



BRISTOL BAY

Regional Seafood Development Association

September 6, 2022

BY EMAIL TO ow-docket@epa.gov AND FEDERAL E-RULEMAKING PORTAL

Water Docket
Environmental Protection Agency
Mail Code 2822T
1200 Pennsylvania Ave. NW
Washington, DC 20460

Re: Docket ID No. EPA-R10-OW-2022-0418 (EPA Region 10's Revised Proposed Determination relating to the Pebble Deposit Area, Southwest Alaska)

The Bristol Bay Regional Seafood Development Association ("BBRSDA") represents more than 8,000 commercial fishermen whose livelihoods depend on the extraordinary Bristol Bay salmon fishery. In total, the region's commercial salmon fishery created 15,000 U.S. jobs and generated \$2.0 billion of economic output in 2019. Bristol Bay is the world's most valuable wild salmon fishery and in recent years has exhibited record-setting abundance. We submit these comments to the EPA Region 10's May 2022 Revised Proposed Determination to support the development of the Pebble Deposit ("RPD").

First and foremost, BBRSDA is strongly of the view that the EPA should prepare a Recommended Determination, and ultimately a Final Determination, that provides for long-term protection against the development of the Pebble mine in the Bristol Bay headwaters. As the RPD points out, these headwaters are a critical part of what make this fishery the most valuable wild salmon fishery in the world. This is truly national treasure worthy of EPA's exercise of its authority under Section 404(c).

The Pebble project – a massive copper-gold-molybdenum porphyry mine placed at the headwaters of two critical salmon-spawning watersheds – threatens to put this national treasure at risk, and for very little comparative gain. Indeed, the project proposes only twenty years of mining operations without any demonstrated proof of technological or economic viability. That is no trade-off for the unacceptable adverse effects recognized in the EPA's Revised Proposed Determination, not to mention the permanent risk of catastrophic impact to the salmon fishery, degraded habitat, and irreparable damage to the fishery's pristine characteristics and reputation.

BBRSDA has consistently participated in the environmental review of the Pebble project to emphasize the extraordinary economic value of the Bristol Bay fishery. BBRSDA attaches its comments to the Army Corps' Draft EIS to provide additional depth regarding BBRSDA's

perspective and to ensure the administrative record includes the economic analysis underscoring the critical value created by a wild, pristine fishery in Bristol Bay (see Attachment A – 2019-06-08 J. Dettmann and C. Coleman letter to U.S. Army Corps of Engineers).

The scientific research on this is well-established. As remote as the Bristol Bay habitat and fishery have remained, the legacy of a wild, sustainable fishery is fragile. Especially during the early and late stages of their lifecycle, salmon are highly sensitive to their surroundings, such that even slight changes in water chemistry, temperature, or sedimentation can have devastating lethal and sub-lethal effects. This fundamental point has been repeatedly proven by the loss or substantial degradation of virtually every naturally reproducing salmon fishery in the United States outside of Alaska. This is a lesson we do not need to learn yet again. As explained below, there are also substantial risks to the economic vitality of Bristol Bay’s commercial salmon fishery, which is the primary source of regional jobs as well as jobs for many thousands of people who reside outside of Bristol Bay.

Bristol Bay is the world’s largest source of premium, wild salmon by a wide margin, and the region’s sockeye runs are more abundant than ever. In 2022, the Bristol Bay commercial fishery met all escapement goals and turned in a record harvest of roughly 60 million sockeye salmon, smashing the previous record of 44 million fish set in 1995. If lined up nose-to-tail, Bristol Bay’s 2022 sockeye run of 78 million fish would stretch around the world. However, this year’s mega-record sockeye run is just the latest example of phenomenal abundance, as Bristol Bay harvests have been extremely strong in recent years. This stands in stark contrast to other commercial fisheries in North America which rely on sockeye, coho, and Chinook salmon. Over the past four years with complete data (2018-2021), Bristol Bay has produced more than twice as much premium, wild salmon as all other North American commercial fisheries combined (see Exhibit 1).

Exhibit 1. Commercial Harvests of Premium Wild Salmon Species* by Area, 2018-2021
in Metric Tons

Year	Bristol Bay, Alaska	Other North America
2010-2017 Average	73,155	74,441
2018	98,585	52,128
2019	101,503	49,940
2020	91,618	29,967
2021	90,275	49,138
2018-2021 Total	381,982	181,172

*Combined totals of sockeye, coho, and Chinook salmon.

Source: Alaska Department of Fish & Game (ADF&G Fish Tickets), North Pacific Anadromous Fish Commission (NPAFC Pacific salmonid catch statistics, updated June 2022), data compiled by BBRSDA.

Bristol Bay sockeye salmon production, though currently abundant, relies heavily on pristine salmon rearing conditions in the Nushagak and Kvichak River watersheds. The proposed Pebble Mine development would create substantial risk to salmon runs in these areas, as well as create existential market risk for all Bristol Bay salmon discussed in more detail further below.

Many other groups are commenting on many of the aspects of the RPD. Rather than cover the same ground here, BBRSDA supports, recommends, and adopts the September 6, 2022, comments of the Bristol Bay Native Corporation, Commercial Fishermen for Bristol Bay, and Trustees of Alaska.

In addition to the information and references in these comments, BBRSDA adds the following:

A. The RPD should better acknowledge the existential risk of economic damage that the mine imposes on the Bristol Bay commercial salmon fishery.

BBRSDA suggests adding language equivalent or similar to the Final Proposed Determination (“FPD”):

The Bristol Bay commercial salmon fishery is highly dependent upon sockeye salmon’s market position as a premium seafood product. Wild sockeye salmon, including those caught in Bristol Bay, generally fetch prices substantially higher than farmed salmon. The proposed Pebble Mine project could easily jeopardize the premium market position of Bristol Bay sockeye due to negative impacts on fish quality or consumer perception, which could result in the region’s commercial fishery becoming economically infeasible.

We offer the following commentary and analysis in support of the statement made above:

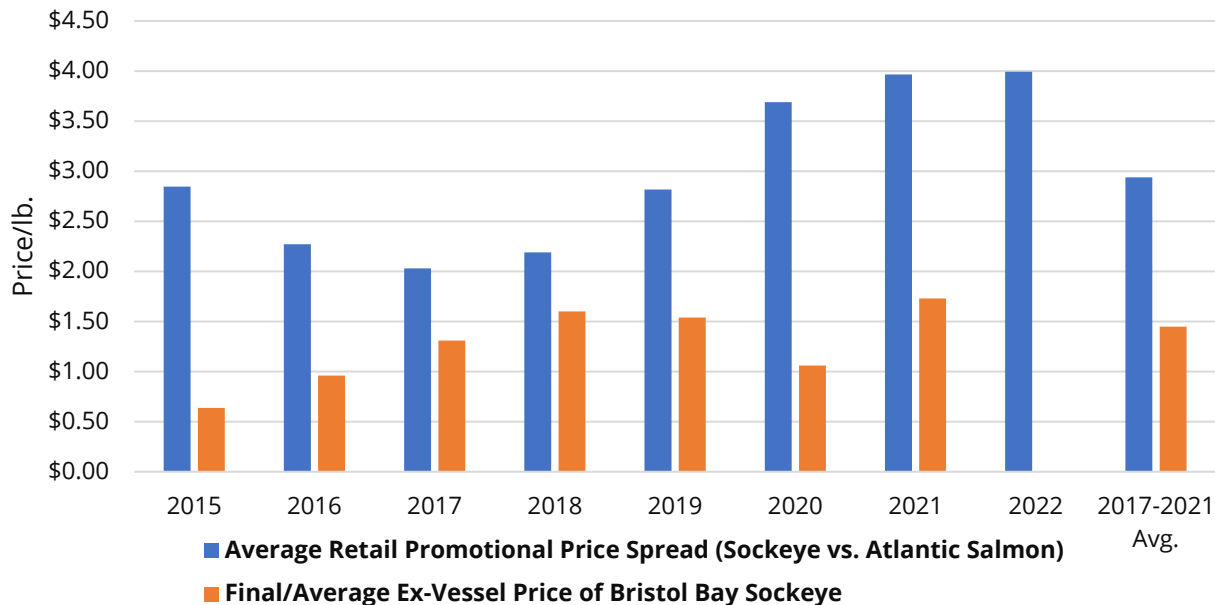
Section 3.3.5. of the RPD highlights the enormous economic value that the Bristol Bay salmon fishery generates. In total, the region’s commercial salmon fishery created 15,000 U.S. jobs and generated \$2.0 billion of economic output in 2019. Moreover, it is important to understand the context of Bristol Bay’s salmon fishery. In a state famous for its salmon, Bristol Bay has accounted for roughly half the ex-vessel value of all salmon caught in Alaska, and it accounts for nearly half of the world’s sockeye salmon production.

While much of the RPD rightly focuses on potential environmental and ecological impacts, there are economic factors which are a critical element in all the jobs and dollars created by Bristol Bay sockeye. This commercial salmon fishery is viable and successful not just due to abundant salmon runs, but because it is valued by consumers as a premium seafood product. The economic feasibility of Bristol Bay’s commercial salmon fishery is highly sensitive even to relatively small changes in fish price.

Over the last two years, wild sockeye prices at U.S. retail stores have (conservatively) been approximately \$4.00 higher per fileted pound compared to farmed Atlantic salmon (see Exhibit 2).¹ On a round weight basis, this works out to roughly \$2.00 per pound. Given that commercial fishermen in Bristol Bay are typically paid between \$1.00 to \$2.00 per round pound, it would be impossible to profitably sustain a commercial fishery in Bristol Bay should retail prices for sockeye decline to the levels paid for Atlantic salmon, or for that matter, to the retail price levels for wild pink and chum salmon. The retail price premium for sockeye salmon, most of which now comes from Bristol Bay, is roughly equal-to-or-larger than the ex-vessel price paid to fishermen. In general, the costs and margins required to process, ship, and sell Bristol Bay salmon are relatively fixed. These parts of the supply chain cost what they cost. This is important, because if retail prices were to decline due to negative impacts on consumer demand, it is the producers—the fishermen—who ultimately suffer the biggest impact.

The simple fact is that if Bristol Bay sockeye salmon were to lose its market status as a premium seafood product, there would not be enough marginal value to support a commercial fishery. Thousands of jobs, hundreds of businesses, and the foundation of Alaska’s salmon industry would be sacrificed.

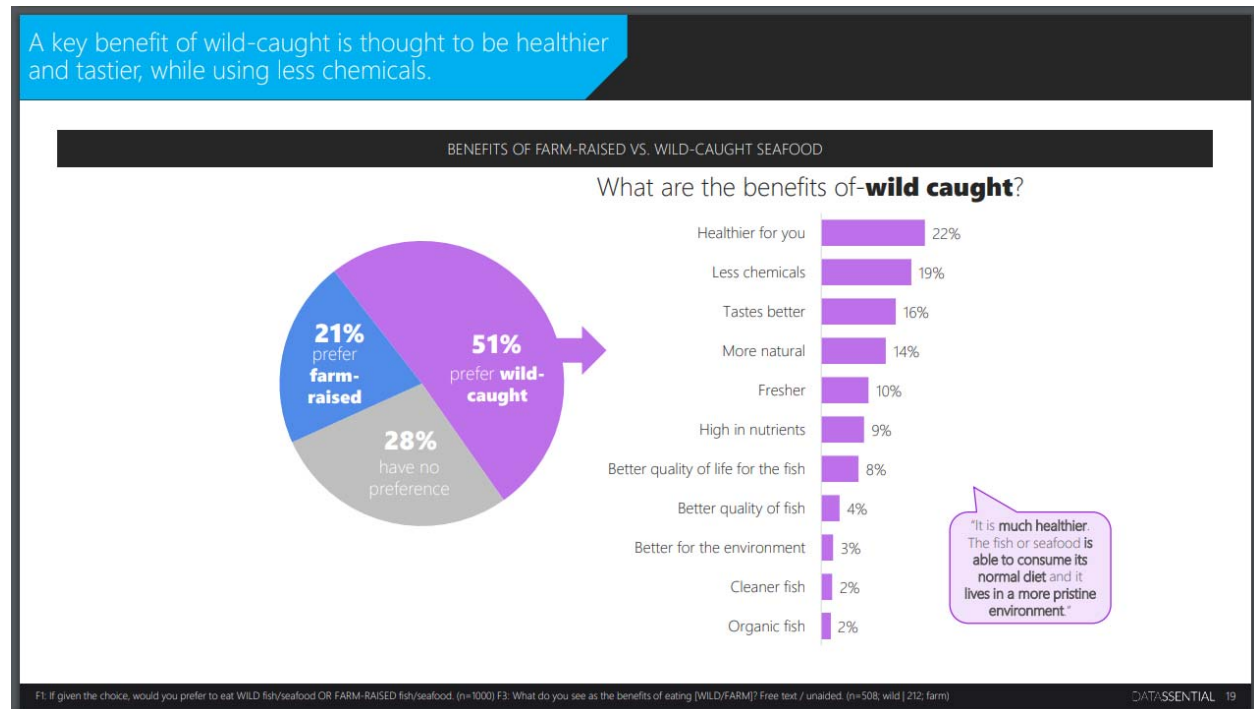
Exhibit 2. Sockeye Salmon Retail Price Premium vs. Ex-Vessel Price



Notes: Final 2022 ex-vessel prices are not yet available, retail features data for 2022 is year-to-date through August 19. Sources: Urner Barry Comtell (Retail Features Database), Alaska Department of Fish & Game (Salmon Prices by Region), compiled by BBRSDA.

¹<https://tinyurl.com/2p98v44n>

Exhibit 3. Consumer Survey Results: Benefits of Wild-Caught Seafood



Concerns about the severe damage that the Pebble mine could cause to consumer perception are well-founded. Consumer research presented by the Alaska Seafood Marketing Institute shows that health perceptions and low chemical content are the top two benefits consumers identify to support their preference of wild-caught versus farm-raised seafood (see Exhibit 3).² The reality and perception of healthy fish from a pristine habitat are principal reasons why sockeye salmon, most of which comes from Bristol Bay, fetches a price far above farmed Atlantic salmon. Without that price premium, there is no commercial salmon fishery. The mere existence of a large copper mine with a massive and persistent tailings storage facility in the Bristol Bay headwaters is enough cause for concern. But even worse, if anything were to go wrong with the mine, then beyond the ecological concerns the economic damage caused from changes to consumer perception alone would put the entire commercial fishery at grave risk.

Therefore, the proposed Pebble Mine creates an existential risk for an existing, successful, sustainable, and much larger economic resource. While it is nice to hope that large scale mining can coexist with abundant salmon runs, there is no evidence to support such a notion.

Indeed, the risks associated with negative impacts to consumer perception from this mine have been studied in connection with the Army Corps' Draft Environmental Impact

² <https://www.alaskaseafood.org/wp-content/uploads/FOR-WEB-Datassential-Alaska-Seafood-Consumer-Research-1.pdf> (Slide 19).

Analyses.³ Dr. Sunny Jardin listed several examples where environmental impacts did lead to significant adverse effects on consumer behavior and demand (see Attachment B – Jardine Comments on the economic analysis in the Pebble Project DEIS). These impacts on consumer behavior would likely extend to wild sockeye *in general* due to the immense scale of Bristol Bay’s sockeye production.

Further, the proposed Pebble Mine puts many other Alaska seafood species at risk. Most of the seafood produced in Alaska comes from the Bering Sea and adjacent waters, which is all technically downstream of the proposed Pebble Mine. Many consumers who place a premium value on Alaska seafood due to its pristine habitat are likely to apply any negative perceptions of the Pebble Mine development to other Alaska seafood products, even if they are caught far away from Bristol Bay. As noted in Dr. Jardine’s research, there is precedent for spillover effects to adversely impact consumer demand for other sources of wild Alaska seafood, even outside of Bristol Bay. The Alaska seafood industry as a whole is a key economic sector in well over a dozen Alaska communities, and could face hardships due to spillover effects of negative consumer perception. These risks ought to be considered in any analysis of development projects.

B. Any purported corrective action or future plan to mine the Pebble deposit should take into account the evidence that the 2020 Mine Plan was not the intended mine nor was it even economically viable.

The EPA must highly scrutinize any “corrective action” or “future plan” for the Pebble mine with great skepticism. Because the RPD relies on the 2020 Mine Plan, the EPA should further note the gaping discrepancy between the so-called “plan” that it described in its permit applications and its actual plans for the mine.

An applicant for a federal Clean Water Act permit must certify that the information contained therein is “complete and accurate.” (See 18 U.S.C. § 1001 (criminalizing false statements in permit applications).) In its original 2017 Permit Application, the Pebble Limited Partnership (“PLP”) pledged in no uncertain terms that “mining in the open pit will stop after 14 years,” and that production would be limited to 1.1 billion tons of the Pebble deposit. (See 2017 Permit Application, Attachment D §§ 1.8, 3.3, 6.1.) Indeed, PLP pronounced that “The Project plan has been limited to mining the near-surface portion of the Pebble Deposit” in order to “significantly reduce the footprint of the open pit, TSF, and mine facilities.” (Table 23.)

PLP twice amended its applications. In 2019, PLP amended its application to extend active mining operations to 20 years, and in 2020, PLP amended its application again to change

³ <https://www.dropbox.com/s/d314zuhcat1huep/Jardine%20Report%20Final.pdf?dl=0>

the transportation corridor (what the RPD refers to as the “2020 Mine Plan”). In none of these applications did PLP ever disclose any possibility of extending the mining operations beyond 20 years. Indeed, PLP’s CEO testified before Congress that “Pebble has planned a smaller, smarter mine” and has “reduced the mine size” to avoid concerns about environmental impacts. PLP’s CEO testified unequivocally that “Pebble has no current plans, in this application or in any other way, for expansion.” (See The Pebble Mine Project: Process and Potential Impacts Before H. Comm. On Transp. And Infrastructure, 116th Cong. (2019) (statement of Tom Collier, CEO, PLP).)

But PLP and Northern Dynasty Minerals Ltd. (“NDM”) executives have made emphatic pronouncements directly contradicting their sworn certifications and testimony. Mr. Ron Thiessen, NDM’s President and CEO, repeatedly stressed that the 20-year project described in the permit application would be only the first stage in an expansive development of the Pebble deposit. (Attachment C – 2020-09-25 Pebble Project – Letter re Pebble Tapes, Ex. 1-1.) Mr. Thiessen has represented that PLP is “gonna make the application to continue for another 20” years, and that additional mining will become “unstoppable” with “constant expansions” after issuance of the first permit. (Attachment C – 2020-09-25 Pebble Project – Letter re Pebble Tapes, Ex. 1-2.) Mr. Thiessen agreed that significant expansion of the mine is “pretty much 100%” likely, and the actual operational life of the mine is “probably gonna be more than 200 years” and “not gonna be finished for 180, 200 years.” (Attachment C – 2020-09-25 Pebble Project – Letter re Pebble Tapes, Ex. 1-3, 33.) PLP has never disclaimed these statements as untrue.

Moreover, we know that the statements of these executives cannot be brushed off as mere puffery, because one of many fundamental problems with the 2020 Mine Plan is that – in addition to the fact that the mine design itself is completely unproven in this type of environment – its economic viability has never been shown (See, e.g. Attachment D – Chambers — PM will be a 78-year mine 3-14-19, Attachment E – Borden — Economic Feasibility).

Indeed, in a form filed with the U.S. Securities and Exchange Commission dated July 2, 2020 (and in similar filings dating back years), NDM stated flatly that PLP’s mineral interests do not contain any “Mineral Reserves,” meaning mineral resources that have demonstrated economic viability. NDM stated further that its “current mine plan that is included in the Project Description for the development of the Pebble Project is not supported by any preliminary economic assessment or any preliminary or final feasibility study.” Accordingly, any so-called “plan” to spend billions of dollars to develop the massive infrastructure needed to mine the Pebble deposit that purports that it will then shut down after mining only a small fraction of the deposit is not economically or even logically sound and cannot be taken seriously.

The evidence showing the direct contradiction of affirmative, material statements made in a federal CWA permit application constitute clear grounds to reject any attempt by PLP or NDM to modify the 2020 Mine Plan in an effort to circumvent any action the EPA takes here. Any such corrective action or future plan must relate to an actual plan to mine the deposit, not an attempt to game the permitting process by seeking a starter permit intended only to open the door to a much longer-term plan to mine a much larger portion of the deposit. Unless and until an actually intended and economically sound plan is presented so that its true adverse effects can be fully assessed and understood, no “corrective action” or “future plan” should be considered.

C. The Recommended Determination should consider discharges associated with other mine infrastructure, particularly the transportation corridor.

The RPD, and particularly Section 6, does not include any discussion of the transportation corridor. BBRSDA suggests that a brief discussion of adverse effects from the transportation corridor outside of the mine site is warranted, especially given that they compound the adverse effects to the fishery resources to such an extent that they alone could justify EPA action under Section 404(c).

The EPA has itself already recognized this. The May 28, 2020 letter from Regional Administrator Hladick states that discharges associated with dredged or fill material for the LEPDA (North Road Only) “may well contribute to the permanent loss of 2,292 acres of wetlands and other waters..., including 105.4 miles of streams, along with secondary impacts to 1,647 acres of wetlands and other waters, including 80.3 miles of streams, associated with fugitive dust deposition, dewatering, and fragmentation of aquatic habitat.”

That level of impact, which rivals the adverse effects outlined in Sections 4.2.1 through 4.2.4 of the RPD, warrants special acknowledgment and consideration.

D. BBRSDA’s understanding of and suggestions for the Proposed Prohibition and Restriction.

BBRSDA agrees with and supports the comments and recommendations for the Proposed Prohibition and Restriction outlined in Section 7 of BBNC’s comments as well as Section 9 of Trustees for Alaska’s comments, with particular emphasis on the following points:

First, BBRSDA supports an effort to clarify the definition of the Pebble deposit to allow for a more scientific approach and an evolving understanding of the deposit. BBRSDA agrees that this will lead to a more durable and transparent determination.

Second, BBRSDA supports an effort to clarify that the prohibition's reference to 2020 Mine Plan would include substantially similar mine plans or effectively any large-scale porphyry mine at the Pebble deposit. While BBRSDA believes that this is already self-evident in the current wording, it would help guard against any potential misunderstandings and potentially avoid future unnecessary use of EPA's time and resources.

In addition, we understand that the phrase "any future plan" includes not just a narrowly proposed starter plan for purposes of obtaining a permit, but a plan that is economically viable, uses proven technology and methods, and constitutes the actual plan for developing the deposit. To the extent that EPA disagrees, BBRSDA recommends that the restriction be broadened to make this clear.

Finally, BBRSDA notes that the phrase "individually or collectively" in the restriction could be a potential source for confusion, as it is unclear whether it modifies "discharge," or "future plan," or both. It should be obvious both that the recommendation applies to individual or collective discharges, and that "future plan" cannot be segmented in an effort to avoid a finding of unacceptable adverse effects and hide the truly intended plan. But to the extent EPA feels that any clarification is warranted, BBRSDA recommends that EPA do so in its Recommended Determination.

Sincerely,

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June 28, 2019

BY EMAIL AND U.S. MAIL

Program Manager
U.S. Army Corps of Engineers
645 G Street, Suite 100-921
Anchorage, AK 99501

Re: **Pebble Project Draft Environmental Impact Statement and Application for Clean Water Act Permit (POA-2017-00271)**

Dear Army Corps of Engineers:

Our firm represents the Bristol Bay Regional Seafood Development Association (“BBRSDA”). These comments are directed to the Pebble Limited Partnership’s application for a Clean Water Act permit to construct an open-pit mine and to Army Corps of Engineers’ Draft Environmental Impact Statement (“DEIS”) for the Pebble project.

Introduction

Bristol Bay is home to the most valuable wild salmon fishery in the world. The fishery is prized not only for its abundance – it produces more wild salmon than any other location on earth – but also for its self-sufficiency. Unlike most other areas worldwide where salmon are either cultivated or planted, Bristol Bay salmon need no farms, hatcheries, or human assistance other than basic management in the form of harvest limits. In a world of shrinking natural resources and dwindling habitat, the abundance of this wild salmon fishery is truly unique and increasingly rare.

