyoni) 5-Year Review: Summary and Evaluation* (Aug. 2013)

U.S. Fish and Wildlife Serv., Threatened and Endangered Species: Steller's Eider (*Polysticta stelleri*) (Aug. 2011)

U.S. Fish and Wildlife Serv., Threatened and Endangered Species: Steller's Eider (*Polysticta stelleri*) (Mar. 2014)

University of Alaska, Fairbanks, Center for Global Climate Change and Arctic System Research, *The Potential Consequences of Climate Variability and Change—Alaska* (Dec. 1999)

J. Warrick, *California Gas Leak Was the Worst Man-Made Greenhouse-Gas Disaster in U.S. History, Study Says*, Wash. Post (Feb. 25, 2016)

L. S. Weilgart, *The Impacts of Anthropogenic Ocean Noise on Cetaceans and Implications for Management*, 85 CANADIAN J. ZOOLOGY 1091 (2007)

L. Weilgart, *The Impact of Ocean Noise Pollution on Fish and Invertebrates* (2018)

R. D. Williams, *Climate Change – Extreme Conditions: Do Plans of Operations Need to Include an Ark?* (2012)

WISE Uranium Project, *Chronology of Major Tailings Dam Failures* (June 5, 2019)

J. P. Wise Jr. *et al.*, *Metal Levels in Whales from the Gulf of Maine: A One Environmental Health Approach*, 216 CHEMOSPHERE 653 (Feb. 2019)

C. Wobus *et al.*, *Modeling the Impacts of a Tailings Dam Failure at the Pebble Mine* (Feb. 28, 2019)