The extraordinary success of the Bristol Bay fishery is rooted in Alaska’s wild, pristine interior that provides immaculate habitat ideal for wild salmon reproduction. Every summer, tens of millions of salmon return to Bristol Bay to run up its rivers and spawn in the pristine inland streams, wetlands, and lakes. Natural spawning and reproduction occurs in the untainted, pure waters of the Bristol Bay watershed. This is the heart of the fishery. This primeval, unspoiled

spawning and rearing habitat is unrivaled anywhere on earth. Left as it has been for millennia, it can support a thriving salmon population in perpetuity, providing a healthy and abundant source of food and jobs indefinitely for generations.

But as remote and isolated as the Bristol Bay habitat and fishery have remained, the legacy of a wild, natural fishery is fragile. Especially during the early and late stages of their lifecycle, salmon are highly sensitive to their surroundings, such that even slight changes in water chemistry, temperature, or sedimentation can have devastating lethal and sub-lethal effects. The science on this fundamental point is well-established and has been repeatedly proven by the loss or substantial degradation of virtually every naturally reproducing salmon fishery in the United States outside of Alaska. And while degraded habitat will undermine a salmon fishery, a toxic release or spill into an aquatic environment like Bristol Bay would cause irreparable long-term damage.

Beyond its ecological importance, the Bristol Bay salmon fishery generates immense economic value. Each year, the Bristol Bay commercial sockeye fishery generates revenue of \$1.2 billion and employs nearly 15,000 people in Alaska. In a state famous for its salmon, Bristol Bay accounts for almost half of the ex-vessel value of all salmon caught in Alaska. More astounding, Bristol Bay provides the world with 45% of the global supply of sockeye salmon (in recent years it has provided over 50%). Protected and preserved, the Bristol Bay salmon fishery will continue as an economic engine year after year, generation after generation.

The economic value of the fishery is far reaching. Residents of 48 different U.S. states either held commercial Bristol Bay salmon fishing permits or participated in the fishery as crew members in 2018. The fishery provides economic opportunity and a way of life to thousands of fishermen and their families, and it will continue to do so indefinitely if not degraded or destroyed. The fishery sustains local communities and generates extraordinary benefits for the State of Alaska. Grocers and cooks throughout the Lower 48 sell and promote wild sockeye, and wild salmon is valued by businesses and individuals throughout the country for its healthy, sustainable, environmentally friendly attributes. Over the last ten years, the Bristol Bay fishery has made tremendous strides capitalizing on these unique values by building a brand for Bristol Bay sockeye that emphasizes the high quality, abundance, and purity of the salmon. The fact that a wild salmon fishery cannot be outsourced or translocated only compounds its economic value to those who depend on it. Given dwindling resources and ever-increasing demand, the value of the Bristol Bay fishery will dramatically increase in the 21st century.

The Pebble project – a massive copper-gold-molybdenum porphyry mine placed at the headwaters of two critical salmon-spawning watersheds – proposes to put all of this at risk, and for very little comparative gain. The project proposes to trade twenty years of modest mining profits for the *permanent* risk of catastrophic impact to the salmon fishery, degraded habitat, and irreparable damage to the fishery's pristine reputation. Simple statistics – and the long history of mining disasters – prove the foolishness of this endeavor. To a self-sustaining resource, adding a permanent risk is no different than putting a time limit on that resource.

Even worse, the Army Corps appears ready to approve this project based on little more than superficial rhetoric and colorful graphics, not science. The DEIS is woefully inadequate and is an affront to sound biological and economic analysis. If the Army Corps issues this permit based on a finalized version of this DEIS, it will be doing so based on information and analysis that is either erroneous, misleading, or altogether missing. Instead of taking a hard look *at* environmental and economic impacts, the DEIS takes a hard look *away* from the profound and predictable impacts of the proposed project.

In doing so, the Army Corps turns a blind eye to the stark conclusions of a 2014 EPA ecological assessment analyzing potential impacts of large-scale mining in the Bristol Bay watersheds. On its own, the 2014 EPA assessment exposes the massive and numerous shortcomings in the DEIS, yet the Army Corps offers no explanation for how it can dismiss the EPA's assessment in favor of its own conclusion that this large-scale mining proposal essentially constitutes an environmental "free lunch" in terms of impact. The DEIS's disregard of the EPA's analysis renders it inadequate and unlawful.

The DEIS is legally flawed and will not withstand legal challenge for many additional reasons, including its oversight of ecological, biological, cultural, and economic impacts. To that end, BBRSDA adopts and incorporates by reference the following submissions and accompanying research: SalmonState, Pacific Seafood Processors Association, Bristol Bay Reserve, and Cameron Wobus (Lynker).

In addition to the issues raised in those submissions, BBRSDA adds the following comments and research focusing on the errors and omissions regarding potential impacts to the economics of the Bristol Bay commercial fishery. These errors and omissions make the lawful issuance of an FEIS or 404 Permit impossible. From an economics perspective, the DEIS is factually illiterate and legally insufficient for the following reasons:

- The DEIS whitewashes the serious immediate and long-term biological impacts of the project. These biological impacts would inflict substantial economic consequences on those who depend on the region's salmon resources.
- The DEIS fails to adequately evaluate the economic impacts of the proposed mine.
- The DEIS ignores the high likelihood of cumulative impacts to the fishery by failing to address the foreseeable expansion of the Pebble mine and the development of industrial access to the Bristol Bay region.
- The DEIS's assessment of alternatives and mitigation measures is legally flawed and insufficient.

Because of these defects, the Army Corps cannot lawfully issue a FEIS based on the current DEIS or any 404 permit for the Pebble project.

Legal Framework

NEPA requires federal agencies to prepare an EIS for all “major Federal actions significantly affecting the quality of the human environment.”¹ The EIS must be a “detailed statement” of: (i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action, (iv) the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resource which would be involved in the proposed action should it be implemented.² The EIS “shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made.”³ An EIS must foster both informed decision making and informed public participation.⁴ A draft EIS “must fulfill and satisfy to the fullest extent possible” the requirements established for a final EIS.⁵

NEPA and its implementing regulations require agencies to take a “hard look” at the environmental consequences of their actions.⁶ This “hard look” must be “timely, and it must be taken objectively and in good faith, not as an exercise in form over substance, and not as a subterfuge designed to rationalize a decision already made.”⁷ Pursuant to NEPA’s “hard look” requirement, the agency must ensure that “the adverse environmental effects of the proposed action are adequately identified and evaluated.”⁸

The agency must consider all foreseeable direct, indirect, and cumulative impacts⁹ of the proposed action.¹⁰ This requires a “reasonably thorough discussion of the significant aspects of the probable environmental consequences” of the proposed action and alternatives thereto.¹¹ When “economic or social and natural or physical environmental effects are interrelated,” the

¹ 42 U.S.C. § 4332(2)(C).

² *Id.*

³ 40 C.F.R. § § 1502.1, 1502.2.

⁴ *California v. Block*, 690 F.2d 753, 761 (9th Cir. 1982); *Trout Unlimited v. Morton*, 509 F.2d 1276, 1283 (9th Cir. 1974).

⁵ 40 C.F.R. 1502.9(a).

⁶ *See, e.g., Northern Plains Resources Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1076 (9th Cir. 2011); *Churchill Cnty. v. Norton*, 276 F.3d 1060, 1072 (9th Cir. 2001); *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989); *Kleppe v. Sierra Club*, 427 U.S. 390, n.21 (1976).

⁷ *Metcalf v. Daley*, 214 F.3d 1135, 1142 (9th Cir. 2000).

⁸ *Robertson*, 490 U.S. at 350.

⁹ “Effects” and “impacts” are synonymous as used in the context of NEPA and its implementing regulations. *See* 40 C.F.R. § 1508.8.

¹⁰ 40 C.F.R. § § 1502.16, 1507.7, 1508.8.

¹¹ 40 C.F.R. § 1502.1; *Block*, 690 F. 2d at 761; *Trout Unlimited*, 509 F.2d at 1283.

EIS “will discuss all of these effects on the human environment.”¹² Put succinctly, the socioeconomic effects that result from a project’s environmental impact must be considered.¹³

The Clean Water Act regulates and protects the waters of the United States by prohibiting the discharge of toxic pollutants in toxic amounts.¹⁴ The Act allows the Army Corps to issue a Section 404 dredge and fill permit for a proposed action that causes “only minimal adverse environmental effects” or “only minimal cumulative adverse effects on the environment.”¹⁵ The permitting guidelines specifically prohibit the issuance of a permit “unless it can be demonstrated that [the discharge of dredged or fill material into the aquatic ecosystem] will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern.”¹⁶

A project shall not be permitted if it contributes to “significant degradation of the waters of the United States.”¹⁷ Effects contributing to significant degradation include: 1) significantly adverse effects of the discharge of pollutants on human welfare, including but not limited to effects fish, wildlife, and special aquatic sites; 2) significantly adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems; 3) significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability; and 4) significantly adverse effects of the discharge of pollutants on recreational, aesthetic and economic values.¹⁸

Analysis

1) The DEIS whitewashes the serious biological impacts of the Pebble mine that will degrade the Bristol Bay fishery.

With minimal analysis, the DEIS disregards the mine’s biological impacts to the Bristol Bay fishery by repeatedly asserting that such impacts will be negligible, minimal, or not measurable.¹⁹ These assertions are conclusory, rely on inadequate science, and fail to consider critically important scientific evidence, rendering the DEIS legally deficient.²⁰

¹² 40 C.F.R. § 1508.14.

¹³ See *Hammond v. Norton*, 370 F. Supp. 2d 226, 242 (D.D.C. 2005).

¹⁴ 33 U.S.C. § 1251.

¹⁵ 33 U.S.C. § 1344(e)(1).

¹⁶ 40 C.F.R. § 230.1(c).

¹⁷ 40 C.F.R. § 230.10(c).

¹⁸ *Id.*

¹⁹ See DEIS § 4.6-5 – 4.6-18

²⁰ See *Cumington Preservation Committee v. Federal Aviation Administration*, 524 F.2d 241, 244 (1st Cir. 1975) (an EIS must not only point to potential environmental problems but must also evaluate them); *Miss. River Basin Alliance v. Westphal*, 230 F.3d 170, 174-75 (5th Cir. 2000) (an EIS must be sufficiently detailed).

Biological impacts from the Pebble mine can be sorted into two general categories. First, the mine is highly likely to cause a number of immediate biological impacts to salmon by degrading or destroying habitat, interfering with natural reproduction, and undermining the pristine conditions necessary for successful salmon spawning and rearing. Second, the mine introduces the risk of environmental catastrophe into the fishery by generating toxic mining waste that would indefinitely threaten the Bristol Bay watershed.

Both the high likelihood of immediate biological impacts and the long-term risks of calamity would irreversibly alter the Bristol Bay fishery that has until now remained untouched by large-scale development, pollution, or degradation of upriver habitat. The DEIS makes no serious attempt to quantify or otherwise evaluate the economic consequences of this dramatic alteration of the fishery. And it fails to acknowledge that the Pebble mine will change the fishery forever by introducing environmental and economic impacts that have never existed and cannot be eliminated.

a) The DEIS improperly dismisses or ignores destruction of spawning habitat and depletion of salmon likely to be caused by the mine.

The DEIS recognizes that the proposed Pebble mine will result in destruction and degradation of salmon habitat.²¹ The EPA had concluded that, even “the smallest” of the several proposed mine sizes “could result in significant and unacceptable adverse effects” on salmon and fishery areas they support.²² In fact, in 2014, EPA Region 10 Administrator Dennis McLerran stated in no uncertain terms:

The science is clear that mining the Pebble deposit would cause irreversible damage to one of the world’s last intact salmon ecosystems.²³

The EPA declared that the impacts to salmon habitat from even the smallest mine scenario would be “unprecedented for the Clean Water Act Section 404 regulatory program in the Bristol Bay region, as well as the rest of Alaska and perhaps the nation.”²⁴ These acknowledgements cannot be squared with the DEIS’s pronouncement that there will be no “long-term, measurable effects” on Bristol Bay salmon. This disconnect is caused by the DEIS’s failure to adequately and fairly account for impacts to salmon populations from the mine’s activities and changes to watershed.

²¹ DEIS § § ES, 4.24, 4.6, 4.27, App. I.

²² Proposed Determination of the US Environmental Protection Agency Region 10 Pursuant to Section 404(c) of the Clean Water Act, Pebble Deposit Area, Southwest Alaska (July 2014), ES-5, 2-17, 4-13 [hereinafter “2014 EPA Proposed Determination”]; *see generally* An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska, U.S. Environmental Protection Agency, EPA-910-R-14-0001A (Jan. 2014) [hereinafter “2014 EPA Assessment”].

²³ EPA News Release, “EPA releases proposal to protect Bristol Bay, Alaska fisheries from potential impacts posed by Pebble Mine,” dated July 18, 2014 [hereinafter “2014 EPA News Release”].

²⁴ *Id.*

First, in Sections 4.6, 4.24, 4.27, and Appendix I, the DEIS acknowledges that the mine will directly and permanently destroy salmon spawning habitat – at least 8.2 miles of the NFK and .75 miles of the SFK. The 2014 EPA Assessment concluded that streamflow reductions and habitat loss resulting from the mine would pose “substantial risks to spawning and rearing habitat” for salmon.²⁵ The DEIS’s contrary attempt to cast this lost habitat as inconsequential is erroneous for multiple reasons. The DEIS fails to translate lost habitat into population impacts, including the risk posed to spawning and rearing areas upstream and downstream from the areas of destroyed habitat. For example, the DEIS fails to account for the vital fact that water from the mining operations will drain into the Nushagak River, Lake Iliamna, and the Kvichak River. Streams and smaller lakes that feed into these larger waterbodies contain many miles of salmon habitat. Any potential polluting of these larger waterbodies could effectively foreclose access to a large percentage of the region’s productive salmon habitat even though the mine’s footprint does not directly destroy a large amount of salmon habitat. Tens of millions of salmon migrate through these waterbodies to reach spawning habitat both downstream and upstream from the proposed Pebble mine site. Given this simple fact, the study area considered by the DEIS is far too small and, therefore, fails to consider foreseeable impacts across a larger area.

The DEIS also misses the fundamental point that the location of the most productive spawning areas in the watershed changes from year to year, so lost habitat in one area can have a highly material impact to the fishery in any given year. And maintaining diverse habitat is critical to the health of the fishery:

Importantly, however, not all habitat supports substantial production in any given year. Rather, Nushagak River sockeye salmon are produced by a spatial mosaic of habitats whose profitability shifts from year to year.... These results emphasize the importance of habitat complexity for stabilizing production of sockeye salmon through time from this, and other, river ecosystems. Environmental impact assessments of potential development activities must take into account the fact that habitat conditions are continuously varying and that the important of any component of habitat can be disproportionately important for sustaining fisheries in some years, even if their average contribution are small over the long-term.²⁶

Rather than accounting for this science, the DEIS ignored it.

Second, with minimal scientific analysis, the DEIS largely dismisses or disregards impacts from degraded spawning habitat. Abundant scientific literature – and the history of salmon everywhere in the United States outside of Alaska – shows that changes to

²⁵ 2014 EPA Assessment at 7-57.

²⁶ Sean Brennan and Daniel Shindler, Using Strontium in Otoliths to Determine the Natal Origin and Habitat use of Sockeye Salmon in the Nushagak River, *prepared for* Bristol Bay Regional Seafood Development Assn., p. 2 (Oct. 1, 2017), https://static1.squarespace.com/static/56b0dfb660b5e98b87fc3d52/t/59de8b3a59cc6888e98697d6/1507756916739/BBRSDA_finalReport_Schindler+2017_compressed.pdf.

sedimentation, water temperature, and water levels cause major impacts to the spawning and reproduction of wild salmon.²⁷ The DEIS fails to quantify the impact to salmon populations likely to be caused by diminished spawning success that result from changes to the sedimentation, temperature, and water levels in the watershed.

Third, the DEIS fails to provide an adequate analysis of the impact of road construction and a transportation corridor in the midst of critical salmon spawning habitat. The DEIS largely dismisses potential impacts based on supposed mitigation measures, without noting that habitat preservation measures such as culverts require maintenance and repair – something that must occur in perpetuity and long after the mine operator has left the scene. Even with maintenance, culvert failure or blockage can eliminate streams as spawning grounds.²⁸ And development of a transportation corridor threatens the fishery with numerous impacts that the DEIS fails to study or quantify.

Fourth, the DEIS ignores impacts to salmon from copper dust. The DEIS fails to examine the serious risk that introduction of copper dust into the watershed will interfere with salmon runs, the volume of salmon returning to spawn, and the aquatic food sources salmon require.²⁹ The DEIS made no effort to examine or quantify these impacts.

Finally, the DEIS fails to account for releases of selenium into the watershed. The DEIS grossly understates releases of waste products from the mine through leaching, releases from ponds, and the imperfect water treatment.³⁰ Among other things, the DEIS's failure to account for the risk of selenium contamination stems from the agency's willingness to blindly accept the mine's assumptions rather than data from previous treatment systems. And the DEIS fails to quantify the extent of leakage.

Uncritically accepting a mine operator's assurance that nothing will go wrong does not substitute for sound analysis. The DEIS fails to provide examples of other mines that otherwise might buttress PLP's claims that its mining approach contains adequate environmental safeguards to avoid harming aquatic resources.

²⁷ See, e.g., Clifford Riebe, et al., Optimal Reproduction in Salmon Spawning Substrates Linked to Grain Size and Fish Length, 50 *Water Resources Research* 898 (2014), <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2013WR014231>; S.M. Greig, et al., The Impact of Fine Sediment Accumulation on the Survival of Incubating Salmon Progeny: Implication for Sediment Management, 344 *Science of The Total Environment* 241 (2005), <https://doi.org/10.1016/j.scitotenv.2005.02.010>.

²⁸ Michael Kravitz & Greg Blair, On Assessing Risks to Fish Habitats and Populations Associated with a Transportation Corridor for Proposed Mine Operations in a Salmon-rich Watershed, *Environmental Management*, p. 11 (2019), <https://doi.org/10.1007/s00267-019-01171-w>.

²⁹ See Carol Ann Woody, Copper, Salmon and the Proposed Pebble Mine, Fisheries Research and Consulting, http://pebblescience.org/pdfs/Pebble_copper_salmon.pdf.

³⁰ See Kendra Zamzow, et al., Selenium Issues in the Pebble Project Draft EIS, *prepared for the U.S. Army Corps of Engineers* (Apr. 2019).

b) The DEIS fails to account for the catastrophic risks to the fishery posed by a spill or discharge event.

The DEIS chooses to disregard the risk of a tailings dam failure based on its claim that such a catastrophe is low probability during the life of the mine. This failure to sufficiently analyze the risk of a tailings dam failure is a direct violation of NEPA.³¹ Moreover, the DEIS's limited analysis of the impacts from a dam failure is fundamentally flawed for multiple reasons.

First, by limiting its risk assessment to the supposed 20-year period of active mine operations, the DEIS is misleading. Because, mine waste will remain toxic indefinitely, any honest analysis of the risk must extend the time horizon to the foreseeable future. Stating the obvious point that the DEIS refused to acknowledge, the risk of failure increases over time and even a small risk of failure in any given year makes an event more likely as the relevant time period expands. And even as the structural integrity of the dam may degrade over time, the risk of earthquakes or other natural disasters increases given a longer time horizon.³²

The DEIS's flawed analysis on this point highlights the agency's unlawful approach to environmental review. The mine's threat to the environment will not end with cessation of mining activities, and the Army Corps has a duty to assess the full scope and duration of potential impacts to the environment. Instead, by limiting its analysis to the mine's active operation, the DEIS exposes that its frame of reference for evaluating the project is the mine and its operators, not the environment and the permanent risks it will pose. This flawed approach is made even worse by the DEIS's willingness to accept that mining operations will cease after 20 years, notwithstanding the agency's recognition that expanded operations are foreseeable. In so doing, the agency abandoned objective assessment of risk by uncritically limiting its analysis to the most favorable time period and then pretending that no risk of spillage would occur after operation of the mine. This is agency malfeasance that violates the letter and spirit of NEPA.

Second, the DEIS underestimates risk by blindly adopting the mine's sanguine assumptions and failing to account for the geological and seismological features of the mine's

³¹ See *Gov't of the Province of Manitoba v. Salazar*, 691 F. Supp. 2d 37, 50 (D.D.C. 2010) ("It may be that the risk of a breach is low given the pipeline's construction, but that is not an excuse for Reclamation to refuse entirely to analyze the *consequences*. When the *degree* of potential harm could be great, i.e. catastrophic, the *degree* of analysis and mitigation should also be great.") (emphasis in original); *Sierra Club v. Watkins*, 808 F. Supp. 852, 868 (D.D.C. 1991) (holding that, given disputed evidence concerning the possibility of severe accidents, an agency may not simply "refus[e] to include certain low probability risks" — it must at least "admit that such accidents are possible," determine the probability of occurrence, and "discuss[] their potential effects.").

³² See, e.g., Lynker Technologies, LLC, A Model Analysis of Flow and Deposition from a Tailings Dam Failure at the Proposed Pebble Mine, prepared for the Nature Conservancy and Bristol Bay Regional Seafood Development Assn. (2019), https://static1.squarespace.com/static/56b0dfb660b5e98b87fc3d52/t/5c9a42bba4222fa3768a60ad/1553613518877/Lynker_TSF_Pebble_Model+-+Final+Report.pdf [hereinafter "2019 Lynker Report"], which is hereby incorporated by reference in its entirety.

location. Sound scientific analysis shows that, even during the short 20-year assumed operation of the mine, there is at least a 1% chance of a catastrophic spill.³³ Due to the large scale of the mine, extent of precipitation, and the area's geology, that risk is likely conservative.³⁴ The DEIS ignores the consequence of this risk: a death sentence for the fishery.

Third, it is improper for the agency to use the relatively low probability of a catastrophe as an excuse to avoid assessing the environmental consequences should it occur. Due to the extreme consequences of a tailings dam failure, even a low-probability event introduces a material risk of environmental disaster that the agency is obligated to understand and assess. Even accepting as factual the fiction that the mine's footprint will be limited to the version assessed in the DEIS, the scale of the project and the amount of mining waste it will generate create the risk of an environmental disaster on par with the mining industry's worst catastrophes.

The spill and tailings storage facility (TSF) failure scenarios contained in the DEIS are superficial and lack the rigorous, objective analysis required by NEPA. The DEIS performed no modeling, failed to look at actual TSF failures, discussed a few arbitrary scenarios, and cited no supporting evidence for its ultimate conclusion that no adverse impacts are likely to occur. In contrast, the BBRSDA commissioned an expert who rigorously and objectively evaluated a potential TSF failure by conducting key modeling and thorough analysis, and who also made his findings public.³⁵ The results were staggering. Utilizing information about the size of actual TSFs, the amount of tailings material disbursed from actual failures, and the topographic profile of Pebble mine's downstream environment, the Lynker Report concluded that based on the size of the proposed "small" Pebble mine plan, a TSF failure would be roughly 10 times larger than the Mount Polley TSF failure or the failures in Brazil at the Brumadinho and Samarco mines.³⁶ The Lynker Report proves that a tailings dam failure could destroy hundreds of miles of pristine salmon habitat in the country's largest remaining wild salmon fishery.³⁷

One possible, yet ultimately invalid, explanation for the Army Corps' oversight in performing a more rigorous analysis of potential TSF failures (such as performed in the Lynker Report) is the possibility that the Army Corps believes that the bulk TSF will be a "dry" TSF and that material from the PAG TSF will be returned to the mine pit after closure, potentially reducing the risk of a failure. But it is not clear if or how PLP would carry this out. The DEIS states that the mine will use a Thickened Tailings Storage method during the operational period.³⁸ So, the tailings will not really be dry, but rather a slurry with a target of 55% solids

³³ *Id.*, p. 1.

³⁴ See Stuart Levit & David Chambers, Comparison of the Pebble Mine with Other Alaska Hard Rock Mines, Center for Science in Public Participation (2012), https://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=513582.

³⁵ See 2019 Lynker Report.

³⁶ *Id.*, p. 6.

³⁷ 2019 Lynker Report, p. 46.

³⁸ DEIS § App. B-62.

having a “molasses” consistency at best. The DEIS does not contain information about how the region’s relatively wet environment will not make the tailings material even more fluid. Also, a technical memorandum from AECOM (which was submitted to the Army Corps) shows there is no precedent for large thickened tailings storage facilities in environments like the proposed Pebble site:

In response to RFI-010 Item 6 regarding examples of successful thickened TSFs in cold regions, PLP provided case history summaries and references on five mines (see Attachment A: RFI-010, Part 2, response). AECOM conducted an independent review of these mine sites, and found that they cannot readily be compared to Pebble, both individually and collectively.

Based on AECOM’s review, it is concluded that there is a limited history of successful thickened tailings operations at large mines in cold regions, coupled with many site and operation differences between the Pebble plan and the other project operations.

Historically, this is the least common facility type in Canada. Based on our research, consistency of tailings product over time and lack of ability to achieve steep tailings slopes are a main concern with high density thickened / paste tailings.³⁹

The DEIS provides scant evidence about how the mine operator would keep the bulk TSF “dry” in perpetuity and fails to provide real-life examples demonstrating that it can even be done in a place like the proposed mine site with such unique weather patterns and hydrological conditions. Nor does the DEIS contain requirements or consequences for the mine operator in the event that water levels in either TSF rise to unacceptable levels. At a minimum, the DEIS should have extensively investigated the precedent for such a scenario and should have created a set of stringent project requirements to ensure that such critical elements of the mine plan are preserved and prioritized in perpetuity. Bristol Bay is not the place to experiment with untested mining activities. Even if the DEIS addresses this in the FEIS, it would be too late. The public has not been given all the information on this point and would be stripped of its right to review and comment on this critical feature of the mine plan.

Fourth, the DEIS fails to include any serious analysis of the long-term risk to the watershed posed by toxic mine tailings even in the absence of a dam failure. The DEIS uncritically accepts the proposition that the mine’s toxic sludge can be stored indefinitely without any serious environmental impact from leaching in a geologically porous area.

³⁹ Technical Memorandum to Bill Craig, AECOM (Re: Review of Tailings Thickening Experience in Cold Regions) (June 28, 2018), <https://pebbleprojecteis.com/files/5c5dc4fe-317d-4f6c-b3ea-1c7d3138aec3>.

Finally, the DEIS's decision to ignore the long-term risks posed by mine waste allows the agency to also ignore the full extent and duration of mitigation measures, funding, and disaster response necessary to redress a spill. Nor does the agency provide any assessment of the difficulty in stopping or remediating a spill in a remote area like Bristol Bay. It would constitute a fundamental abdication of the agency's mission and duties to expose the Bristol Bay fishery to an indefinite risk of environmental calamity without conducting a serious assessment of whether and how such a disaster could be contained and remediated.

c) The DEIS fails to assess the economic consequences of these biological impacts.

While the DEIS fails to adequately assess impacts of the proposed mine on Bristol Bay's biological resources, its failures are even worse when evaluating the commercial and economic consequences of those biological impacts. The DEIS makes no attempt to assess the impact of the mine on commercial fishing jobs, margins of the various participants in the fishery, level of participation in the fishery, or risks to the viability of commercial fishing operations.

The DEIS fails to acknowledge that Bristol Bay salmon produce significant economic benefits at a regional, statewide, and national level. The commercial salmon fishery in Bristol Bay is the most valuable wild salmon fishery in the world and is the economic foundation of the region.⁴⁰ Each year, the Bristol Bay commercial sockeye fishery generates revenue of \$1.2 billion and supports over 15,000 jobs.⁴¹ Fishermen and processors own \$1.2 billion of regional assets that are dependent on the fishery.⁴² In 2018, Bristol Bay salmon accounted for 47 percent of the preliminary ex-vessel value of all salmon caught in Alaska.⁴³ Once post-season price adjustments are factored in, Bristol Bay will likely account for more than 50 percent of the entire Alaskan salmon fishery value in 2018.⁴⁴ Additionally, Bristol Bay commercial salmon fisheries produce large quantities for export markets, resulting in a large impact on the national economy. From 2013 to 2017, the commercial Bristol Bay salmon fishery yielded an average of \$235 million worth of exports, which help offset the U.S. trade deficit and brought new money into the U.S. economy.⁴⁵ Bristol Bay is a key player in the Alaskan seafood industry, which is the State's

⁴⁰ Wink Research & Consulting, *Economic Benefits of the Bristol Bay Salmon Industry*, prepared for the Bristol Bay Regional Seafood Development Assn., p. 1 (July 2018), <https://static1.squarespace.com/static/56b0dfb660b5e98b87fc3d52/t/5b7b38e6aa4a99fdf3b45215/1534802160748/Economic+Benefits+of+Bristol+Bay+Salmon+Full+Report+-+July+2018+-+updated+082018.pdf> [hereinafter "2018 Wink Research & Consulting Report"].

⁴¹ *Id.*

⁴² *Id.*, p. 2.

⁴³ See Pebble Mine DEIS Comment filed by Andy Wink (June 2019) [hereinafter "2019 A. Wink Comment"]; see also 2018 Alaska Commercial Salmon Harvest – Ex-Vessel Values, Alaska Dept. of Fish & Game, https://www.adfg.alaska.gov/static/fishing/pdfs/commercial/2018_preliminary_salmon_summary_table.pdf.

⁴⁴ 2019 A. Wink Comment.

⁴⁵ 2018 Wink Research & Consulting Report, p. 38.

largest private-sector employer.⁴⁶ Nowhere does the DEIS address the very real, large, adverse economic consequences that the proposed action would have on the regional economy that depends on Bristol Bay and the national economy that greatly benefits from Bristol Bay.

The DEIS should have accounted for the economic reality of commercial fishing operations in Bristol Bay. Had it done so, it could not have dismissed the large economic impact caused by even marginal declines in the quantity or price of sockeye salmon. Given the economics of participating in the fishery, even small changes in revenue can alter the viability of fishing operations.

As fisheries accountant and Bristol Bay commercial fisherman Jerry Liboff details in his comment on the DEIS, participation in the Bristol Bay salmon fishery requires significant investments. A Bristol Bay fisherman typically makes initial investments anywhere from \$500,000 to \$700,000 in vessel, permits, and gear to enter the industry.⁴⁷ Additional expenses are required each season to remain viable. And it is not uncommon for fishermen to have invested over \$1 million in their venture, as detailed by multiple comments on the DEIS.⁴⁸ In addition to these investments, approximately 50% of the fleet is financed with high-interest loans.⁴⁹ Because many Bristol Bay fishermen are paying down their capital investments, even years after entering the industry, much of the fishery is subject to high fixed costs and thin margins. And virtually all costs are essentially fixed if fishermen commit to participate in the fishery, since fishermen have a very limited ability to scale investments in nets, gear, and crew based on harvest.

In addition to high fixed costs, fishermen face natural variability in harvest. Even under normal, natural conditions, fishermen may break even or lose money in any given year. It is therefore critical for fishermen to capitalize on good years and avoid any reductions in revenue from external or artificial sources. As Mr. Liboff explains, given the high fixed costs associated with the Bristol Bay fishing industry, something as small as a 10-20% decline in revenue – whether from fewer fish or lower prices – can eliminate a profitable year.⁵⁰ And just one or two depressed seasons can be enough to put Bristol Bay fishermen out of business, induce default on loans, or force sale of their fishing assets. Numerous comments on the record by commercial fishermen support this conclusion.⁵¹

⁴⁶ *Id.*, p. 39.

⁴⁷ Pebble Mine DEIS Comment filed by Jerry Liboff (June 2019) [hereinafter “2019 J. Liboff Comment”].

⁴⁸ *See, e.g.*, Pebble Mine DEIS Comment filed by Nick Lee of Alaska Select Seafood (June 2019) [hereinafter “2019 N. Lee Comment”]; Pebble Mine DEIS Comment filed by Fran Kaul of Misty Fjord Seafood Producers (June 2019) [hereinafter “2019 F. Kaul Comment”]; Pebble Mine DEIS Comment filed by the Niver Family of Surrender Salmon (June 2019) [hereinafter “2019 Niver Family Comment”]; Pebble Mine DEIS Comment filed by Steve and Jenn Kurian of Bride of Bristol Bay and Wild for Salmon (June 2019) [hereinafter “2019 S&J Kurian Comment”].

⁴⁹ 2019 J. Liboff Comment.

⁵⁰ *Id.*

⁵¹ *See, e.g.*, 2019 J. Liboff Comment; 2019 N. Lee Comment; 2019 F. Kaul Comment; 2019 Niver Family Comment; 2019 S&J Kurian Comment.

Moreover, Bristol Bay fishermen have never before had to contend with the significant added risks that would accompany the Pebble mine and manmade development in Bristol Bay's headwaters. The DEIS is silent on the economic impacts of accounting for the changed risk profile caused by the mine. While the immediate, short-term biological risks may not eliminate salmon, reduced salmon runs in any given year can materially change the economic dynamics of the fishery, the value of permits, the calculus of fishermen, and the level of participation in the fishery. Yet the DEIS does nothing to address these issues that are central to evaluating the real economic impacts of the proposed mine.

The threat from the Pebble mine lasts as long as its mining waste – essentially in perpetuity.⁵² The DEIS does not account for the permanent change to the risk profile of the fishery facing not only current fishermen but also their children and future fishing generations. All Bristol Bay commercial fishermen have to decide whether to enter the fishery and stay in it. As several comments on the record explain, mere consideration of the proposed action discourages the younger generation from entering.⁵³

Simply put, the DEIS offers no serious analysis of the impact that the mine would have on the Bristol Bay fishing industry.

2) The DEIS includes factual errors and fails to adequately address the economic impacts from the Pebble mine on the brand and price of Bristol Bay salmon.

The DEIS's assessment of the potential impacts of the Pebble mine on the brand and price of Bristol Bay salmon is a factual and legal disaster. On this subject, the DEIS is so riddled with fundamental factual errors, so divorced from the real-world marketplace, and so devoid of adequate analysis that it sacrifices the agency's credibility and calls into question whether the agency possesses the basic competencies needed to evaluate this project. Absent a complete do-over of the DEIS's assessment of economic impacts, the environmental review of the Pebble mine cannot survive legal scrutiny.

The DEIS acknowledges that a "potential impact" of the proposed project on commercial fishing includes the "reduction in consumer willingness to buy Bristol Bay salmon due to a perceived loss of quality, resulting in lower prices to be paid to commercial harvesters."⁵⁴ The DEIS even points out that scoping comments specifically addressed concerns that the Bristol Bay commercial fishery would be impacted and that the Bristol Bay wild salmon brand would be damaged by the presence of an open-pit copper mine in the heretofore pristine watershed.⁵⁵ After acknowledging this serious issue, the DEIS failed to undertake any economic analysis regarding

⁵² 2019 A. Wink Comment.

⁵³ See, e.g., 2019 F. Kaul Comment; Pebble Mine DEIS Comment filed by Nels Ure (June 2019) [hereinafter "2019 N. Ure Comment"].

⁵⁴ DEIS § 4.6-1.

⁵⁵ *Id.*

the foreseeable impacts that the mine would have on consumer willingness to buy Bristol Bay salmon. Instead, the DEIS simply asserts, without analysis, that a decline in market perception is “not expected.”⁵⁶

Potential impacts of the mine on the commercial standing of the Bristol Bay fishery is of extreme importance. Any reasonable assessment of the mine and its impacts must start with a clear-eyed, fact-driven, detailed, and reasoned examination of the market position of Bristol Bay salmon, the relationship between public perception and price, the branding and marketing of the fishery, and the economic drivers of the fishery’s success. This should require an exercise in economic analysis. Instead, the DEIS attempts to justify its assertions with this short paragraph containing no analysis of economic substance:

As noted in Section 3.6 [a reference to two paragraphs containing price data from 1997-2017], Bristol Bay salmon is a “price-taker,” it does not have a cohesive brand identification as the Copper River fishery does to help drive prices higher. Therefore, Bristol Bay prices reflect both the market for wild Alaskan salmon products and the broader market for all salmon products. In addition, prices paid in Bristol Bay are nearly always lower than those paid in other Alaska salmon fisheries producing similar products, which reflects the higher transportation expense associated with Bristol Bay’s geographic location.⁵⁷

The DEIS makes no attempt to substantiate any of this. It cites virtually no facts, relies on no economic expertise, and makes no attempt to measure impacts of branding. The DEIS’s lack of any reasonable discussion and detailed analysis on this topic renders its conclusion legally deficient.⁵⁸

The DEIS’s failures on these points is made all the worse by the fact that an economic framework and abundant economic literature exist to provide a basis for the agency to conduct a competent analysis.⁵⁹ In particular, abundant scholarship exists around preferences for wild salmon, the value of seafood branding, and threats to the marketability of seafood posed by both

⁵⁶ *Id.* § 4.6-2.

⁵⁷ *Id.*

⁵⁸ *See* 40 C.F.R. § § 1502.16, 1507.7 (the agency must consider all foreseeable direct and indirect impacts of the proposed action); *Block*, 690 F. 2d at 761; *Trout Unlimited*, 509 F.2d at 1283 (the NEPA process requires a “reasonably thorough discussion of the significant aspects of the probable environmental consequences” of the proposed action and alternatives thereto); *Westphal*, 230 F.3d at 174-75; *Cumington Preservation Committee*, 524 F.2d at 244 (an EIS must not only point to potential environmental problems, but it must also evaluate them in a sufficiently detailed manner).

⁵⁹ Sunny Jardine, Comments on the Economic Analysis in the Pebble Project Draft Environmental Impact Statement, *prepared for* Bristol Bay Regional Seafood Development Assn. (June 2019), § § 1-2, [hereinafter “2019 S. Jardine Comment & Economic Analysis”], which is hereby incorporated by reference in its entirety.

actual or perceived contamination. Yet the agency turned a blind eye to the rudiments of assessing brand, threats to brand damage, and marketplace impacts.

Moreover, the Pebble mine poses threats to the vibrant recreational fishery in Bristol Bay that are at least as dire as threats to the market standing of the Bristol Bay fishery.⁶⁰ The recreational fishery depends not only on abundant salmon runs, but also the wild, pristine habitat that supports them. Just like the commercial fishery, the success of the recreational fishery is linked to the public's perception of Bristol Bay as a wild, untainted environment. Yet the DEIS offers no analysis of any substance regarding impacts to recreational fishing interests.

Had Army Corps fulfilled its legal duties to analyze the foreseeable environmental and socioeconomic consequences of the proposed action, it would have come to the same conclusion the EPA reached in 2014: that the proposed action poses unacceptable adverse impacts to the Bristol Bay commercial fishery, including negative direct and indirect impacts on the market perception of Bristol Bay salmon.

a) Without evidence or factual support, the DEIS falsely denies the unique economic value and market position of the Bristol Bay fishery.

Without analysis, the DEIS asserts that the Bristol Bay fishery is a “price taker” such that participants in the fishery cannot influence the price of Bristol Bay salmon. According to the superficial analysis in the DEIS, Bristol Bay salmon is essentially indistinguishable in the marketplace from farmed salmon and receives no price premium. These assertions are just plain wrong, and these factual errors render the DEIS's assessment of commercial fishing impacts deeply flawed.

The DEIS acknowledges in a fleeting statement that “individual and collective efforts around marketing, improved quality product, and developing new markets and products can also have long-term effects on the value of salmon at the harvester level.”⁶¹ But the DEIS failed to analyze any of these important factors in the context of the market for Bristol Bay salmon. As a result, the DEIS incorrectly determined that Bristol Bay is a “price taker” and has “no cohesive brand,” yielding an unsubstantiated assessment that adverse impacts to the Bristol Bay brand are “not expected.”⁶² The DEIS made no effort to quantify the impact of branding and sourcing on the price of Bristol Bay salmon. Without actual economic analysis, the DEIS has no basis for these assertions.

Had the DEIS analyzed these critical factors, it would have reached a drastically different conclusion. A basic analysis of these factors reveals: 1) Bristol Bay is known for being the most abundant sockeye salmon source in the world due to proper management of the fishery, including protection of its pristine headwaters; 2) the Bristol Bay fleet has instituted key quality-

⁶⁰ *Id.*, § 3.

⁶¹ DEIS § 3.6-5.

⁶² *Id.* § 4.6-2.

control mechanisms to improve the quality of their catch, which has made Bristol Bay sockeye one of the highest-quality products available on today's market; and 3) the Bristol Bay fishing community has undertaken significant efforts to develop a robust branding and marketing campaign, which has helped boost Bristol Bay sockeye salmon to the top of consumer desirability. As such, Bristol Bay is a leader in today's market for wild, sustainable, pure sockeye salmon. The DEIS did not undertake any analysis providing a basis to deny these facts.

Numerous comments submitted on the record elaborate on these three factors, providing overwhelming evidence that Bristol Bay has a strong brand, that Bristol Bay is not a price-taker, and that the proposed action poses unacceptable, foreseeable adverse impacts to the brand and marketability of Bristol Bay sockeye salmon.⁶³ Because the comments speak for themselves in addressing these issues, we refer the Army Corps to those comments, incorporate them by reference, and highlight only some of the main points here.

First, proper management of the fishery, including not allowing any development in the headwaters, is critical to the brand of Bristol Bay sockeye and the sustainability of the most abundant wild sockeye resource in the world. The Bristol Bay watershed has been regulated and managed for over a hundred years, securing the viability of the headwaters and streams, resulting in a sustainable, renewable resource. The fact that Bristol Bay sockeye has no contamination, and no possibility of contamination, is critical to the Bristol Bay brand, which is premised on coming from an abundant, pristine environment.

Second, starting in the early 2000s, the Bristol Bay fleet began investing in and prioritizing quality-control mechanisms, moving away from producing canned salmon to premium fillets. This revolutionized the industry. Bristol Bay fishermen have made substantial investments in hydraulically driven chilling units to immediately chill and preserve the fish on board the vessel. In 2008, only 16 percent of salmon caught in Bristol Bay were chilled, but by 2018 this figure increased to 86 percent.⁶⁴ Fishermen have begun using mats and salmon slides to ensure the fish are not bruised, they hand-bleed the fish immediately after being caught, and they tender their catch to a processor for immediate gutting, filleting, flash-freezing, and vacuum-packing to preserve the quality. These are known practices of Bristol Bay, which produce premium-quality sockeye fillets at the top of the market. These practices distinguish Bristol Bay's product from other salmon products such as farmed salmon, which contain

⁶³ 2019 N. Lee Comment; 2019 F. Kaul Comment; 2019 Niver Family Comment; 2019 S&J Kurian Comment; 2019 N. Ure Comment; 2019 A. Wink Comment; Pebble Mine DEIS Comment filed by Michael Jackson of BBRSDA (June 2019) [hereinafter "2019 M. Jackson Comment"]; Pebble Mine DEIS Comment filed by Fritz Johnson of BBRSDA (June 2019) [hereinafter "2019 F. Johnson Comment"]; Pebble Mine DEIS Comment filed by Elizabeth Herendeen (June 2019) [hereinafter "2019 E. Herendeen Comment"]; comments submitted by over 30 professional chefs; comments submitted by over 100 commercial fishermen; and comments submitted by retailers who purchase Bristol Bay sockeye.

⁶⁴ Northern Economics, 2018 BBRSDA Processor Survey, *prepared for* Bristol Bay Regional Seafood Development Assn., p. 1 (May 2019), <https://static1.squarespace.com/static/56b0dfb660b5e98b87fc3d52/t/5cd5e3c6eb39313ec9967cb1/1557521372047/2018+BBRSDA+Processor+Survey+Report+Final.pdf>.

antibiotics, growth hormones, and dyes; from other wild salmon not preserved at the point of harvest; and from and foreign imports of salmon, which are often twice-frozen and contain unhealthy preservatives.⁶⁵

Third, approximately 15 years ago, Bristol Bay initiated efforts to develop the Bristol Bay brand and instituted a concerted marketing campaign to promote its wild salmon. Through the WhyWildProgram and the Savor Bristol Bay Campaign, efforts were dedicated to cultivating public awareness of the ecological and health benefits of consuming wild salmon over farmed salmon and to increase awareness of Bristol Bay's valuable, sustainable resources, building market appreciation for Bristol Bay sockeye.⁶⁶ The marketing campaign focused on the strengths of Bristol Bay sockeye: a high-quality, abundant product that is sustainably sourced from a pristine environment.⁶⁷ BBRSDA developed logos, targeted branding initiatives, and point-of-sale promotions, launching a concerted effort similar to other regions, such as Copper River.⁶⁸ BBRSDA even flew chefs to Bristol Bay to familiarize them with the region's ecological purity, its commitment to sustainability and preservation, and the many hardworking fishermen who dedicate their lives to the fishery.⁶⁹ As a result, many chefs, such as world-renown chefs Tom Douglas, Rick Moonen, Nora Pouillon, and Tom Colicchio, have developed a strong connection to Bristol Bay and feature Bristol Bay sockeye on their menus.⁷⁰ In 2016, BBRSDA ramped up marketing efforts even further, investing more than \$2 million in promoting the branding of Bristol Bay Sockeye Salmon to ensure that each salmon's source is known and easily verified at the time of purchase.⁷¹

Fourth, over the past decade, a number of Bristol Bay commercial fishermen have launched direct-marketing and distribution businesses, successfully selling Bristol Bay sockeye to consumers all across the United States. These businesses are flourishing at exceptional rates, selling directly to grocery stores, health food cooperatives, restaurants, local farmers markets, and individual consumers. Their marketing efforts promote the pure, wild, traceable, and sustainable nature of their catch. These are critical selling points to their customers who prioritize knowing that their food lacks any risk of potential contamination. Their businesses and livelihoods are rooted in exactly what the proposed action threatens: the purest, most abundant source of sockeye in the world.⁷²

Finally, Bristol Bay sockeye is posed to gain additional market power so long as it does not have to contend with the adverse risks that accompany the proposed action. The payoffs from

⁶⁵ See, e.g., 2019 N. Lee Comment; 2019 F. Kaul Comment; 2019 S&J Kurian Comment.

⁶⁶ 2019 E. Herendeen Comment.

⁶⁷ *Id.*

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ 2019 A. Wink Comment.

⁷² See, e.g., 2019 N. Lee Comment; 2019 F. Kaul Comment; 2019 Niver Family Comment; 2019 S&J Kurian Comment.

the community's organized branding efforts and marketing campaigns are just starting to accrue.⁷³ For example, just last year, there were over 1,000 promotions for "Bristol Bay Sockeye Salmon" in grocery stores nationwide.⁷⁴ Moreover, recent years have seen an increase in supply of Bristol Bay sockeye, which has been met with price increases.⁷⁵ The 2018 season was the largest Bristol Bay sockeye return on record and received one of the highest prices of all time.⁷⁶ This defies normal supply-demand economics, evidencing that Bristol Bay sockeye continues to rise to the forefront of consumer awareness and desirability.⁷⁷ Bristol Bay stands to gain even greater market power as other Alaskan waters, such as Copper River, have seen a decline in run size over the last several years.⁷⁸ Given the recency of these efforts, the traction that BBRSDA and the fishery have gained has been impressive and will only grow in the future.

Moreover, the DEIS errs by not accounting for ongoing branding efforts and the future value of a wild, untainted salmon fishery. The potential impacts of the mine determine the proper timeframe for analyzing its economic impacts – many decades. The DEIS should account for the future brand value, rather than limiting analysis to a fixed point in time.

This point is underscored by the DEIS's failure to account for non-use values of the Bristol Bay fishery.⁷⁹ The DEIS makes no attempt to acknowledge the possibility of public's interest in maintaining one of the last remaining wild salmon fisheries in the country, much less to quantify the value that the public accords this resource. Understanding that non-use value would provide context for consumers' willingness to pay a premium for wild salmon from untainted sources. Yet the Army Corps entirely ignored the analysis in reducing Bristol Bay salmon to a commodity with no value beyond farmed salmon.

Because the DEIS fails to consider any of these factors, it wrongly concludes that impacts to the marketability of Bristol Bay sockeye salmon are "not expected." To the contrary, the mine threatens to destroy a central market advantage of the fishery – the wild, pristine, untainted source of Bristol Bay salmon. The DEIS omits any analysis denying that the project poses unacceptable direct and indirect impacts to the brand of Bristol Bay sockeye salmon, which is predicated on being high-quality from a pristine source. As discussed in detail in Section 1, the proposed action poses real risks of contamination in its day-to-day operations, or even worse, in the event of a catastrophic tailings storage facility. If contamination occurs, the entire Bristol Bay brand will be destroyed.

⁷³ 2019 E. Herendeen Comment.

⁷⁴ *Id.*; see also Bristol Bay Regional Seafood Development Assn., Bristol Bay Sockeye Market Report, p. 19 (Fall 2018), <https://static1.squarespace.com/static/56b0dfb660b5e98b87fc3d52/t/5bec7cbc758d46d1ac7450ec/1542225095765/BBRSDA+Sockeye+Market+Report+-+Fall+2018+-+Full+Color.pdf> [hereinafter "2018 Bristol Bay Sockeye Market Report"].

⁷⁵ 2018 Bristol Bay Sockeye Market Report, pp. 6-7.

⁷⁶ *Id.*, pp. 1, 6-7.

⁷⁷ *Id.*

⁷⁸ 2019 A. Wink Comment; 2019 E. Herendeen Comment.

⁷⁹ 2019 S. Jardine Comment & Economic Analysis, § 4.

Even if relatively little contamination occurs, the impact to the market will be exponential. Market perception will be heavily tainted as consumers will not risk eating potentially contaminated food. The market would not only shift to other sources of salmon, including farmed salmon and other sources of protein, resulting in severe price declines and diminished demand for Bristol Bay salmon.

The annual value of the price premium that Bristol Bay salmon enjoy over farmed salmon is at least \$201 million in ex-vessel landings.⁸⁰ A contamination event – or even a market scare based on negative publicity around water quality – could eliminate the marketability of Bristol Bay salmon altogether. But even if Bristol Bay lost only its price premium vis-à-vis farmed salmon, that loss of \$201 million amounts to a loss of billions of dollars over the supposed 20-year operational life of the mine.⁸¹ Even in conservative terms, the Pebble mine puts at risk at least two-thirds of the commercial value of the fishery.⁸²

Even the mere presence of the mine in the otherwise untouched headwaters will be enough to pose serious damage to the Bristol Bay brand, leading to severe economic consequences to the Bristol Bay fishing industry and the communities it supports.

b) The DEIS fails to assess the market impact of placing a copper mine in the fishery.

The DEIS's analysis of price data is deeply flawed, rooted in the fact that it accepts pricing as a given without evaluating the levers that impact price.⁸³ Price data alone does not adequately capture the value of the Bristol Bay fishery or the magnitude of the potential adverse impacts that the proposed action poses to the Bristol Bay brand.

Even a cursory analysis of pricing data reveals that market forces other than commodity pricing impact Bristol Bay salmon. For example, harvests of Bristol Bay salmon have been abundant the last two years, and prices have risen even as harvests have increased and in some cases more than increases in the prices of farm-raised salmon.⁸⁴ This suggests that Bristol Bay salmon is not simply a price taker and has been highly successful in promoting its brand.⁸⁵ Nor can this be understood based on overall salmon prices. The Army Corps did none of the pricing analysis of salmon markets necessary to justify its assertion that Bristol Bay is a mere price taker.

⁸⁰ 2019 A. Wink Comment.

⁸¹ *Id.*

⁸² *Id.*

⁸³ DEIS §§ 3.6-4, 4.6-2 (“The total value of the fishery in economic terms starts with volume (i.e., productivity) and price (i.e., what the market will pay for the fish.)”).

⁸⁴ 2018 Bristol Bay Sockeye Market Report, pp. 6-7.

⁸⁵ 2019 A. Wink Comment.

The DEIS's narrow focus on price data fails to capture the value of the Bristol Bay fishery, resulting in the false conclusion that Bristol Bay sockeye are not as valuable as other wild salmon at market, such as sockeye from Copper River. While Bristol Bay sockeye salmon might currently fetch lower prices than sockeye fisheries in Prince William Sound, Cook Inlet, and Kodiak, this simplistic comparison ignores the obvious difference in harvest volume.⁸⁶ Bristol Bay produced nearly 10 times as many sockeye as all the aforementioned areas combined in 2018.⁸⁷ This means that Bristol Bay fishermen can often accept a lower price because they can earn a healthy financial return because they catch more fish than sockeye fishermen in other areas.⁸⁸ It does not mean that Bristol Bay sockeye salmon is worth less than wild sockeye salmon from other areas or that Bristol Bay sockeye has less market power. Had the DEIS performed a serious economic analysis, it would have found that Bristol Bay actually sets the market price for frozen wild salmon from Alaska because Bristol Bay provides the largest supply of premium wild salmon in the world.⁸⁹

Instead of conducting a serious economic analysis of the Bristol Bay fishery, the DEIS makes another astonishing claim: that environmental disasters like the *Exxon Valdez* oil spill and the Fukushima disaster have not caused pricing impacts to affected fisheries.⁹⁰ The DEIS premises its economic analysis on the purported facts that “no effect on salmon prices” occurred in the wake of the *Exxon Valdez* oil spill of March 1989 and that there were “very small or undetectable” “seafood price effects” in the wake of the Fukushima nuclear disaster in March 2011.⁹¹ It is shocking that an agency's environmental review could get basic facts so wrong. Environmental disasters like these have devastating market impacts on affected fisheries, including terrible consequences for fishing communities, serious declines in consumer confidence, long-term dislocation, and extreme marketplace disruption.

Contrary to the DEIS's conclusion, salmon prices *did* decline after the *Exxon Valdez* oil spill, and the spill caused rippling economic effects throughout markets for Alaskan seafood. A study comparing ex-vessel fish prices expected for the years 1989 and 1990 without the occurrence of the oil spill to actual ex-vessel fish prices in wake of the oil spill demonstrates that the spill resulted in a dramatic decline in prices for all south-central Alaskan fishery products.⁹² The study contains an enormous amount of pricing data showing that the oil spill lead to drastic price reductions for salmon, shellfish, herring, and sablefish in 1989 and 1990. Table 1 presents the specific price declines for salmon and herring.

⁸⁶ *Id.*

⁸⁷ *Id.*

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ DEIS § 4.27-91.

⁹¹ *Id.*

⁹² Maurie J. Cohen, *Economic Impacts of the Exxon Valdez Oil Spill*, in *The Exxon Valdez Disaster: Readings on a Modern Social Problem* (J. Steven Picou et al., 2d Ed. 2008), pp. 149, 151-52 [hereinafter “Cohen, Economic Impacts of the *Exxon Valdez* Oil Spill”].

Table 1 Forecasted vs. Actual Prices, Southcentral Alaska (all figures in nominal dollars per pound)

Fish	1989		1990	
	Without-Impact (Forecasted)	With-Impact (Actual)	Without-Impact (Forecasted)	With-Impact (Actual)
Chinook Salmon	\$2.41	\$1.51	\$2.55	\$1.83
Sockeye Salmon	\$1.79	\$1.23	\$1.70	\$1.19
Coho Salmon	\$1.56	\$0.67	\$1.71	\$0.98
Pink Salmon	\$0.50	\$0.36	\$0.42	\$0.31
Chum Salmon	\$0.77	\$0.38	\$0.82	\$0.40
Pacific Herring	\$0.48	\$0.20	\$0.46	\$0.29

Source: Cohen, Economic Impacts of the *Exxon Valdez* Oil Spill, p. 151.

Of the salmon populations, pink salmon and sockeye salmon were hit the hardest, having lost \$65.4 million in commercial fishing revenue and \$22 million in commercial fishing revenue respectively, in 1989 alone.⁹³ All fisheries combined lost an estimated \$108.1 billion in ex-vessel revenue in 1989 and an estimated \$47 million in ex-vessel revenue in 1990.⁹⁴ Courts even awarded fishermen \$507.5 million in compensatory damages for fishing losses, a basic fact that the DEIS fails to acknowledge or explain.⁹⁵

The *Exxon Valdez* oil spill’s impact on prices, while devastating, is not the only measure of the adverse effects it had on the local fisheries and fishing industries. The long-term effects of the spill have been crippling. The spill resulted in long-term damage to the salmon and herring fisheries and to the commercial fishing industries that relied on those fisheries. Even after years of dedicated restoration efforts, the pink and sockeye salmon fisheries were not deemed to have “recovered” until 2002 – 13 years after the spill – and even still, they are nowhere close to their productive state prior to the spill.⁹⁶ Even 30 years later, the herring fishery has still not recovered.⁹⁷ Moreover, chronic stress and negative psychological impacts have been documented in communities affected by the spill, with particularly high levels of stress and negative mental health effects in the commercial fishing community due to resource depletion and continuing threats to fishery resources.⁹⁸

The Fukushima nuclear disaster sent shockwaves through the international market for fish and resulted in a huge economic loss for the Japanese fishing industry. The total cost of damage to the fishing industry is estimated at around \$12.49 billion, and many fishermen have

⁹³ *Id.*, p. 152.

⁹⁴ *Id.*

⁹⁵ *Exxon Shipping Co. v. Baker*, 554 U.S. 471 (2008) (accepting compensatory damages award established in *In re Exxon Valdez*, 236 F. Supp. 2d 1043, 1063 (D. Alaska 2002).

⁹⁶ *Exxon Valdez* Oil Spill Restoration Plan: 2014 Update Injured Resources and Services, adopted by the *Exxon Valdez* Oil Spill Trustee Council (Nov. 19, 2014), pp. 36-7, available at <http://www.evostc.state.ak.us/static/PDFs/2014IRSUpdate.pdf>.

⁹⁷ *Id.*

⁹⁸ J. Steven Picou & Duane A. Gill, *The Exxon Valdez Oil Spill and Chronic Psychological Stress*, 18 *American Fisheries Society Symposium* 879, 890 (1996).

been forced out of work and have lost their livelihoods.⁹⁹ As of 2018 – 7 years after the catastrophe – the Japanese fishing industry has still not recovered.¹⁰⁰ Despite being able to catch fish that contain no traceable amounts of radiation, commercial fishermen remain unable to overcome the devastating market perception that the fish are still unsafe for consumption.¹⁰¹ Such impacts cannot in good conscience be considered “negligible.”¹⁰² The DEIS even cites to a consumer choice study conducted after the Fukushima nuclear disaster, which found that labeling seafood as being from Fukushima Prefecture resulted in lower willingness-to-pay, compared to unlabeled seafood or seafood from other prefectures.¹⁰³ Yet the DEIS dismisses the significance of that study and arbitrarily concludes that such an impact would not apply to a Pebble disaster, apparently based on some unstated, unsubstantiated assumption that the public might be less concerned about arsenic, mercury, acid sulfides, concentrated soluble radioactive materials, and other copper-mine waste than nuclear radiation.¹⁰⁴

The DEIS’s invocation of *Exxon Valdez* and Fukushima is telling. The Pebble mine would indeed introduce the risk of an environmental catastrophe on the scale of these disasters into the Bristol Bay fishery. Yet the DEIS’s inability or unwillingness to acknowledge the ruinous consequences of these disasters for affected commercial fishing industries is also telling and typifies the DEIS’s whitewash of the environmental impacts portended by the mine.

In sum, the DEIS incorrectly assesses the potential impacts that the proposed action will likely have on the Bristol Bay brand by focusing solely on price data. Contrary to what the DEIS concludes, price data alone is not a sufficient indicator of a fishery’s value, and the Bristol Bay fishery has tremendous value due to its unmatched volume of sockeye and its strong brand of quality sockeye. Contrary to what the DEIS concludes, historical data—including price data—regarding environmental contamination events *do* provide a basis for being concerned about the real adverse impacts associated with the proposed action. The DEIS gets this exactly backwards.

⁹⁹Antoni Slodkowski, *Rising Radioactive Spills Leave Fukushima Fishermen Floundering*, Reuters, May 31, 2013, <https://uk.reuters.com/article/uk-fukushima-fishermen/rising-radioactive-spills-leave-fukushima-fishermen-floundering-idUKBRE94U0FA20130531>; Jun Hongo, *Population of Fishermen Hit by Earthquake, Aging*, The Wall Street Journal – Japan Real Time Blog, Sep. 5, 2014, <https://blogs.wsj.com/japanrealttime/2014/09/05/population-of-fishermen-hit-by-earthquake-aging/>.

¹⁰⁰ *Id.*

¹⁰¹ Noriyuki Suzuki, *Fukushima’s Fishing Industry Stuck in Slow but Steady Battle to Change Public Perceptions after 3/11*, The Japan Times (Mar. 11, 2018), <https://www.japantimes.co.jp/news/2018/03/11/national/fukushimas-fishing-industry-stuck-slow-steady-battle-change-public-perceptions-3-11/>.

¹⁰² DEIS § 4.27-91.

¹⁰³ *Id.* § 4.27-92.

¹⁰⁴ *Id.*

c) Diminished market perception of Bristol Bay salmon can cause profound negative impacts to the commercial fishery.

As noted above in Section 1c, the DEIS fails to account for the financial realities facing commercial fishermen, so it cannot reasonably evaluate the economic impact of the proposed mine. Since revenue is a function of the quantity of the salmon harvested multiplied by price, any decrease in price erodes the profitability of the fishery. By undermining the ability of the Bristol Bay to obtain a premium for wild, untainted, pristine salmon, the Pebble mine jeopardizes fishery's thin profit margin. The DEIS makes no attempt to quantify the premium that Bristol Bay sockeye obtain based on brand and market position, and it ignores the promotional efforts undertaken to obtain higher prices. It therefore fails to conduct any economic analysis of the impact of the proposed mine on the profitability of the fishery.

The DEIS ignores a couple of critically important related points. First, efforts to promote the Bristol Bay fishery are relatively recent and have achieved significant success over the last 10-15 years. That traction will only build over time. The DEIS makes no effort to evaluate the opportunity available to the fishery over the life to the mine to maximize the fishery's market position. In a world where wild seafood is increasingly rare even as consumer demand for authentic, wild, natural, traceable, premium sources of food also increases, the Bristol Bay fishery is ideally suited to capitalize on its unique position. The Pebble mine threatens not only the existing brand and marketability of Bristol Bay salmon, but also denies fishermen the future opportunity to market the untouched habitat and pristine environment that produces wild salmon. That impact would be permanent and irreversible.

Second, the DEIS fails to grasp the fundamental interplay between the quantity and price of Bristol Bay salmon. The abundance of the fishery and the reliability of its harvest is a critical marketplace advantage that is jeopardized – in reality or in perception – by the mine. In contrast to commodities, increased supply helps to generate demand. The risk of diminished harvests or contamination events can therefore undermine the market standing of Bristol Bay salmon.

Third, spills that impact fish populations result not only in diminished catch but also disrupt demand, undermine the brand, and lower prices. Even a minor event that generates negative publicity without significantly affecting populations could have a devastating impact on prices and the profitability of the fishery.

In short, the mine's threat to the brand and market position of Bristol Bay salmon poses a serious risk to the profitability of the fishery that the DEIS cannot ignore.

3) The DEIS unjustifiably fails to evaluate the Pebble mine's cumulative impacts.

The DEIS fails to adequately consider reasonably foreseeable cumulative impacts from the proposed project. Most notably, based solely on the information the DEIS presents, it appears inevitable that the project will metastasize into something much larger in scope, over a much longer time frame, compounding the impact and risk not only of the project but of the massive

amount of waste and industrial development left behind. Moreover, the installation of roads and other infrastructure for this project will facilitate the development of other mining claims in the proximate area.

The DEIS does practically nothing to confront this reality. Instead of analyzing the cumulative effects of obvious and foreseeable expansion scenarios at the mine, it considers only one incremental (albeit massive) expansion and then offers speculative generalities about what impacts might occur in the future. That is not analysis. Beyond that, the DEIS refuses to consider several additional development scenarios at the mine site, under the excuse that “reasonable foreseeability” requires that these actions within the current 20-year operations period. That is not the law, nor does it track with reality.

NEPA requires that an EIS contain a “useful analysis” of the cumulative impacts of past, present, and future projects.¹⁰⁵ General statements about “possible effects” or “some risk” do not constitute a hard look.¹⁰⁶ The DEIS falls far short of this mark, for at least the following reasons:

a) The DEIS acknowledges that mine expansion and other projects are reasonably foreseeable but provides no useful analysis of them.

The recognition that a federal action will significantly affect the environment is the beginning of the NEPA process. Here, with regards to cumulative impacts, the DEIS treats this threshold as the penultimate analysis. It takes the view that as long as potential impacts are acknowledged, they are adequately identified and evaluated. That is not sufficient.

The DEIS admits that NEPA requires an evaluation of cumulative impacts here.¹⁰⁷ In fact, the DEIS spends far more time explaining what cumulative impacts are, and deciding which ones it will consider, than it does actually evaluating the cumulative impacts. The DEIS defines “cumulative effects” of the proposed project in part as follows:

Cumulative effects are interactive, synergistic, or additive effects that would result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions (RFFAs) regardless of what

¹⁰⁵ *Muckleshoot Indian Tribe v. U.S. Forest Service*, 177 F.3d 800, 811 (9th Cir. 1999) (an EIS must provide a useful analysis of cumulative impacts of past, present, and reasonably foreseeable future projects and cannot be too general or one-sided); *Northern Plains Resources Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1076 (9th Cir. 2011) (an EIS must contain a useful analysis of the cumulative impacts of future projects and their environmental effects); *Great Basin Resources Watch v. Bureau of Land Management*, 844 F.3d 1095, 1104-05 (9th Cir. 2016) (holding open mining project failed to present sufficient analysis of cumulative impacts to the region).

¹⁰⁶ *Ocean Advocates v. U.S. Army Corps of Eng’rs*, 402 F.3d 846, 868 (9th Cir. 2005).

¹⁰⁷ DEIS § 4.1-2.

agency (federal or non-federal) or person undertakes such other actions. (40 CFR Part 1508.7).¹⁰⁸

The DEIS further defines RFFAs as “existing plans, permit applications, and fiscal appropriations that are external to the proposed action, and likely (or reasonably certain) to occur.”¹⁰⁹ Beyond minor exploration activity, the DEIS does not identify any past or present mining development in the analysis area.¹¹⁰

The DEIS then lists several potential RFFAs for analysis and picks and chooses among them. Most notably, the DEIS concludes that a potential expansion of the project, as described in the Wardrop 2011 Preliminary Assessment Technical Report (commissioned by Northern Dynasty Minerals and refined in PLP 2018-RFI 062), is reasonably foreseeable and therefore, presumably, must be analyzed.¹¹¹ This plan would expand the current project to develop 55% of its reserves over an additional 58 years of mining, and 20 to 40 years of post-mining processing low-grade ore and pyritic material.¹¹² The expansion would use existing infrastructure, but it would also require thousands of acres of additional bulk and pyritic tailings storage, along with new rock storage and processing facilities, pipelines, and loading facilities.¹¹³

Section 4.6.6 contains the DEIS’s analysis of cumulative effects to the commercial and recreational fisheries. Despite that the mine expansion scenario significantly expands the mine footprint and extends the impact period by almost eight decades, the DEIS devotes only three pages to impacts on commercial and recreational fisheries, most of which are descriptive (facts already obvious and known), some of which state obvious “potential” impacts (potential impacts “come from productivity losses” – in other words, potential impacts to the fishery come from loss of fish), and little if any of which constitute actual “analysis” of cumulative impacts.¹¹⁴

With regards to the vastly expanded mine site itself, the entirety of the DEIS’s purported analysis in regard to the commercial fishery is as follows:

The primary potential future impacts to fish from the Pebble mine expansion would be direct loss of habitat, fish displacement and injury, habitat degradation, and changes in the natural flow regime. These impacts would be similar to those described for the project in Section 4.24, Fish Values. With the mine expansion, the duration of these impacts would be extended by 78 years. The construction of the south waste rock facility collection pond would affect the South Fork Koktuli and Upper Talarik Creek watersheds affecting sockeye, coho, chum, and possibly

¹⁰⁸ *Id.* § 4.1-3.

¹⁰⁹ *Id.*

¹¹⁰ *Id.* § 4.1-3 – 4.1-5.

¹¹¹ *Id.* § § 4.1-6, 4.1-8.

¹¹² *Id.* § 4.1-8, *citing* PLP 2018-RFI 062.

¹¹³ *Id.* § 4.1-8; *see* PLP 2018-RFI 062.

¹¹⁴ DEIS § 4.6-16 – 4.6-19.

Chinook salmon. Expanded development would increase the magnitude and duration of disturbance impacts. Any impacts that result in a reduction in the number of returning adult spawners would affect commercial fisheries. Commercial fishing impacts related to expansion of the mine site are limited to the Bristol Bay commercial fishery. However, the construction and operation of a deep-water port in Iniskin Bay would affect the chum and pink salmon fishery in that area and could affect the recovery of the Pacific herring fishery. These effects would be similar to the potential direct effects described for Alternatives 2 and 3 earlier in this section.¹¹⁵

There is no explanation for how these sweeping conclusions were derived, or to what extent these impacts would occur. All we know is that the massive increase in duration and scope of the proposed project “would affect” the commercial fishery. That is not a useful or sufficient analysis of impacts. At most, the DEIS seems to suggest that the same impact of the proposed project also applies to the massively expanded mining scenario, as if impact stays constant no matter how big the project ultimately gets. There is no basis for that conclusion.

Section 4.24.6, in turn, contains one page on the cumulative impact of the expanded mine site on the commercial fishery. This section largely restates Section 4.6.6. Summarizing: potential impacts to the fishery include impacts to fish and fish habitat; they would be the same impacts as described for the proposed project, just over a longer duration; the expansion would require more water treatment and disturb more area; the risk of spills would increase. The one and only additional attempt at analysis is a single sentence:

At the mine site, an additional 35 miles of anadromous stream habitat would be lost in the SFK and UTC watersheds, including the entire footprint of Frying Pan Lake, which would inundated [sic] by the south collection pond, affecting sockeye, coho, chum, and potentially Chinook salmon.¹¹⁶

Again here, there is no explanation of how the 35-mile figure is derived, and there is no attempt at evaluating the effects to these salmon populations.

The Executive Summary then disclaims *any* impact of the expanded mine scenario to the fisheries:

[P]opulation-level effects on fish and fish habitat are not projected, given the limited abundance of fish and productivity of habitat affected by expansion of the mine site, and permit requirements for anadromous stream crossings by roads and pipelines.¹¹⁷

¹¹⁵ *Id.* § 4.6-17; *see also* DEIS § ES-55 (restating and summarizing same).

¹¹⁶ DEIS § 4.24-37.

¹¹⁷ *Id.* § ES-52.

The DEIS is at least unintentionally honest here, because the population effects are, quite literally, *not projected* – there is no such analysis. As shown above, while acknowledging that the mine expansion will impact sockeye and other salmonids, the DEIS makes no attempt to evaluate what additional habitat will be impacted, either within the expanded footprint or downstream from it.

Elsewhere, the DEIS seems to contradict these conclusions, or at least call them into serious question. For example, when discussing water and sediment quality, the DEIS acknowledges that the estimated area of disturbance “would be nearly tripled” over the proposed project, increasing the footprint from 12,371 to 34,790 acres.¹¹⁸ As a result, the DEIS states, “[t]he potential for cumulative impacts on surface water, groundwater, and sediment would increase substantially.”¹¹⁹ Likewise, the DEIS predicts that an additional 12,445 acres of wetlands would be “affected” (which presumably means destroyed).¹²⁰ It is impossible to square these statements with the summary conclusion that there will be no impacts to fish or fish habitat.¹²¹

Lastly, the DEIS provides a subsection on cumulative effects in regard to spill risk. Section 4.27.8 states that spills are not typically a RFFA because they are not “planned or routine.”¹²² But it then acknowledges – again stating the obvious – that the expanded mine scenario “could increase the volume and geographic extent of an unintentional release.”¹²³ It further acknowledges that the expanded mine would require additional ponds and facilities, but states that the risk is the same as previously described for the proposed project, although the impact will “potentially” increase.¹²⁴ In other words, under the DEIS’s logic, scale and duration do not increase risk, and the increase to impact is anyone’s guess.¹²⁵

The EIS fails to adequately consider the reasonably foreseeable road improvement and community development projects’ cumulative effects on BB salmon fishery. The EIS concedes that there will be anticipated road improvement projects and new transportation corridors needed, which would result in sedimentation and changes to the salmon populations “affecting the value of the commercial fishery” but summarily dismisses it has having no impact worth evaluating.

¹¹⁸ *Id.* § 4.18-36.

¹¹⁹ *Id.*

¹²⁰ *Id.* § 4.22-40.

¹²¹ *Id.* § ES-52.

¹²² *Id.* § 4.27-127.

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ The DEIS is similarly opaque with respect to impacts from other actions listed in the RFFA analysis. For example, the EIS concedes that there will be anticipated road improvement projects and new transportation corridors needed, which would result in sedimentation and “changes to salmon...populations thus affecting the value of the commercial fishery.” DEIS § 4.6-18. But it makes no attempt to evaluate what those impacts might be.

After winding around through the DEIS's various references to cumulative impacts, the reader finally comes to understand that, in fact, there is no analysis. The public and decision-makers alike are left to wonder what they have learned about the environmental impact of this expected and massive expansion of the existing project. And the answer is absolutely nothing.

b) The DEIS neglects to evaluate other reasonably foreseeable actions at or near the same mine site and in the surrounding area.

Beyond the one expansion scenario it purports to assess, the DEIS identifies five additional expansions (Pebble East and West, Pebble South, Big Chunk North, Big Chunk South, and Groundhog) at and in the immediate vicinity of the current project.¹²⁶ At least some of these are owned by Northern Dynasty Minerals and could use the infrastructure of the proposed project.¹²⁷ The DEIS deems "exploration" of these expansions as a RFFA but finds that actual "development" of the claims is not, because development would not occur "within the operations timeframe" of the proposed project.¹²⁸ Overall, the DEIS limits its consideration of any RFFAs only to those actions that, in addition to meeting other criteria, "may occur during construction and operation of the proposed project."¹²⁹ In other words, any action that is expected to occur after the 20-year operations period ends is, by the DEIS's self-serving definition, not reasonably foreseeable.

By adopting the ruse that RFFAs would include exploration but not development, the DEIS can then render the impacts of these massive additional expansions as "seasonally sporadic, temporary, and localized, based on remoteness."¹³⁰ Although this fails to constitute any actual evaluation of impact, the DEIS is then able to side-step any consideration of what these additional expansions might mean to the area and its fisheries.

There are several fundamental defects with this conclusion. First, even though an action may not occur within the operations period of the proposed, minimum-scope project, it may still be reasonably foreseeable. There is seemingly no statute, regulation, or case law that supports the DEIS's conclusion on this point. And in fact, the case law suggests the opposite. Under NEPA review, an effect is deemed to be "reasonably foreseeable" if it is "sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision."¹³¹ At a minimum, if it is reasonably foreseeable that the mining project could expand in duration and

¹²⁶ DEIS Fig. 4.1-1.

¹²⁷ *Id.* § 4.1-9 - 4.1-11.

¹²⁸ The DEIS identifies a number of other mineral and oil and gas development projects in the surrounding areas, at least two of which (Fog Lake and Kamishak) could possibly take advantage of the transportation corridor built for the proposed project, but it nevertheless declines to consider these additional projects as RFFAs. The DEIS's failure to include the development of all these other projects in its cumulative effects analysis is not justified and renders it legally defective.

¹²⁹ DEIS § 4.1-6.

¹³⁰ *Id.* § ES-52.

¹³¹ *City of Shoreacres v. Waterworth*, 420 F.3d 440, 453 (5th Cir. 2005); *Sierra Club v. Marsh*, 976 F.2d 763, 767 (1st Cir. 1992).

scope for at least 78 years, and still only capture 55% of the available resources, it is more reasonable to expect dramatic expansion. A person of ordinary prudence would have taken those factors into account in the cumulative impacts to the environment.

Second, the DEIS lacks the information that would be needed to assess the likelihood of expansion. In particular, there is no information regarding the expected cost or profitability of the proposed project, the expected expansion, or the five additional expansions. The Army Corps is legally required to consider cost in its analysis of practicable alternatives.¹³² If, for example, either the project does not become profitable until well into the expansion scenario, or the additional expansions can be performed at relatively little additional expense (after all, the infrastructure is already there), then it is reasonable to foresee that the project will continue to expand far beyond the 78-year extended timeframe, if not sooner. At a minimum, given the large upfront investment in infrastructure needed to undertake just the proposed project, it is reasonable to expect that expanding the mine will be far cheaper than creating it to begin with. If by undertaking the proposed project the expansion scenarios become economically feasible, then by definition, they are reasonably foreseeable, and their cumulative effects must be studied.

Third, by shirking this analysis of cumulative effects, the DEIS never considers how continued expansion of the proposed project might increase the impact from either induced development (more roads, more crossings, more facilities, more dust, etc.) or increased risk and impact of spills. The relationship between the scope and duration of the project and the risk and impact of spills is vital to understanding the potential adverse impact of this project. But the DEIS leaves us in the dark on these fundamental questions.

More broadly, the DEIS should evaluate whether the proposed project would result in development of additional claims in the surrounding area of the mine site. Such claims may not be economically feasible to develop now, but the infrastructure of the proposed project may make them so. This omission leaves the DEIS's cumulative impacts analysis incomplete.

By improperly disregarding the full extent of mining and development that could occur as a result of the proposed project, the DEIS dodges the fundamental question of whether this project is worth the impact and risk to Bristol Bay's invaluable biological and ecological resources. The DEIS's answer is to turn NEPA on its head: leap now, look later.

c) The DEIS's analysis of cumulative impacts ignores the EPA's 2014 Report and findings.

The 2014 EPA Assessment exposes in plain view the shortcomings of the DEIS's cumulative impacts analysis. It is inexplicable how the Army Corps could issue the DEIS in its current form without considering the cumulative impacts raised in the EPA's findings.

¹³² See 40 C.F.R. § 230.10(a).

The 2014 EPA Assessment considers “three realistic mine scenarios” to represent different stages in the potential mining of the deposit: Pebble .25, Pebble 2.0, and Pebble 6.5.¹³³ Each represented the amount of ore processed in billions of tons, with operation periods lasting 20, 25, and 78 years respectively, and with tailings storage facilities covering 6.8, 16.1, and 48.6 km² respectively (2.6, 6.2, and 18.8 m²).¹³⁴ (Even these didn’t cover the total size of the Pebble deposit, which is an estimated nearly 12 billion tons.¹³⁵) The EPA also considered the post-mining phase, which it said could continue for centuries and possibly in perpetuity, as the mine wastes would be “persistent.”¹³⁶ Finally, the EPA considered risks from both routine mine operation as well as various failure scenarios.¹³⁷

The EPA further recognized the compounded uncertainties due to the complexity of mining systems, the unpredictability of accidents and unforeseen events, the increase in flooding expected from climate change, and the centuries-long timeframes under consideration. As an example, the EPA cited the Fort Knox Mine, which was permitted as a “no-discharge” facility but needed later to obtain a permit to discharge wastewater into a nearby stream.¹³⁸

The EPA also recognizes that its analysis focused only on the major mine components – the mine pit, the tailings storage facilities (TSFs), and the transportation corridor. But the EPA further observed:

The actual infrastructure needed to operate any large-scale mine would be significantly more extensive than these four components and would result in larger cumulative impacts of a single mine.¹³⁹

Additional infrastructure needs would include mining and processing facilities, drainage management structures, other storage and disposal facilities, and other operational infrastructure (e.g., administrative buildings, dorms, a sewage treatment plant, a power generation plant, a truck stop, etc.).

According to the EPA, “[t]he cumulative impacts of a large-scale mine at the Pebble deposit likely would be much larger than the footprints evaluated in the mine scenarios.”¹⁴⁰ In terms of population alone, the EPA observed, the mine site would rival Dillingham as the largest population center in the watershed during construction, and the second largest during operation. And road infrastructure would need to support a fleet of 50-100 vehicles, in addition to 150 large

¹³³ 2014 EPA Assessment at ES-3.

¹³⁴ *Id.* at ES-10-11.

¹³⁵ *Id.* at ES-10, 6-4.

¹³⁶ *Id.* ES-4.

¹³⁷ *Id.* ES-10-11.

¹³⁸ *Id.* at 6-4. Some of the impacts listed in this section might also be considered as “direct” or “indirect,” but regardless, they all need to be studied.

¹³⁹ 2014 EPA Assessment at 6-3.

¹⁴⁰ *Id.*

ore-hauling trucks, which would pose risks similar to (but in addition to) those recognized for the transportation corridor.¹⁴¹

The EPA further expresses concern about the siting of the tailings storage facilities (TSFs), cautioning that the placement “does not imply that these sites would not pose unacceptable environmental harm, or that they would be the least environmentally damaging practicable alternatives for purposes of Clean Water Act permitting.”¹⁴² Moreover, the low-grade nature of the ore would result in large amounts of tailings: 99% of the material processed, with 85% as NAG bulk and 14% as PAG (pyritic).¹⁴³

The EPA notes that mining operations would affect the quantity, quality, timing, and distribution of surface flows. “Mining operations always consume some water, so there would be less water available in the landscape during active mining than before the mine was present.”¹⁴⁴ “Many of the potentially significant impacts of large-scale mining relate to a mine’s use of water and its impact on water resources.”¹⁴⁵ Water deficits for the three scenarios would be 3.9, 26, and 27 million m³ / year.¹⁴⁶

The EPA finds that development of any mine in the Bristol Bay watershed would require substantial expansion and improvement of the region’s transportation infrastructure. “The Bristol Bay watershed is located in one of the last remaining, virtually roadless regions in the United States.”¹⁴⁷

The EPA recognizes the far-reaching cumulative impacts and risks of the post-closure phase:

Seepage and leachate monitoring and collection systems, as well as the WWTP, might need to be maintained for hundreds to thousands of years. It is impossible to evaluate the success of such long-term collection and treatment systems for mines. No examples exist, because these timeframes exceed both existing systems and most human institutions.¹⁴⁸

“TSFs would require active management for hundreds to thousands of years.”¹⁴⁹

¹⁴¹ *Id.*

¹⁴² *Id.* at 6-11.

¹⁴³ *Id.*

¹⁴⁴ *Id.* at 6-15.

¹⁴⁵ *Id.* at 6-23.

¹⁴⁶ *Id.* at 6-25.

¹⁴⁷ 2014 EPA Assessment at 6-16.

¹⁴⁸ *Id.* at 6-27.

¹⁴⁹ *Id.* at 6-33.

The EPA also recognizes a far more extensive amount of foreseeable mining in the area should the proposed project proceed. Based on Ghaffari et al. (2011), the EPA observes that Pebble 2.0 and Pebble 6.5 have both undergone extensive exploration and assessment and are “economically viable, technically feasible and permittable.”¹⁵⁰ Other mines developed in the area would have “characteristics and impacts” closer to the Pebble .25 plan. The EPA “assume[s] that the mine would be closed after all economically profitable ore was removed from the site.”¹⁵¹

The EPA recognizes that additional mines would pose cumulative risks.¹⁵² In fact, the report devotes an entire chapter – 35 pages of tables, maps, and analysis – just to the cumulative risks of multiple mines.¹⁵³ “If the infrastructure for one mine is built, it would likely facilitate the development of additional mines.”¹⁵⁴ Citing NEPA, the Report states the clear legal standard:

Assessing the cumulative impacts of multiple mines requires considering the impacts of their combined footprints, as well as the cumulative risks of leaks, spills, and other accidents and failures associated with each individual mine.¹⁵⁵

The report continues:

The original mine—with its associated transportation corridor, port, power generation facilities, and other infrastructure—likely would initiate the accumulation of impacts across the watersheds. Mineralized areas in the region (Figure 13-1) are currently without development infrastructure (e.g., roads, utilities, and airports), which creates an expensive barrier to development. Thus, 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 impacts. In addition, the initial and subsequent mines would increase accessibility of the region, causing other induced development and associated impacts.¹⁵⁶

“As environmental effects on freshwater habitats accumulate, the magnitude of total impact on the region’s fisheries would increase.”¹⁵⁷

The EPA then identifies 15 mining prospects (in addition to the Pebble deposit, which would include all three mine scenarios plus Pebble East and West and Pebble South) with “more

¹⁵⁰ *Id.* at 6-20.

¹⁵¹ *Id.* at 6-27.

¹⁵² *Id.* at ES-26.

¹⁵³ *Id.* at Ch. 13.

¹⁵⁴ *Id.* at 13-1.

¹⁵⁵ *Id.*

¹⁵⁶ 2014 EPA Assessment at 13-2.

¹⁵⁷ *Id.*

than minimal exploration” in the Nushagak and Kvichak River watersheds.¹⁵⁸ This compares to only 4 identified in the DEIS, which fails to explain why these 11 other prospects are not worthy of consideration.¹⁵⁹ The report identifies further cumulative impacts from “induced development” due to mine-related activity.¹⁶⁰

EPA analyzes specific cumulative impacts for six additional mine projects: Pebble South/PEB, Big Chunk South, Big Chunk North, Groundhog, AUDN/Iliamna, and Humble.¹⁶¹ The report describes its estimates of habitat loss as “conservative.”¹⁶² The report explains the methodology for its estimates and summarizes its findings on Table 13-8, which shows a range of 43.2 to 69.5 km (26.8 to 43.2 miles) of *additional* streams lost just to these six projects, along with 9.2 to 29.1 km² (3.6 to 11.2 miles²) of water and wetlands.¹⁶³ The EPA’s conclusion is stark: “These influences [of the six mines] would likely accumulate over time and space, potentially having widespread and extensive effects on the region’s populations of fish, wildlife, and human residents.”¹⁶⁴

In particular, this accumulation of impacts would “exacerbate[e] total effects on salmon.”¹⁶⁵ Regarding Pacific salmon, the “effect of each stressor accumulates regardless of whether factors occur at the same time, or even in temporal proximity.”¹⁶⁶ “The overall result of these cumulative effects has been the reduction and even extinction of many salmonid populations.”¹⁶⁷ “In the Pacific Northwest, habitat degradation and loss related to human land use have obviously been a major factor in salmon declines by reducing population productivity, adult densities, and early-life-stage production over large geographic areas (Ruckelshaus et al. 2002).¹⁶⁸

In a final analysis, the 2014 EPA Assessment addresses the fact that each one of these projects will create long-term post-closure issues:

Closure at each mine would typically require hundreds to thousands of years of monitoring, maintenance, and treatment of any water flowing off-site. Given the magnitude of these timeframes, we would expect multiple and more frequent system failures in future years. In light of the relatively ephemeral nature of human institutions over these timeframes, we would expect that monitoring, maintenance,

¹⁵⁸ *Id.* at 13-3.

¹⁵⁹ *See* DEIS § 4.1.

¹⁶⁰ 2014 EPA Assessment at 13-31 – 13-32.

¹⁶¹ *Id.* at 13-8 – 13-31.

¹⁶² *Id.* at 13-8.

¹⁶³ *Id.* at 13-21.

¹⁶⁴ *Id.* at 13-27.

¹⁶⁵ 2014 EPA Assessment at 13-2.

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

¹⁶⁸ *Id.* at 13-3; *see also* Box 13-2 (explaining other examples of mine scenarios gone wrong).

and treatment would eventually cease, leading to increased release of contaminated waters downstream.¹⁶⁹

It is hard to imagine a more dire warning for what the proposed project means to the future of the region, and in particular the risk of catastrophic impact to the Bristol Bay salmon fishery. This stark conclusion amounts to a death sentence.

In the context of the 2014 EPA Assessment, the DEIS's treatment of cumulative impacts seems not only fatally deficient, but outright unconscionable. Incredibly, the DEIS does not disagree with any of the EPA's analysis; instead, it just chooses to ignore that it exists. Instead of taking a hard look, the DEIS turns a blind eye.

d) Regarding catastrophic failure, the science backs the EPA's findings, not the Army Corps', but the Army Corps nevertheless puts the risk of failure on the backs of the fishermen.

Modelling studies show that the impacts of a tailings dam failure could be catastrophic to salmon habitat in the Bristol Bay watershed, supporting the EPA's conclusions.¹⁷⁰ Because tailings would be stored in on-site facilities in perpetuity, the risk of failure persists indefinitely, significantly increasing the odds, if not outright assuring, that a failure will happen at some point. Yet the DEIS's analysis on tailings failures is constrained to the 20-year operational period of the dam. This neglects the obvious fact that the risk of failure accumulates over time, increasing the risk significantly over time.¹⁷¹ In other words, over time, a catastrophic TSF failure becomes *more* foreseeable, not less.

Even worse, by eliminating the post-operational phase from the analysis, the Army Corps fails to ensure that the operator will remain responsible for compensatory damages and reparations over the long haul.¹⁷² The operator, not the fishery and those who depend on it, must bear the risk of failure indefinitely and cannot be allowed to treat the risk as an externality that it walks away from when the mine closes. And the only way this can occur is if the Army Corps studies the cumulative effects of catastrophic failures and considers this as a "cost" in its analysis of alternatives.¹⁷³

¹⁶⁹ *Id.* at 13-21.

¹⁷⁰ 2019 Lynker Report, pp. 41-44.

¹⁷¹ *Id.*, p. 1.

¹⁷² *See* 40 C.F.R. § 230.91 (implementing compensatory mitigation measures).

¹⁷³ *See* 40 C.F.R. § 230.10(a).

e) Evaluating a scaled-down version of the Pebble mine without assessing cumulative impacts from future development violates NEPA.

The EPA recommendation considered three versions of the Pebble mine and concluded that all versions, including the smallest, posed an unacceptable risk to the Bristol Bay watershed. The EPA further recognized that the small scenario – the one closest in size to the proposed project in the DEIS – was “significantly smaller” than the mine presented to the operator’s investors.¹⁷⁴ The mine’s effort to evade an honest consideration of impacts is transparent – it applied for a permit that significantly scales back the proposed project, while failing to disclose the minimum viable scale for mining development and operations, withholding financial information necessary to evaluating the full, intended scale of the mine, and omitting any information about future expansion.

It is arbitrary and capricious – and a violation of the letter and spirit of NEPA – for the Army Corps to indulge the applicant’s game. The Army Corps has an obligation to evaluate the impacts from the reasonably foreseeable project, rather than allowing the applicant to bound analysis of environmental impacts to an unreasonable, unlikely project scope as a ruse to obtain a permit.

4) Reasonable alternatives and mitigation measures in the DEIS are unsupported and inadequate.

NEPA and its implementing regulations require that an agency “[r]igorously explore and objectively evaluate all reasonable alternatives.”¹⁷⁵ Reasonable alternatives are those that will accomplish the intended purpose, are technically and economically feasible, and yet have a lesser or no impact, by virtue of avoiding or minimizing the adverse effects of the proposal.¹⁷⁶ A Clean Water Act 404 permit cannot be issued if practicable alternatives to the project exist.¹⁷⁷

Here, the no-action alternative has already been recognized by the EPA as the only viable, acceptable, and lawful alternative to mining in the Bristol Bay headwaters.¹⁷⁸ The EPA evaluated several versions of the project with varying scales, and it found that the no-action alternative was the only option with acceptable environmental and economic risks.¹⁷⁹ The EPA felt so strongly that it utilized its rarely invoked veto authority under Section 404(c) of the Clean Water Act in an attempt to prohibit, restrict, and deny the use of the Bristol Bay headwaters for

¹⁷⁴ 2014 EPA News Release

¹⁷⁵ 42 U.S.C. § § 4332(2)(C)(iii), 4332(E); 40 C.F.R. § 1502.14(a).

¹⁷⁶ 40 C.F.R. § § 1500.2, 1502.1, 1502.14, 1502.16.

¹⁷⁷ 40 C.F.R. § 230.10(a).

¹⁷⁸ 2014 EPA Proposed Determination at ES-1.

¹⁷⁹ *Id.* at ES-3-5 (“mining of the Pebble deposit at any of these sizes, even the smallest could result in significant and unacceptable adverse effects on ecologically important streams, wetlands, lakes, and ponders and the fishery areas they support”).

mining by PLP. The EPA noted that it has “used its Section 404(c) authority judiciously and sparingly, having completely only 13 Section 404(c) actions in the 42-year history of the CWA” but choose to do so here in order to “protect important fishery areas in the SFK, NFK, and UTC watersheds from unacceptable adverse effects.”¹⁸⁰ The DEIS ignores that finding.

Applicants are not entitled to a 404 permit. Reviewing agencies must therefore have the authority to evaluate the evidence and select a no-action alternative. Here, the no-action alternative is the only option that avoids a large-scale, dramatic change to the Bristol Bay watershed that threatens the immediate and long-term viability of the commercial salmon fishery. The EPA has already recognized this fact. Any reversal of that finding would be arbitrary, capricious, and unlawful agency action in violation of NEPA, the Clean Water Act, and the Administrative Procedure Act. Accordingly, the no-action alternative is the only lawful option that mitigates the impacts of the mine.

Finally, an EIS must include appropriate mitigation measures and means to mitigate adverse environmental impacts.¹⁸¹ Mitigation includes (a) avoiding the impact altogether by not taking a certain action or part of any action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; (e) compensating for the impact by replacing or providing substitute resources or environments.¹⁸² The mitigation measures considered by the DEIS are wholly insufficient.

The DEIS contains no rehabilitation or restoration plan regarding the Bristol Bay fishery. It defies common sense not to require monitoring of the headwaters to ensure that the proposed action does not actually result in unacceptable levels of contamination. Also missing is any remediation plan should those waters become contaminated. Instead of devising a mitigation and remediation plan, the DEIS blindly trusts that no contamination will occur – something that the science and history disprove. The DEIS even acknowledges that bridges and culverts will need long-term maintenance so as not to block fish passage and result in habitat destruction and population loss. Yet the DEIS provides no rehabilitation or restoration plan with regard to the dozens of bridges and culverts that will be constructed for the proposed action.

It is not acceptable to claim – as the DEIS does – that a salmon hatchery can mitigate impacts from the mine on wild salmon spawning. There is no replacement for a wild salmon fishery, and the DEIS fails to account for the many biological and economic impacts created by wild, naturally reproducing salmon. Nor does the DEIS explain who will pay for fundamentally altering the Bristol Bay fishery to a managed fishery that relies on hatchery salmon. Like the suggestion of a hatchery as a mitigation measure, many of the DEIS’s mitigation measures are grounding in wishful thinking rather than scientific analysis.

¹⁸⁰ *Id.* at ES-5.

¹⁸¹ 40 C.F.R. § § 1502.14(f), 1502.16(h), 1508.20.

¹⁸² 40 C.F.R. § 1508.20.

The DEIS or permit could at the very least require the operator to establish a bond to be used to restore adversely affected fish habitat and fish population and to compensate the commercial fishing industry for any adverse impacts to the Bristol Bay fishery. Yet the DEIS fails to do even that. Nor does the DEIS require provisions for adequate monitoring of water quality and salmon impacts for the many decades during which the mine will threaten the fishery. Likewise, the DEIS is silent on a required action plan to mitigate and halt spills or releases from the mine.

The DEIS contemplates allowing the Pebble mine to place a guillotine over the Bristol Bay fishery that will hang over it for generations, without adopting any mitigation plan to halt, ameliorate, or redress the catastrophic impacts should the blade fall.

Conclusion

BBRSDA exists to promote economic development, and its mission entails economic progress. While BBRSDA understands the role and need for mining as a source of economic development, the Pebble mine is, in the words of Senator Ted Stevens, “the wrong mine for the wrong place.” Development of the Pebble mine would be disastrous for Bristol Bay, Alaska, and the nation. Even the first step of approving a permit for the mine, and certainly the commencement of any development of the mine, would cause irreparable harm to the brand and market standing of the Bristol Bay fishery.

The Army Corps should protect the Bristol Bay fishery and the current and future generations who stand to benefit from it. The Army Corps should reject the DEIS as inadequate and deny the permit application for this mine. The only proper response here is “no action.”

Sincerely,



Jonathan W. Dettmann



Craig S. Coleman

Attachment B

Comments on the economic analysis in the Pebble Project Draft Environmental Impact Statement

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1 Introduction

In the following report I comment on the economic analysis in the Pebble Project Draft Environmental Impact Statement (hereafter the DEIS) with a focus on Section 4.6 of the DEIS. As a general characterization, the DEIS is fairly devoid of any economic analysis. There has been no attempt to quantify or even define the economic impacts of the Pebble Project, as related to impacts to natural resources and the environment. Further, much of the information needed to develop an understanding of these impacts is readily available in the literature, but not considered in the DEIS.

In this report I expand on these points and specifically comment on the three following notable deficiencies of the DEIS:

1. The DEIS concludes that changes in the market reception of Bristol Bay fish are not expected to occur based on an inadequate review of the evidence;
2. The DEIS ignores the economic value of recreational angling and does not examine the potential impacts of the project on these values;
3. The DEIS fails to consider consumer surplus and non-use values.

Each of these deficiencies of the DEIS must be addressed in order to understand the economic impacts of the Pebble Project. Accordingly, I have reservations that the economic analysis in the DEIS is sufficient to decide on the permit for the proposed project.

Throughout the report I follow conventions in the field of welfare economics and define economic value as the sum of producer and consumer surplus (Figure 1). Consumer surplus is the difference between what consumers would be willing to pay (WTP) and what they actually have to pay for the goods they consume. Producer surplus can be thought of loosely as producer profits, but is more precisely defined as gross revenues less the variable cost of supplying a product to market. Neither producer nor consumer surplus are discussed in the DEIS although they should be the fundamental building blocks of an economic assessment. While policy makers may also be interested in regional economic impacts, such as changes to jobs and

both direct and indirect expenditures (including multiplier effects), for the most part, regional economic impacts are not discussed in this report.

This report is organized as follows: Section 2 of this report discusses the deficiency of the DEIS in considering the larger literature on consumer responses to perceived contamination of seafood products. Section 3 discusses the existing literature on economic values from recreational angling and how the literature can be used to understand the impact of the Pebble Project on these values. Section 4 discusses the importance of consumer surplus and non-use values associated with environmental quality in the Bristol Bay region. Section 5 concludes.

2 Potential market impacts

The DEIS concludes that changes in the market reception of Bristol Bay fish are not expected to occur. Despite a rich and decades-long literature on the topic, the conclusion in the DEIS is based on just three papers describing just two case studies: the *Exxon Valdez* oil spill and the Fukushima nuclear disaster. Because neither of these case studies represents events that may unfold due to environmental degradation and possible spill events from Pebble Project, the larger literature should not have been ignored.

The existing literature provides insight into the conditions under which consumers will respond to food safety scares (with both real and perceived health risks), as well as the factors that determine the magnitude of the response and, therefore, the economic losses. Economic losses are defined by both consumer and producer surplus losses in markets for seafood products. Consumer surplus is the difference between what consumers are WTP and what they actually have to pay for the seafood products (see Section 4.1 for more on consumer surplus from Bristol Bay salmon). Producer surplus can be thought of loosely as producer profits, but is more precisely defined as gross revenues less the variable cost of supplying fish to market.¹ Both consumer and producer surplus can be affected by a food safety scare if the scare leads to a reduction in demand for the project. Figure 2 is a conceptual diagram illustrating these losses.

¹ Seafood markets have multi-stage supply chains where producers include harvesters, processors, wholesalers, and retailers. Producer surplus can occur at each of these stages and the sum of producer surplus along the supply chain is the total producer surplus in the market. Consumer surplus, on the other hand, should only be measured in the final market to avoid double counting.

Summarizing the literature, consumer responses to acute short-lived media coverage of food safety issues tend themselves to be short-lived and small in magnitude. In contrast, sustained media coverage can lead to enduring changes in consumer behavior (Kalaitzandonakes, Marks, and Vickner 2004). The literature also generally shows that negative press has a larger impact on consumer behavior than positive press, restricting but not eliminating the opportunity for effective organized industry damage control (see Verbeke and Ward 2001). Finally, the literature shows that in many cases media coverage can lead to spillover effects where markets for uncontaminated but related products are impacted (see Section 2.2).

It is important to note that there are two types of consumer responses to food safety scares: (1) a rational consumer response where consumers appropriately respond to real health risks by decreasing their demand for the contaminated product; and (2) an irrational response based on imperfect information where there is no actual health risk, but consumers nevertheless believe that there are health risks, and avoid food products unnecessarily. Swartz and Strand (1981) refer to the welfare losses from the latter type of consumer response as “needless” losses. Following the DEIS, the remainder of this discussion focuses on consumer responses driven by imperfect information generating “needless” losses.²

Additionally, although the literature has documented consumer reactions to health scares in a wide variety of markets including apples (Van Ravenswaay and Hoehn 1991), strawberries (Richards and Patterson 1999), milk (e.g. Smith, Van Ravenswaay, and Thompson 1988) and meat (e.g. Verbeke and Ward 2001), the following discussion focuses on seafood markets. Nevertheless, common themes run throughout this literature and a thorough analysis of the potential impacts from the Pebble Project should take the broader literature into consideration.

In what follows, I distinguish between primary market effects and spillover market effects. I present a brief overview of the literature, which is not intended to be comprehensive, but instead will be illustrative of available information that should be considered to understand the potential market impacts from the Pebble Project.³

² The focus is predicated on the DEIS finding that any increased hazards to human health from the project will be indistinguishable from the baseline (Section 4.10). If the assessment should change, then the welfare losses associated with a rational consumer response should also be considered.

³ Notably, results from the stated preference literature, where consumers are surveyed about their preferences for food safety, are not covered here.

2.1 Primary effects

Primary market effects for Bristol Bay salmon could be generated by the Pebble Project if the project leads to changes in the perception of health risks from consuming Bristol Bay salmon. This could happen if the project leads to increased concentrations of toxic substances in the watershed that bioaccumulate in fish and have uncertain health consequences. For example, the project is expected to increase selenium concentrations in salmon (Zamzow et al. 2019) and the health consequences from various levels of selenium exposure are unclear (Morris and Crane 2013; Lawrence and Chapman 2007). The combination of the uncertain health risks from selenium consumption, pre-existing consumer concerns about ocean pollution on wild fish (Schlag and Ystgaard 2013), and the high level of attention to the Pebble Project, may create conditions for media attention and a consumer reaction.

In its discussion of primary market effects, the DEIS (Section 4.6) references Owen et al. (1995), who show that seafood prices were not affected by the *Exxon Valdez* oil spill. A likely driver of the apparent lack of consumer response was a corresponding lack of media attention to the issue. In fact, Owen et al. (1995) report that there was absolutely no media coverage of contaminated seafood after *Exxon Valdez*. Therefore, even if consumers were aware of the spill and concerned about contaminated seafood, these fears were not validated or reinforced by the media.

The *Exxon Valdez* spill is an example of the best-case scenario when it comes to contamination from the Pebble Project, i.e. even with a large contamination event, media coverage of the event is scant, and consumers do not alter their purchasing patterns. However, this case study is not generalizable, and the larger literature must be considered.

To highlight another possibility, consider the example of Hites et al. (2004), published in *Science* magazine, which found that polychlorinated biphenyls (PCBs) in farmed salmon were high relative to wild salmon.⁴ Despite the fact that PCB levels found in Hites et al. (2004) were well within FDA limits, and the fact that the FDA disputed that farmed salmon presented a health risk, the study resulted in extensive media coverage generating what has been called an international health scare (Butterworth 2004).

⁴ Most of the literature examining “needless” welfare losses from environmental contamination focus on what I call spillover effects (Section 4.2). Therefore, I focus this section on a single case study.

Examining the impacts of the event on the demand for farmed salmon, Sha et al. (2015) found that media coverage led to a reduction in U.S. farmed salmon imports of roughly 1/3rd during 2004-2006 (Table 1). Sha et al. (2015) also note that several studies post-2006 show that consumers continue to believe that wild salmon is healthier suggesting that the PCB scare may have had long-lasting impacts on consumer perceptions.

Therefore, both case studies (*Exxon Valdez* and the PCB scare) demonstrate the importance of media coverage in the market impacts of a contamination event, i.e. media coverage is needed to generate a consumer response. This is consistent with a rich literature on the topic that has not been considered in the DEIS. In order to predict whether consumers will respond to environmental changes created by the normal operations of the Pebble Project or a spill event, it is necessary to assess the probability of negative media coverage of the Pebble Project, as relates to the quality of salmon produced in Bristol Bay, and the likely intensity and duration of any media coverage. The DEIS's failure to do so renders it unable to evaluate the potential market impacts.

2.2 Spillover effects

Spillover effects can occur when an environmental quality change or contamination event in the Bristol Bay fishery leads to reduced demand in another fishery, e.g. all Alaskan salmon products or all wild-caught salmon products. This can happen when consumers have imperfect information on which products have been affected, because media coverage is not clear about which products are affected, or because consumers do not want to invest time in acquiring information on which products to avoid and would rather avoid all related products.

Spillover effects do not always occur or can be marginal when they do occur. For example, the DEIS cites Wakamatsu and Miyata (2016) who examine the impacts of the Fukushima disaster on market demand for cod and pollock from prefectures other than Fukushima. The authors find that the event led to only negligible impacts on the quantity demanded from other prefectures for the two products.

However, several other studies do find spillover effects. Consider the widespread market impacts created by a health scare around oysters from the Gulf of Mexico in the early 1990s. Eastern oysters from the Gulf can have high levels of the bacteria *Vibrio vulnificus* which can lead to serious illness or death for individuals with weakened immune systems. In the early 1990s several states and the FDA adopted a program to raise consumer awareness about the health risks from consuming oysters from the Gulf and in 2003 California banned the sale of Gulf oysters during warm months with higher loads of *Vibrio vulnificus*. The issue received considerable and sustained media attention (Keithly Jr and Diop 2001; Dedah, Keithly, and Kazmierczak 2012). As a result, the data suggest that consumers avoided Eastern oysters not just from the Gulf, but from the Chesapeake Bay as well. Avoiding East Coast oysters meant consumers increased demand for Pacific oysters from the West and imported oysters. Specifically, Dedah, Keithly, and Kazmierczak (2012) found that the health scare led to a 35% decrease in the market share of Chesapeake Bay oysters and large increases in the market shares for Pacific oysters and imported oysters.

Other examples of spillover effects in seafood markets include: 1) the 1975 closure of all fisheries on Virginia's James River due to the detection of kepone pollution leading to reduced demand for uncontaminated Chesapeake Bay oysters (Swartz and Strand 1981); 2) a toxic algae bloom on Prince Edward Island, Canada, leading to reduced demand for unaffected U.S. mussels (Wessells, Miller, and Brooks 1995); and 3) large reductions in the demand for oysters grown in Oregon and Washington, due to a paralytic shellfish poisoning outbreak in Northern California (Conte 1984).

Details of these events and their impacts are summarized in Table 1.⁵ Overall, the studies suggest that, if the Pebble Project were to generate negative media coverage related to seafood safety, producers and consumers of Bristol Bay seafood products may not be the only individuals harmed. Yet the DEIS does not consider this risk.

3 Recreational fishing values

The DEIS, Section 4.6, makes no attempt to characterize the economic values from the recreational fishery and the impacts to those values from the Pebble

⁵ It is important to note that because many of these studies are based on data from a particular segment of the market, and thus are an underestimate of the total impacts of spillover effects on consumer and producer surplus.

Project. This is a noticeable omission given the status of the Bristol Bay as a destination location for recreational anglers that is known for its remote, uncrowded, and wild setting (Duffield et al. 2007). The failure of the DEIS to consider values from recreational angling is also noticeable given the availability of information on values from recreational angling in the region.⁶

Instead of examining the economic impacts to the recreational fisheries sector, Section 4.6 of the DEIS simply provides a description of the number of historical recreational trips taken in various locations, and the primary target species, and harvest methods in these various locations.

Table K3.6-7 of the DEIS suggests that a total of 10,544 angler days per year could be affected by “an aspect of the project or unanticipated release”. This estimate of impacted angler days is likely an underestimate, because the data on angler days used in the DEIS is from the (now-defunct) Alaska Department of Fish and Game’s (ADF&G) Freshwater Guide Logbook program, which does not include angler trips made without a fishing charter or guide. It is likely that resident anglers are largely excluded from this data as well as self-guided non-resident trips.⁷

To understand the impacts of Pebble Project to the recreational sector, it is again important to understand the consumer surplus and producer surplus associated with recreational trips and how those economic values might change with the project. Producer and consumer surplus can be affected by the Pebble Project if the project causes any of the following impacts to anglers who would have fished in the affected area in absence of the project: (1) anglers to continue to fish in the affected area but value the experience less; (2) anglers fish at other locations, either outside of the Bristol Bay watershed or outside of Alaska entirely, which is, by definition, of less value to them; or (3) anglers do something else besides fishing, which is, by definition, of less value to them.

Angler values from recreational fishing trips depend on trip attributes, which include travel and other costs, harvest levels, regulations such as bag and size limits,

⁶ Angler expenditures are discussed briefly in section 3.6 of the DEIS but are not the same as the economic value of recreational trips and impacts to these expenditures are not estimated.

⁷ Southwick Associates et al. (2008) estimate 191,000 Alaska residents and 285,000 non-Alaska residents fished approximately 2.5 million days in 2007 and that resident angler days were 35% greater than non-resident angler days, suggesting the importance of resident angler trips.

water quality, congestion, and the scenic beauty of the fishing trip.⁸ Therefore, changes in these attributes lead to changes in consumer (and producer) surplus from recreational fishing regardless of whether attribute changes lead to changes in fishing location choice.

To get some sense of how much surplus is at stake we can look to the literature on the value of recreational angling trips.⁹ For example, a recent EPA report estimates a total of \$14.28 million, in 2018 dollars, in annual angler consumer surplus from the Bristol Bay region (EPA 2014a). Based on this estimate of annual consumer surplus, the value of receiving this surplus year after year, i.e. the perpetuity value, is \$204 million when using a 7% discount rate and \$476 million when using a 3% discount rate. To estimate the economic impact of the Pebble Project on the recreational fishery, however, the DEIS should draw from studies that estimate the value of trips based on trip characteristics such as location or target species rather than simple average values.

Relevant studies include Layman et al. (1996) who estimate daily surplus of \$51.77 for Alaska resident anglers fishing for Chinook salmon on the Gulkana river (in 2018 dollars). Bag limits for Chinook on the Gulkana limited anglers to one Chinook per day, meaning that the consumer surplus estimates represent the value of the opportunity to catch one Chinook salmon (Criddle and Shimizu 2014). Similarly, Criddle et al. (2003) estimate that surplus from fishing in the Kenai Peninsula is \$129.09 for residents and \$185.99 for non-residents in 2018 dollars.

Lew and Larson (2012) estimate that the average WTP for an off-shore recreational fishing trip for Alaska residents fishing for Chinook salmon ranged from \$267 to \$364, depending on area of residence. The WTP for non-resident anglers on a chartered fishing trip for Chinook salmon was estimated to be \$2,639. Estimates for Pacific halibut ranged from \$266-\$444 for residents and, for non-residents, the estimated value of a chartered halibut fishing trip was \$2,593. Note that to convert these WTP estimates to estimates of producer and consumer surplus one must subtract out the variable cost of supplying these trips.

Furthermore, several economic studies lend themselves to considering the economic impacts of changes in sportfish harvest rates that could be generated by

⁸ See Phaneuf and Smith (2005) for a review of the literature.

⁹ The literature review is not comprehensive, but is meant to be illustrative of the relevant information ignored by the DEIS.

the Pebble Project. For example, in a study on the Cook Inlet recreational fishery, Criddle et al. (2003) examine the impact of halibut catches on participation, economic value, and regional economic impacts including expenditures, income, and employment. The authors find that a 20% reduction in halibut harvest in the recreational fishery in Cook Inlet leads to the loss of \$10.24 million in economic value (in 2018 dollars) and a loss of 136 jobs (Criddle et al. 2003).

Lew and Seung (2010) consider the economic impacts of reducing bag limits in Alaska saltwater sport fisheries, finding that one fewer Chinook salmon leads to a -0.86% change in non-resident saltwater fishing or a -2,261 change in saltwater non-resident fishing participants. Reducing halibut bag limits by one fewer halibut leads to a -1.49% change in non-resident saltwater fishing or roughly -3,929 in non-resident participants. Lew and Seung (2010) also calculate the impacts of the bag limit changes on angler expenditures in Alaska and Alaskan household incomes and jobs. For example, a reducing the Chinook bag limit by 1 fish leads to \$7.8 million reduction in angler expenditures, a \$3.2 million-dollar reduction in household incomes, and 47 jobs lost.

Similarly, a number of studies have developed methods to quantify how changes in recreational site aesthetics, e.g. water clarity and general aesthetic beauty, impact values to recreational anglers. While to my knowledge, the value of aesthetic attributes of fishing locations in Alaska have not been estimated, there is a rich and decades-long literature on the topic that can be used to understand the potential magnitude of the impacts. However, generating high-quality estimates of these impacts may require that an original study be designed and implemented. In this case the methods are well-established.¹⁰

In summary, given the importance and value of recreational fishing in the project area the EIS of the Pebble Project should quantify the potential economic losses that will be generated by anticipated changes to recreational fishing trip attributes. Changes in economic values from expected changes to harvest rates can make use of existing economic value estimates. Understanding the impact of changes to site aesthetics may require an original study for which the methods are well established. Yet the DEIS fails to include any analysis of the economic impacts to recreational fishing.

¹⁰ To obtain revealed preference estimates in Alaska one would need a level of variation in the aesthetic attributes that may not exist. In this case, stated preference methods, such as a discrete choice experiment, may be preferable.

4 Other Economic Values

4.1 Consumer Surplus

Consumer surplus is the difference between what consumers would be WTP and what they actually have to pay for the goods they consume. Economic theory shows that consumer surplus does not exist for small producers of goods for which there are perfect substitutes, e.g. undifferentiated products. Therefore, in order for consumer surplus to exist, it is necessary for Bristol Bay to be a large producer for some seafood products that consumers prefer over available substitutes. If consumers were completely indifferent between wild-caught sockeye and farmed salmon, for example, then consumers would not be harmed by even the most dramatic changes to production from Bristol Bay or perceived quality of Bristol Bay salmon (although producer surplus would still be affected).¹¹ In what follows, I review evidence for the existence of consumer surplus from Bristol Bay salmon.

A recent EPA report estimates that, on average from 2000-2010, Bristol Bay produced 45% of the world's sockeye, 18% of Alaskan salmon, 7% of wild salmon, and 3% of the world's salmon supply (EPA 2014a). According to the Marine Stewardship Council (MSC) website, Alaska supplies roughly 85% of the volume of their certified salmon (volumes include all 5 species of Pacific salmon).¹² Combined with the EPA (2014a) estimate that Bristol Bay salmon comprises 25% of all Alaskan salmon, these figures suggest that Bristol Bay supplies 1/5th of all MSC-certified salmon to the global market. Therefore, Bristol Bay is a large supplier of Alaska salmon, sockeye salmon, and salmon with the MSC eco-label.

Bristol Bay is also a large supplier of valuable wild-caught species that are typically sold as fresh and frozen products. Figure 4 shows the total annual volume of wild-caught Chinook, sockeye, and coho, by region, from the Food and Agricultural Organization (FAO) fisheries statistics database. From 2000-2017, the U.S. supplied an average of 72% of these high-valued species to the global market. Combining the FAO data on U.S. production with data from Alaska's Commercial Fisheries Entry Commission, I estimate that roughly 50% of U.S. Chinook, sockeye,

¹¹ A precise definition of perfect substitutes is goods that consumers are willing to substitute at a constant rate. For example, if a consumer is indifferent between two farmed salmon fillets and one wild salmon fillet, the goods are perfect substitutes for that consumer.

¹² The estimate is from <https://fisheries.msc.org/en/fisheries/@@search?q=salmon&search=>, accessed on 06/25/19.

and coho, and thus 36% of the global supply of these species, is harvested from the Bristol Bay.

Clearly Bristol Bay is a large supplier of some products. So, the question is do consumers have preferences for these products? There are two types of methods that researchers have employed to examine this question: (1) revealed preference studies using market price and quantity data; and (2) stated preference methods using survey data where consumers are questioned about their preferences. Results from revealed preference methods are generally viewed as more reliable because consumers don't always do what they say they will do, e.g. saying that you prefer wild salmon is different from avoiding farmed salmon in the market. However, stated preference methods have the advantage of being used in markets where the data are not available to conduct a revealed preference study.

Relevant revealed preference studies include Ashe et al. (2005) who examine the degree to which wild and farmed salmon are substitutes in the market using monthly Japanese import data. The authors find evidence that the majority of consumers view farmed and wild salmon as perfect substitutes, but that there is niche market for wild salmon (Asche et al. 2005).¹³ Other revealed preference studies show that consumers value and are willing to pay more for salmon with the MSC eco-label (Roheim, Asche, and Santos 2011; Asche et al. 2015; Sogn-Grundvåg, Larsen, and Young 2014; Asche and Bronnmann 2017).

A large number of stated preference studies find that consumers prefer wild salmon to farmed salmon in most major salmon markets around the world including: in the US (Roheim, Sudhakaran, and Durham 2012; Davidson et al. 2012), Europe (Jaffry et al. 2004; Salladarré et al. 2010; Asche and Bronnmann 2017), and Japan (Uchida et al. 2014). The reasons for these preferences vary, but the literature generally shows that consumers believe wild salmon are healthier and safer (Brett and Melo 2010; Roheim, Sudhakaran, and Durham 2012; Rickertsen et al. 2017), wild salmon tastes better (Davidson et al. 2012), and is a more "natural" method of food production (Schlag and Ystgaard 2013).

¹³ More specifically, the authors find that overall the law of one price holds in the data, but prices can deviate from their long-run relationship in seasons with low quantities of wild salmon on the market.

In fact, to my knowledge, there is only one stated preference study showing that consumers prefer farmed salmon over wild salmon. In this 1993 survey of U.S. consumers, the authors found that 62% of their sample had not heard of farmed salmon and, of consumers who had an opinion about the relative safety of consuming farmed salmon, the majority believed that farmed salmon were safer to consume (Holland and Wessells 1998). The discrepancy in the results of Holland and Wessells (1998) and more recent stated preference studies may suggest that consumer perceptions and preferences have evolved over time, potentially due to negative media coverage of farmed salmon (see Section 2.1).

In addition to the peer-reviewed literature, Oceana recently released a report showing that farmed salmon are being mislabelled as wild salmon and that mislabelling rates at restaurants and diners were three times higher than at grocery stores (Warner et al. 2015). The mislabelling is potentially indicative of consumer preferences and higher WTP for wild salmon.¹⁴

While more research is needed, the evidence suggests that consumers along with producers will be harmed if the Pebble Project reduces productivity in the Bristol Bay ecosystem (Figure 3), reduces consumer demand for Bristol Bay seafood products (Figure 2), or both. Therefore, in order to understand the impacts of the Pebble Project, impacts to consumers must be considered. The DEIS fails to do this.

4.2 Non-use values

Non-use values are another notable missing component of the DEIS. Given that the Bristol Bay region is unique in its beauty and is home to North America's most diverse and productive wild salmon fishery (EPA 2014b) non-use values of environmental quality in the region are potentially very high. Environmental non-use values come from the utility that individuals receive from the environment regardless of whether they interact with the environment directly. In other words, individuals who value maintaining environmental quality in the region may be willing to pay something to avoid the environmental degradation associated with the Pebble Project regardless of whether they will ever visit Bristol Bay or consume salmon from the region.

¹⁴ Seafood mislabeling can either be deliberate or unintentional.

Non-use values can be particularly large when the resource in question is unique. Under these conditions significant non-use values can be held by even those individuals living far from the site of environmental degradation, i.e. non-use values and thus the economic impacts of the Pebble Project are likely to reach far outside of the geographical boundaries of the project. Irreversible environmental degradation or change further contributes to the magnitude and extent of non-use values. In summary, because the Pebble Project will degrade a unique resource, and because that degradation will be irreversible, the potential economic impacts of the project to non-use values are likely to be substantial.

Harpman et al. (1993), quote the Council on Environmental Quality (CEQ) regulation (40 C.F.R. pt. 1508.14), which states, “When an EIS is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment”. Harpman et al. (1993) go on to argue that the failure to report changes in non-use values in an EIS, when they are relevant, is “contrary to the language of the regulations” and recommend that non-use values be estimated as a part of the EIS process.

While non-use values have not been estimated for the Pebble Project, other studies may be suggestive of the magnitude of non-use values at stake. For example, losses in non-use values from the BP oil spill were estimated at \$17.2 billion (Bishop et al. 2017), non-use values from removing two dams on the Elwha river in Washington, USA, and restoring populations of 4 salmon species and steelhead was roughly \$6.27 billion or \$10.03 billion in 2018 dollars, with 97% of non-use values coming from non-residents (Loomis 1996); and losses to non-use values associated with the *Exxon Valdez* oil spill were estimated at \$2.8 billion or \$5.01 billion in 2018 dollars (Carson and Mitchell 1992).

The non-use values of avoiding the Pebble Project cannot be directly inferred from the studies cited here; however, as an important point of reference, the estimated net present value of profits from the Pebble Project over 25 years was estimated at \$3.8 billion or \$4.24 billion in 2018 dollars (Ghaffari et al. 2011). These figures were based on an older mine plan which included processing roughly 38%

more material than the current Pebble mine plan.¹⁵ Therefore, it is possible that the loss in non-use values alone would outweigh the benefits from the Pebble Project, making it imperative that these values be considered.

5 Conclusion

For all of these reasons, it is my opinion that the DEIS does not sufficiently analyze the foreseeable impacts to the human environment from the proposed Pebble Project, fails to properly consider the prevailing research discussed herein, and reaches unsupported conclusions with regards to impacts to commercial and recreational fishing and societal values for the current level of environmental quality in Bristol Bay.

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¹⁵ The NPV estimate is based on mining 1.99 million tons of ore (Ghaffari et al. 2011) and the project described in the DEIS (Appendix N) states that a total of 1.44 million tons of ore will be mined over 20 years.

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Tables

Table 1. Consumer Responses to Contamination Events in Seafood Markets

Contamination Event (study)	Contaminated Product	Affected Product	Estimated Impact
2004 elevated PCB levels found in farmed salmon (Sha et al. 2015)	Farmed salmon	Farmed salmon	U.S. imports of farmed salmon reduced by 1/3 during 2004-2006 relative to expected import levels without media coverage Note: these findings are based on a single country, so the total economic impacts may be larger.
1975 kepone detected in Virginia's James River (Swartz and Strand 1981)	Several species in the James River including oysters	Shucked oysters harvested in the Chesapeake Bay and sold in the wholesale Baltimore market	Estimated consumer surplus losses of \$13,000 in 1967 dollars. Note: these findings are based on one product form and one market, so the total economic impacts are likely much larger.
1987 toxic algae (domoic acid) bloom on Prince Edward Island, CA (Wessels et al. 1995)	Prince Edward, Island (PEI) mussels	Mussels sold by one firm from Maine, U.S., in the Montreal, CA, wholesale market	A Canadian ban on all mussels leads to direct loss in annual sales of 8% and consumer avoidance leads to a loss of 6.5% in annual sales. Note: these findings are based on a single firm's sales in a single market, so the total economic impacts are likely much larger.
1980 PSP outbreak in Northern California (Conte 1984)	Oysters grown in Northern California	Oysters grown in Oregon and Washington	Approximately 25% market loss to oyster growers in Oregon and Washington that market their products in California
Several programs raising awareness about safety of consuming oysters from the Gulf of Mexico (Dedah et al. 2011)	Oysters grown in the Gulf of Mexico	Eastern oysters grown in the Chesapeake Bay and Pacific oysters grown on the West Coast and imported oysters	The market share for oysters grown in the Chesapeake Bay fell by 36% due to the media coverage and new law, the market share for Pacific Oysters increased by 60%, and the market share for imported oysters nearly doubled.

Figures

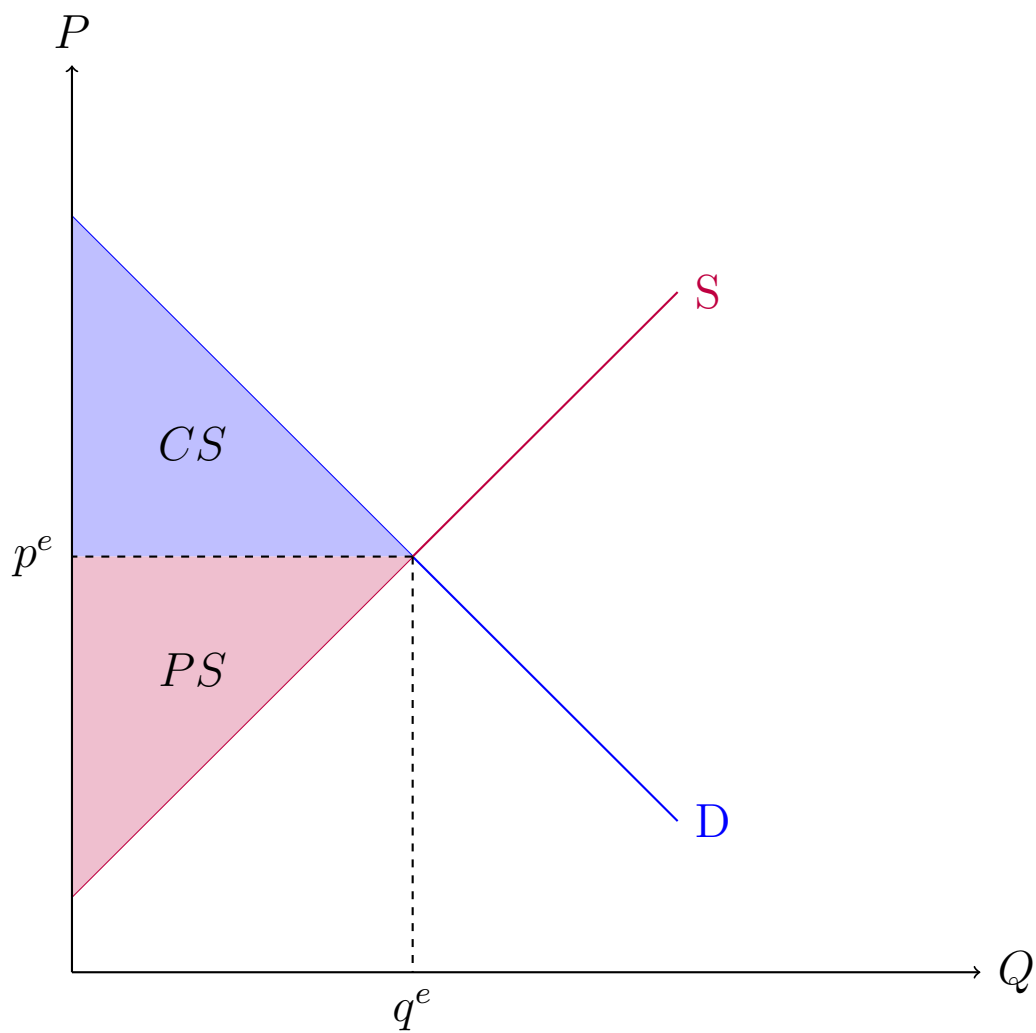


Figure 1 The supply and demand model of a market where S represents the supply curve, D represents the demand curve, and p^e and q^e represent the equilibrium market price and quantity. Economic market value is defined as the sum of consumer surplus (CS in the figure) and producer surplus (PS in the figure).

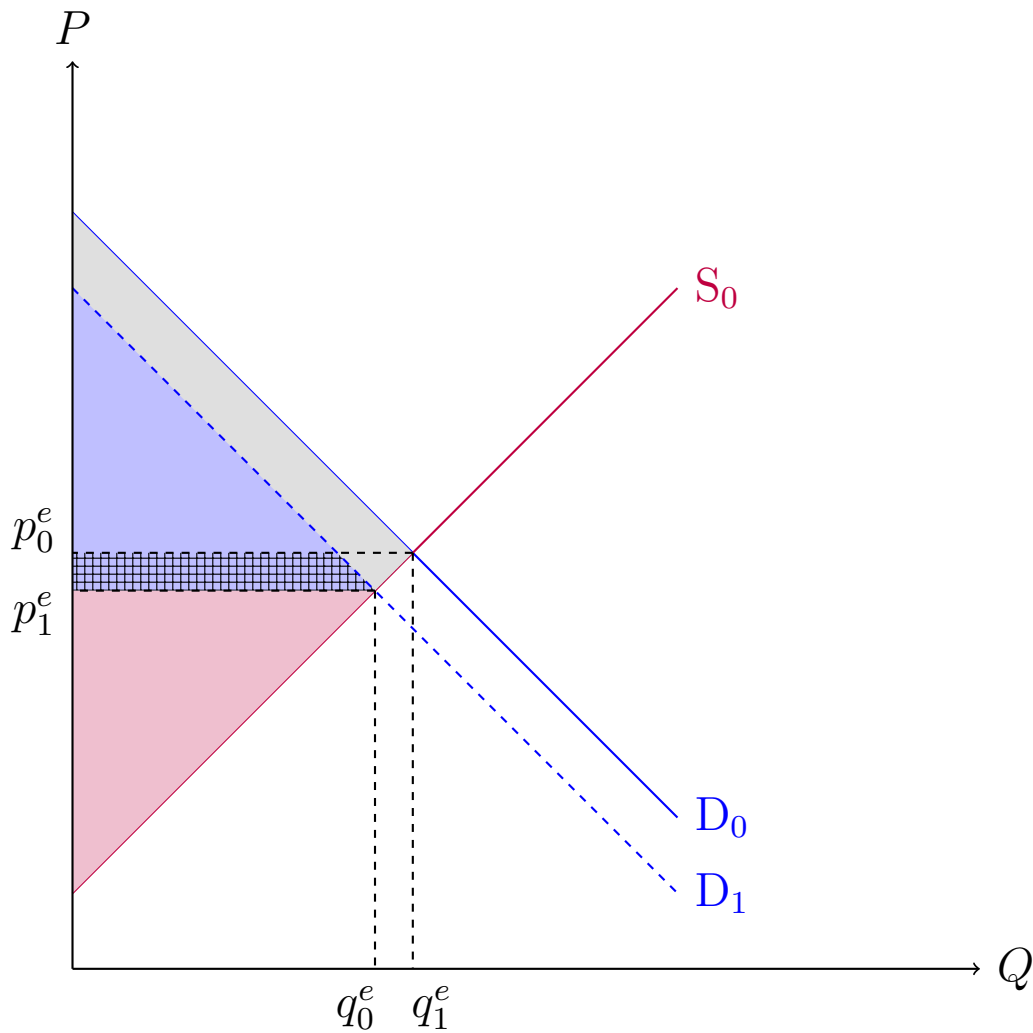


Figure 2 A conceptual illustration of producer and consumer losses from a food scare. Here the food scare causes a demand shift from D_0 to D_1 , which lowers market prices from p_0^e to p_1^e . The total economic loss from the scare are represented by the gray shaded area. Some of the gray shaded area was formerly consumer surplus and the remainder was formerly producer surplus. Additionally, while not considered an economic loss, it is important to note that the gridded area represents welfare that was transferred from producers to consumers.

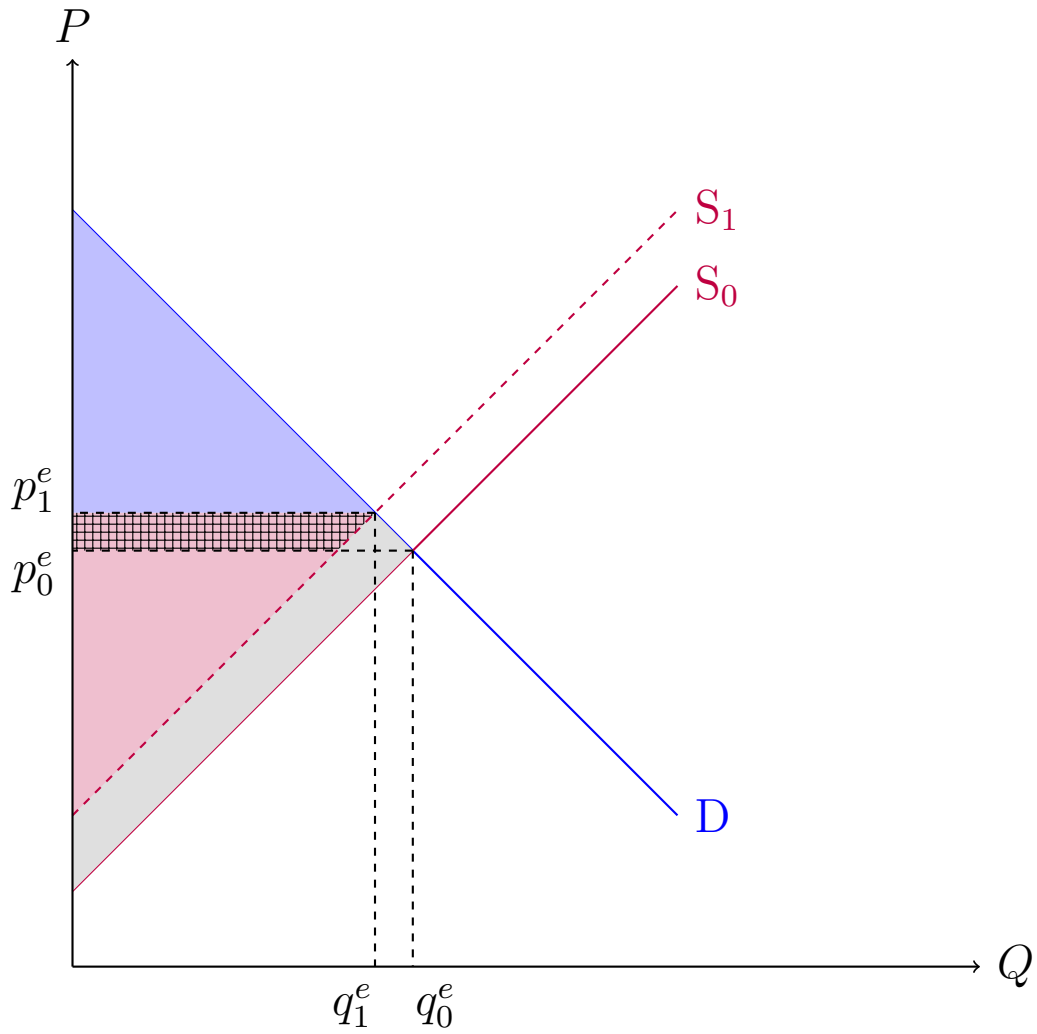


Figure 3 A conceptual illustration of producer and consumer losses from quantity reductions. Here supply shifts from S_0 to S_1 , which raises market prices from p_0^e to p_1^e . The total economic loss from the scare are represented by the gray shaded area. Some of the gray shaded area was formerly consumer surplus and the remainder was formerly producer surplus. Additionally, while not considered an economic loss, it is important to note that the gridded area represents welfare that was transferred from consumers to producers.

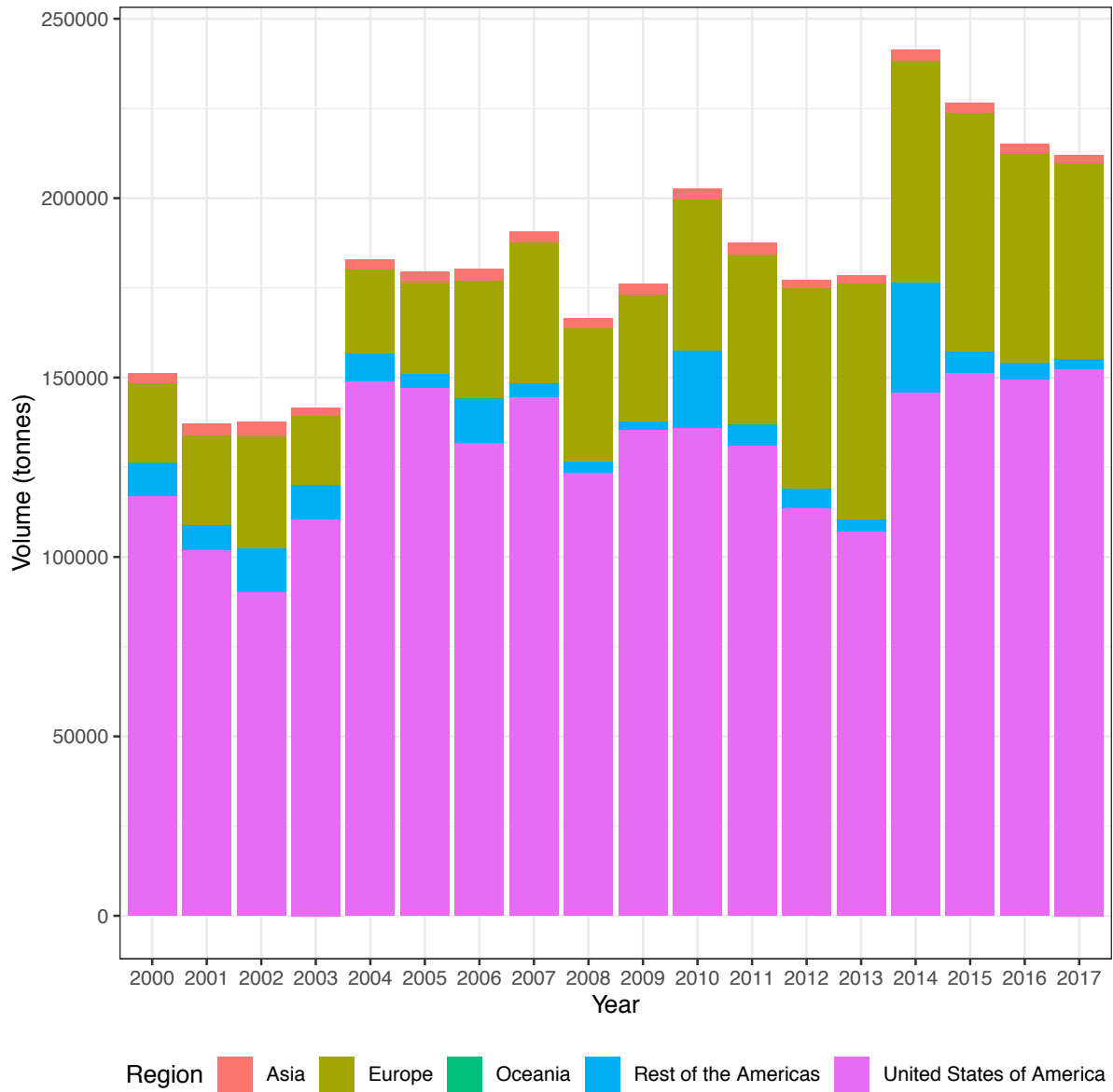


Figure 4 Global production of wild-caught Chinook, sockeye, and coho from FAO data

Attachment C



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September 25, 2020

VIA E-MAIL AND CERTIFIED MAIL

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Re: **Pebble Project Environmental Impact Statement and Application for Clean Water Act Permit (POA-2017-00271)**

Dear Assistant Secretary James, Lieutenant General Spellmon, and Mr. McCoy:

We write on behalf of the Bristol Bay Regional Seafood Development Association (“BBRSDA”) to address the new comments made by Pebble Limited Partnership (“PLP”) CEO Tom Collier and Northern Dynasty Minerals, Ltd. CEO Ron Thiessen on recorded conversations released by the Environmental Investigation Agency (“EIA”). Review of the tapes makes it obvious that denial of PLP’s permit application is the only lawful outcome of the Army Corps’ permitting process. Indeed, the words straight from the mouths of these executives render it impossible to defend issuance of a permit based on the existing record, and the Army Corps should immediately deny PLP’s permit application rather than continuing to waste public resources reviewing it.

We have attached as Exhibit 1 a full set of the transcripts of the “Pebble Tapes,” and the recordings are available at <https://eia-global.org/reports/20200921-the-pebble-tapes>. Far from contesting the authenticity of the tapes, Mr. Collier has resigned from PLP based on the content of the tapes and Mr. Thiessen has “unreservedly apologize[d] to all Alaskans.”

1. The Pebble Tapes demonstrate that the permit should be denied due to PLP's false statements to the Army Corps, Congress, and the American public

The integrity of the Army Corps' environmental review and permitting process depends, first and foremost, on the honesty of the applicant about basic facts related to its application and the project. Indeed, the ability of the agencies and the public to count on applicants not to lie in permit applications is so fundamental to the process that the U.S. Code criminalizes false statements. *See* 18 U.S.C. § 1001. Here, PLP certified that the information in its 2017 and 2019 applications was "complete and accurate" and acknowledged that it would be subject to criminal liability if it "disguises a material fact," "covers up any trick or scheme," or "makes any false" statement.

PLP's acknowledgement of this legal obligation was underscored by its accusation that the EPA's Section 404(c) process had supposedly negated what must be a "rigorous, exhaustive CWA permit review and associated National Environmental Policy Act ('NEPA') review process." (Executive Summary of The Pebble Limited Partnership's Response to EPA's February 28, 2014 Letter, April 29, 2014 at 2) In that same letter, PLP claimed that the CWA Section 404 review process, and the associated NEPA review, "will provide a full record on the scope and potential impacts of the project," and that its permit application would "contain extensive information on the scope of the project, including detailed data on construction and operation plans, and potential impacts." (*Id.* at 3 (emphases added))

Thus, PLP has always known that accurate, honest assessment of the project's true scope is imperative to a legally adequate permit process and environmental review. And, PLP got exactly what it asked for: the opportunity to submit its permit application and to describe in detail the scope of the project it intended to develop.

The Pebble Tapes definitively demonstrate that PLP violated its fundamental duty of honesty in its permit application and instead took advantage of the process. Most fundamentally, PLP misrepresented the scope of the project. In its 2017 permit application, PLP made the deliberate, intentional choice not to disclose that the project would proceed in staged phases or that its true intention is massive expanded development of the Pebble deposit. Instead, PLP affirmatively pledged that "mining in the open pit will stop after 14 years" (2017 Permit Application, Attachment D § 6.1 (emphasis added)), it stated that production would be limited to 1.1 billion tons of the Pebble Deposit (*id.* §§ 1.8, 3.3), and it offered a mine closure plan to obfuscate its plans for future expansion.

PLP's public commitment to a 20-year project was integral to the permit application and its effort to obtain a permit based on the purportedly limited impacts of the project. Indeed, PLP pronounced that, "The Project plan has been limited to mining the near-surface portion of the Pebble Deposit" in order to "significantly reduce[] the footprint of the open pit, TSF, and mine facilities." (Tab 23) Purporting to describe the project "from initial construction through closure and reclamation" (Attachment D, § 1), PLP represented that the mine will have an "operating life of 20 years" (*id.*, § 1.1). This commitment was specific and based on PLP's representation that the project would be limited to a "total of 1.2 billion tons of material mined over the life of the Project" with a "milling rate of 58 million tons per year." (*Id.*) PLP expressly acknowledged that

the project's limited scope was designed to achieve the "avoidance and minimization of environmental impacts." (*Id.* § 1.3)

Rather than acknowledge the possibility of expansion, PLP instead deliberately touted its "design-for-closure philosophy" to ensure that "post-closure site management were considered from the beginning of the Project." (*Id.*) Specifically, that closure plan called for tailings to be placed in the open pit, precluding further mining at the mine site and committing PLP to a 20-year mining plan. Likewise, PLP represented that "[t]otal project operations" would be limited to 20 years with a "[d]aily process rate" of 160,000 tons. (*Id.* § 3.1) It further claimed that the mine would only be in production for "20 years." (*Id.* § 3.2) And it claimed that the site was specifically selected to ensure accommodation of "tailings for the 20-year life of the Project." (*Id.* §3.4.1)

PLP went out of its way to claim that it had designed a closure plan as a core feature of the project to limit environmental impacts: "PLP's core operating principles are governed by a commitment to conduct all mining operations, including reclamation and closure, in a manner that adheres to socially and environmentally responsible stewardship while maximizing benefits to state and local stakeholders. PLP has adopted a philosophy of 'design for closure' in the development of the Project that incorporates closure and long-term post-closure water management considerations into all aspects of the project design to ensure that all regulatory requirements, as well as private landowner obligations, are met at closure." (*Id.* Attachment D § 6.) "Active mining in the open pit will stop after 14 years, pit dewatering will stop, and the pit will begin to flood." (*Id.* § 6.1) Those statements are unqualified.

PLP's commitment to close the mine after 20 years with a specific plan that terminated operations at the mine site was foundational to its application. "Prior to commencing construction, the Project Reclamation and Closure Plan approval and associated financial assurance mechanisms will need to be in place." (*Id.* § 6.3) "A detailed reclamation and closure cost model will be developed that will address all costs required for both the physical closure of the Project and the funding of long-term post closure monitoring, water treatment, and site maintenance." (*Id.*)

Thus, PLP explicitly relied on a limited, 20-year mining proposal to obtain favorable determinations regarding the impact of the Pebble Mine, and ultimately a permit, and that commitment was central to every aspect of its application. Rather than acknowledge its plans to continue mining beyond 20 years, PLP intentionally committed to terminating mine operations by filling and watering the pit.

Since its original permit application, PLP has twice amended its application, first in 2019 and again in 2020. In 2019, PLP's application extended active mining operations from 14 to 20 years and increased the milling rate of the processing operation from 160,000 to 180,000 tons per day. But PLP did not disclose any possibility of extending mining operations beyond the original 20-year timeframe, and it changed none of its other representations quoted above. Instead, it repeated them. Similarly, its 2020 application changed the transportation corridor supporting the project and added a concentrate pipeline but made no attempt to correct the record about PLP's intentions for the duration and scope of the project. Given the chance to clarify its intentions for

expansion of the mine, PLP instead continued to represent that the mine would be limited to 20 years of operations with a limited footprint and a closure plan that precluded further mining.

PLP's representations about the scope, size, and duration of the mine were intentionally designed to downplay the impacts of developing the Pebble Mine. PLP made exactly that point to Congress in October 2019 testimony by Mr. Collier. Mr. Collier expressly told Congress that the Draft EIS' conclusions regarding impacts to the Bristol Bay fishery resulted from PLP taking "steps to de-risk our mining plans." (*The Pebble Mine Project: Process and Potential Impacts Before H. Comm. on Transp. and Infrastructure*, 116th Cong. (2019) (statement of Tom Collier, CEO, PLP)) Specifically, Mr. Collier represented to Congress that "Pebble has planned a smaller, smarter mine" and has "reduced the mine size" to avoid concerns about environmental impacts. (*Id.* at 1) He repeated PLP's representations that its mine closure plan is a "significant factor" in reducing impacts from the mine because it eliminates waste rock storage by filling the open pit. (*Id.*)

In response to concerns about the possibility of expanded mining of the Pebble deposit, Mr. Collier categorically rejected those concerns as nothing more than "desperation" of those opposed to the mine. (*Id.*) Mr. Collier was unequivocal in his testimony on this point: "Pebble has no current plans, in this application or in any other way, for expansion." (*Id.* (emphasis added))

PLP's permit application and sworn statements about the scope of the project cannot be squared with the Pebble Tapes. On the tapes, Mr. Thiessen repeatedly stresses that the 20-year project described in the permit application will be only the first stage in PLP's expansive development of the Pebble deposit. (Exhibit ("Ex.") 1-1) Directly contrary to Mr. Collier's testimony to Congress and the permit application, Mr. Thiessen represents that PLP is "gonna make the application to continue for another 20" years. (*Id.*) PLP intends that its plans for additional mining will become "unstoppable" with "constant expansions" after issuance of the first permit. (*Id.* 1-2) Mr. Thiessen agreed that significant expansion of the mine is "pretty much 100%" likely, and PLP intends for the actual mine to operate for 180 years or more. (*Id.* 1-3) "[I]t's probably gonna be more than 200 years." (*Id.*) Far from the "reduced mine size," "smaller, smarter mine," and limited "footprint" touted to Congress and the Army Corps, Mr. Thiessen discloses PLP's true intent to develop a mine as large as 25 square miles. (*Id.*) And "this mine is not gonna be finished for 180, 200 years." (*Id.* 1-33)

These representations are far beyond mere puffery. Mr. Thiessen confirmed that the mine's processing capacity has been designed to expand far past the milling rates disclosed in the permit application. (*Id.* 1-4) And both Mr. Thiessen and Mr. Collier enthusiastically embrace the northern infrastructure corridor because it will facilitate expansion of the mine. (*Id.* 1-4, 1-19) Mr. Thiessen unequivocally agreed that "all the key elements of the expansion are already contained in the current project." (*Id.*) Expansion of the mine "is the plan." (*Id.*) "See this project ultimately will look a lot like the Mongolian project Oyu Tolgoi," an open pit and underground mine that is one of the largest in the world. (*Id.* 1-5.)

In short, the Pebble Tapes demonstrate that PLP has been dishonest about the fundamentals of its permit application. It falsely designed the project to maximize its chances of obtaining a permit despite having no intention of limiting the mine to the size, scope, or duration

presented to the Army Corps, Congress, and the American people. Such dishonesty in the permitting process cannot be tolerated. The Army Corps must deny this permit now.

2. The Pebble Tapes make it impossible to approve a permit based on the FEIS

In addition to exposing PLP's dishonest approach to the permitting process, the Pebble Tapes make it untenable for the Army Corps to approve the project based on the existing FEIS. PLP's admissions confirm profound flaws in the FEIS.

First, BBRSDA and others have repeatedly demanded an economic feasibility study for the proposed project due to concerns that PLP gamed the process with an unrealistic application designed to obtain a permit rather than study the actual impacts of the mine likely to be built. The Pebble Tapes not only confirm the accuracy of BBRSDA's concerns, but they also demonstrate that PLP has hidden the ball about the scope of the project to evade meaningful environmental review. The Army Corps can no longer participate in PLP's cover up.

Second, while the Army Corps' assessment of the cumulative impacts of the Pebble Mine has never been legally adequate, the Pebble Tapes leave the Army Corps no other choice than to deny the permit based on the existing FEIS. The Pebble Tapes confirm that expansion of the mine is not only a reasonably foreseeable cumulative impact, but is the actual purpose of the project itself. The FEIS in its current form cannot be used to justify issuance of a permit.

Third, the Pebble Tapes confirm that the plan for closure of the mine reviewed in the FEIS is pure fiction. BBRSDA has explained why it has always been unreasonable for the Army Corps to accept PLP's representation that it would backfill and water the pit after 20 years. Now the Army Corps has heard from PLP executives that its contrived closure plan will not happen and that expansion of the mine after 20 years will continue for centuries.

Fourth, the size of the proposed project has been central to numerous critical issues reviewed in the FEIS. The Army Corps has correctly determined that "the mine site would cause unavoidable adverse impacts to aquatic resources" and that those impacts "would result in significant degradation to those aquatic resources." That determination was evident from PLP's artificially limited proposed project, and the Pebble Tapes make clear that the actual project will entail the destruction of far more aquatic resources. And the FEIS' assessment of everything from water treatment to fugitive dust to tailings hinges on PLP's representations about the size and scope of the mine's operation. Those assessments are no longer valid in light of the Pebble Tapes.

Given the Pebble Tapes, the FEIS simply cannot be used to approve a permit. The only remaining viable alternative presented in the FEIS is "No Action."

3. The Pebble Tapes must be included in the administrative record

The Pebble Tapes are now part of the administrative record. The statements reviewed herein are illustrative, not exhaustive, of the highly material information contained in the tapes that bear on issues central to consideration of PLP's permit application.

BBRSDA does not anticipate any controversy on this point. The Army Corps has not yet issued a Record of Decision, and the Pebble Tapes are now squarely before the agency. The tapes contain PLP's own statements about the project, and it would not be tenable for the Army Corps to turn a blind eye to an applicant's statements that are directly related to its application, environmental review, the permitting process, and the Army Corps' own actions in reviewing the project. That is especially true where PLP's statements make it clear that the agency's FEIS has been premised on invalid assumptions and false statements. At bare minimum, the agency's obligation to undertake an informed decision-making process requires consideration of an applicant's own statements about, *inter alia*, the scope and design of the project.

Should a need to litigate the issue arise, there is little doubt that the courts would supplement the record with the Pebble Tapes. Indeed, the tapes confirm the Army Corps' obligation to take corrective action to remedy the false and misleading project scope set forth in the permit application and reviewed in the FEIS. *See, e.g., Theodore Roosevelt Conservation P'ship v. Salazar*, 616 F.3d 497, 514 (D.C. Cir. 2010) (holding that the administrative record must be supplemented given a "showing of bad faith or improper behavior."); *City of Las Vegas, Nev. v. F.A.A.*, 570 F.3d 1109, 1116 (9th Cir. 2009) (holding that extra-record evidence should be reviewed when: "(1) it is necessary to determine whether the agency has considered all relevant factors and explained its decision, (2) the agency has relied on documents not in the record, (3) supplementing the record is necessary to explain technical terms or complex subject matter, or (4) plaintiffs make a showing of bad faith."); *Commercial Drapery Contractors, Inc. v. United States*, 133 F.3d 1, 7 (D.D.C. 1998) (allowing additions to the administrative record upon a showing of "bad faith or improper behavior"). The Army Corps cannot compound PLP's bad faith by pretending that the Pebble Tapes do not exist.

Moreover, there can be no doubt that the Pebble Tapes include information that is highly relevant and probative to the outcome of the agency's decision on the permit. *See Caulder v. Bowen*, 791 F.2d 872, 877 (11th Cir. 1986) (a court will supplement the administrative record with evidence that is "sufficiently relevant and probative so that there is a reasonable probability that it will change the administrative decision."). The Army Corps cannot ignore PLP statements indicating that it has no intention of closing the mine after 20 years and that significant expansion of the mine is all but assured by issuance of the permit (Ex. 1-3), that PLP's corporate structures allow Northern Dynasty to evade accountability for environmental consequences of the mine (Ex. 1-29 – 1-30), and that it has sought to capitalize on personal relationships with Army Corps staff to benefit review of the project (Ex. 1-13 – 1-14).

Any conclusion by the Army Corps that there is no reasonable probability that such information would inform the agency's decisions would necessarily betray the permitting process as an arbitrary and capricious exercise. Moreover, the Pebble Tapes suggest that the Army Corps has engaged in multiple, ongoing off-the-record discussions with PLP and a permitting process that has been seriously tainted by PLP's influence. Remedying the loss of confidence in the agency's review of the project must start by including the Pebble Tapes as part of the agency's decision-making record.

The Pebble Tapes must be included in the administrative record and addressed in the Record of Decision.

For the foregoing reasons, the Army Corps should immediately issue a Record of Decision denying PLP's permit application. The notion that any compensatory mitigation plan could possibly save this sham is preposterous, and PLP's misconduct makes it unnecessary for the Army Corps to wait for one.

Very truly yours,



Jonathan W. Dettmann



Craig S. Coleman

Exhibit 1:
The Pebble Tapes

Pebble Tape Transcript 01 - Scale of Mine

The original footprint was about 16 to 18 square miles. How do we bring that down and make people comfortable? Well we said 'Ok, number one let's not use cyanide.'

Let's keep cyanide out of the region. But that costs us in our gold recovery. We recover 10 percent less gold because we don't use cyanide.

Doesn't impact the footprint, but it impacts the perception.

We then said 'Ok, let's see if we can reduce the size of the project overall and still have a reasonable economic.'

So we reduced the size of the processing plant to 160,000 metric tons per day. And then we said 'Let's just have a 20-year mine life.'

And one of the reasons was, I mean this entire deposit, 10 billion tons, it can be mined by open pit, but it might at some point be more reasonable to do what's called a high-volume large scale

underground mining block caving, or panel caving, but for sure the first 20 years is gonna be open pit, and during that 20 years you'll make a decision on how you will go forward.

Will it be open pit only? Block cave only? Or a combination of the two? It'll be a combination of the two, I'm pretty sure. So we said 'Let's only have a 20-year mine life'

and so that's how we kept the footprint down to five-and-a-half square miles. Is slightly smaller throughput and a 20-year mine life.

But during that 20 years, you're gonna make the application to continue for another 20. So we do have all the studies that go through all of this,

and to increase the size of the mill from 160,000 metric tons per day we can go to 220, we can go to 320. Again, some of these things you'll have to go through permitting again,

but when you've got 2,000 people working making \$100,000 a year, and the state's collecting money—the area that we're in, the Lake and Penn Borough,

which is the municipality, you have to understand there's hardly any people living in Western Alaska. In 50,000 square miles there's 7,500 people.

And 80% of them are on the coast anywhere from 120 to 500 miles away from us. The nearest two villages, both 20 miles away, are 100 people each.

Pebble Tape Transcript 01 - Scale of Mine

You know when you look at four or five hundred square miles around Pebble there's maybe 500 people.

Investigator: So, you mean that essentially once we are in, once the mine is starting producing employment, development, after that nobody's gonna stop it?

Ronald Thiessen: No. Correct. And then those numbers from 2011-
Investigator: Do you think it's gonna be unstoppable?

Yes.

Well who's gonna stop a mine that has 180- at a 160,000 metric tons per day, the first deposit that we've discovered at Pebble - and there will be more - but the first one lasts 180 years.

now we could start Pebble at say 35,000 tons and grow over a 30-40 year period. No, we're gonna start it at 160,000 tons per day.

And maybe it grows to either 260 or 320 over the next 20-30 years.

No. No in America there's not a single major mine, and there certainly isn't a major oilfield,

that didn't start out small, smaller than it has grown. And there have been constant expansions that have been suggested and approved. And that's what would happen here.

This is a well-worn path that we're following to build something that allows us to show the community and the state that we can do it, we can do it well, that it's not dangerous

and then we'll come in at some point in the future and request an extension of the time and probably an expansion of how much we are producing on a daily basis.

Well you know to some extent it's political. We probably want to file it when there's a republican administration instead of a democratic administration. You know, those kinds of things.

But frankly I'm not aware, certainly I'm not aware of a project in Alaska, where an expansion has ever been turned down. And off the top of my head I can't think of one in America.

But I know that's the case in Alaska and that's because - look we built all this infrastructure. And remember it's not just money coming to us, it's money going into the state.

I bet you that the state's going to be pounding on us to do an

Pebble Tape Transcript 01 - Scale of Mine

expansion before we're ready to do the expansion because they want the revenue.

Investigator: So the likelihood is pretty much 100 percent almost?

Tom Collier: Yes

Yes we'll need to get a federal permit and a state permit. We'll need to go through those processes, but the processes will not be as intense nor as long as this process

because you can build on what we've already done.

Well I'm just saying that based on a 180,000 short tons a day of processing capacity, and we have 10 billion tons, that's 180-year mine life.

And we know that there's more ore there so it's probably gonna be more than 200 years.

When you look at mines like Bingham Canyon in, outside Salt Lake City, that mine has been operating since the 1880s.

When you look at Chuquicamata in Chile, 1880s 1890s when those mines started up. I mean they started obviously much smaller. The biggest mine in the world is Escondida.

And Escondida started operating in the late 1980s at a 35,000 ton per day concentrator. Today it's more than ten times that size, 360,000 tons per day concentrate.

And it's the biggest copper producer in the world, that mine. It's owned by BHP, Rio, Mitsubishi, and Chile.

Investigator: And so that's very likely to be the path forward for Pebble?

RT: Yes.

Once you have something like this in production why would you want to stop? And even, at the end of the day its footprint is so tiny. If we mined the whole valley it's 25 square miles.

And the land area up there is 40-50,000 square miles. And when the mines all done, finished, it fills with water and it's just another lake. And in fact, it'd be a tiny lake.

There's a lake nearby us called Six Mile Lake because it's six miles long. And Alaskans say that shouldn't really qualify as a lake, it's not big enough.

Investigator: So mining the valley would be really natural.

Pebble Tape Transcript 01 - Scale of Mine

Ronald Thiessen: Yes.

The northern corridor infrastructure part will handle the expansion. When that expansion comes on, you know because the PEA talks about effectively a 220,000 ton per day concentrator

and what we're building in the first stage is a 180,000 ton per day concentrator. In all likelihood the expansion mainly involves just increasing the crushing and grinding capacity,

probably one secondary, one additional line of secondary mills – not sure that we would even need a new line of SAG mills, probably just increase motor size on existing SAG mills,

but the northern corridor will handle the expansion of Pebble.

Investigator: So all is already contained, all the expansion, all the key elements of the expansion are already contained in the current project.

Ronald Thiessen: Yes

Investigator: And that's the plan? That's really the objective?

Ronald Thiessen: That is the plan, and that's because the northern corridor plan that was submitted

as part of the Pebble permitting process really came out of effectively the work that was done to accommodate the PEA, so it already has that capacity in it.

How locked are we into, you, into thinking or planning to go beyond 20 years, 180 years or so?

Ronald Thiessen: Well it's absolutely because the ore is there. We've drilled it.

We've engineered it. All the work's been done for it.

The only thing that we have to do additionally is determine will there be more open pit exclusively or will we also do some underground mining like bulk underground mining, block-caving,

in which case we need to sink a shaft and do some underground work. That itself will probably be two to three hundred million dollars, but that will be carried out through that 20-year period

and then we'll make application for another 20 or maybe 40 years of mine life.

And it's not unusual that mines, you know in fact you're better off

Pebble Tape Transcript 01 - Scale of Mine

asking

for a permit for 20 years than asking for a permit for 60 years

because we don't know what kind of mine operation we will have after 20 years.

We don't know that yet.

So when they ask us what the environmental footprint is of that expansion,

we can't tell them today. We'll only be able to tell them in say year 12 or year 15.

See this project ultimately will look a lot like the Mongolian project Oyu Tolgoi.

You know where there's an open pit and there's underground.

Pebble Tape Transcript 02 - Donlin

I mean there is, I'm not telling you any big secrets, there is another project that's 175 miles north of Pebble.

It's called the Donlin Project. It's owned 50% by Barrick and 50% by Novagold. While currently the infrastructure for the mines are completely separate and independent,

use different directions and corridors, there is a lot of logic to us joining forces to make a single corridor. And the infrastructure on their mine is 1.5 billion,

the infrastructure on our mine is 1.5 billion. If you put them together it's not a total savings, but it's probably saving 50 to 75% of one of them.

Their infrastructure is 350 miles of road and pipeline and powerline. Ours is 85 from the port into site and then we're only 75 miles into, or 175 miles from our project

to their project and it's over easy terrain. Western Alaska doesn't look like typical Alaska. Western Alaska was eroded by ten to fifteen thousand feet of ice during the last ice age.

It's pretty flat to rolling countryside.

The Donlin issue is a little bit different and that's an issue where what did you say Ron?

Ronald Thiessen: They're on native land.

Yea they're on native land. And they had to negotiate a revenue agreement with the native landowners in order to build their mine so they have to pay royalties to the native landowner.

The cost of the royalties and the cost of the capital that has to be invested in that project makes it a project that's really difficult to go forward with at the current time.

One of the things that I'm sure Ron mentioned to you is that we think it's possible that we can combine some infrastructure which has the beauty of reducing their need for capital investment,

and we think significantly, which means that this is another reason that the state's interested in pebble. Because if you flip the pebble switch on

it's likely that you may also be flipping on the Donlin switch. And we think that's a real benefit that the project has.

Investigator: Are you in discussions with them?

Pebble Tape Transcript 02 - Donlin

That's a question for Ron to answer

Ronald Thiessen: Not exactly yet. We've had a couple conversations but really we need to get to the point where we have our ROD in place.

Investigator: And that would be the starting point...

Ronald Thiessen: yes.

Investigator: ... to really see more concretely... and is the governor supportive of this bigger plan for the region?

Both parties are looking to the government to underwrite the financial cost of the infrastructure and each mine has a total separate infrastructure requirement.

Donlin's comes from Anchorage, goes north and across to Donlin, I think they said it was about 350 miles through mountain passes. And ours comes from the coast and is 85 miles into the site.

And Donlin itself is 175 miles from us so if you look at it it's just logical. Donlin went ahead with their infrastructure plans because they didn't think Pebble was going to be able to get there.

But now, once we've got our ROD, then we can sit down and say ok, combining the two is not gonna be a total savings because our CapEx on our infrastructure

is gonna be close to one and a half billion, there's was one and a half billion.

So we've got one and a half billion and then a 175-mile road to build which we probably think is gonna be three quarters of a billion, something like that.

The savings will be somewhere, I'm gonna say between half a billion and three quarters of a billion, on the infrastructure.

Investigator: So it means that what doesn't make sense economically now for

Donlin would make sense? That's what you're saying?

Yes. We think the economics of Donlin improve with collaboration on the infrastructure especially because we think we can bring the state in

and some of the larger native corporations to fund that infrastructure and then we pay for it over time either in tolling or payments.

In Alaska it's pretty typical that government, and there's an agency of the government called AIDEA the Alaska Export Investment

Pebble Tape Transcript 02 - Donlin

Development, I don't know,

it's the Alaska Economic Investment Development of Export Association, something like that.

Anything to do with exporting their resources that that agency will look at funding the infrastructure requirements. So port, road.

The largest zinc mine in the world is Red Dog up above the Arctic Circle and AIDEA owns the port and the road. And they just charge a toll usage fee to Teck for that road.

Tom mentioned Ambler. They're permitting that road. The state's gonna own that road and they'll do the same thing, they'll charge a toll for that.

And the state can borrow money cheaper than we can and they can also issue what's called tax free bonds to do that.

So initially it would require us to work together and then approach the government together.

Investigator: Alaska or Federal?

Ronald Thiessen: Alaska.

Investigator: Which would make it easier then?

Ronald Thiessen: Much easier, yea.

Pebble Tape Transcript 03 - AK Governor

Tom is – in North America you work through lobbyists, who are law firms and you have relationships. I mean we can talk to the Chief of Staff of the White House any time we want.

You want to be careful with all this because it's all recorded. Every telephone call that the Chief of Staff to the White house has, has to be recorded. It's not that they tape the call,

it's just that it's recorded that 'He had a call with Tom Collier, the CEO of Pebble Limited Partnership'. You don't want to be seen to be trying to exercise undue influence.

It's better for us if we want to push that envelope that Tom talks to the Governor of the State of Alaska

and the Governor of the State of Alaska picks up the phone and calls the Chief of Staff to the White House, yes.

More government-to-government than necessarily ourselves, or lawyers talking to the lawyers in the White House.

The governor I count as a friend. I did in my home the largest private fundraiser for the governor when he was running for office and it's not unusual for the governor to call me.

I've flown down to Juneau which is about half the year where the governor is, he spends about half the year in Anchorage and half the year in Juneau.

I've flown down to Juneau where the governor's mansion is and had private dinners with him in the mansion. So the governor and I are pretty good friends

and like I said we talk on a regular basis. The governor's chief of staff, Ben Stevens, we about – god Ron how long ago was it?

– three or four years ago we formed what we called the Pebble Advisory Committee. We reached out to important politicians and environmentalists and native leaders in the state

and brought them in to a committee that would advise me personally on how best to go forward on this pebble project. And Ben Stevens was on our pebble advisory committee

before the governor got elected and he was requested by the governor to come in and be chief of staff. Now in a lot of states, frankly, chief of staff is more important than the governor.

The governor has to be out there playing politics and kissing babies, where the chief of staff is sitting at his desk running the state

Pebble Tape Transcript 03 - AK Governor

government.

And that's a guy who was on the pebble advisory committee.

Sure, the State of Alaska is every bit as supportive if not more supportive of us as each day goes by. And that's for two reasons.

One is the State of Alaska is in a serious threatening fiscal crisis here. I don't know if you know much about how state government works in Alaska,

but Alaska is one of the very few states in America that does not have an income tax. So, the only way the government really raises money is off of the tax it imposes

on the oil and gas industry per barrel of oil essentially. And you know what's happened to the price of oil in the last year or so.

And that has had two impacts: first of all, it's reduced the tax because the price of oil has gone down so far. The second is it's reduced our production

because it's no longer as profitable to produce oil. So, we have deficits up here of billions of dollars and the state can't borrow money to cover its deficits, it's got to come up with it every year.

And so, we're looking at a potential bankruptcy of the state in just another couple of years here. And the only way to fill that gap, the state now believes, is essentially through mining revenue.

And we're the biggest game in town with respect to that so they're really supporting us because of their monetary needs.

Secondarily, every day that we get closer to getting our Record of Decision, it's easier politically for the government to be more vocal in its support.

They've always been supportive kind of behind the scenes but more vocal so this mitigation plan that we're putting together, almost all of the land is state land.

And so, the state has to be a partner with us. And what we're gonna do with that land is we're gonna turn it into a preserve. We're gonna set it aside, put a conservation easement on it

Investigator: Like a park? Like a big park?

Tom Collier: Similar to a park.

And that will be available for hunting and fishing only in the State

Pebble Tape Transcript 03 - AK Governor

of Alaska. And we would not be able to respond positively to this letter we got today

if the state weren't there as our partner moving forward with this plan. And they are, ok? And just to put a fine, fine note on that, just between us guys,

I had a two-hour one-on-one meeting with the governor when all of this came up about a month ago to walk him through this, to get his commitment that they would be there

and now we're working with his department of natural resources and they are being very cooperative in working this through with us.

Pebble Tape Transcript 04 - Army Corps

So Tom meets every week with the fellow that runs the Army Corps of Engineers in the region – he lives in Anchorage – his name's Dave Hobbie.

And James Fueg he talks almost every day to the colonel – it's a lady – that runs the Army Corps of Engineers office in Anchorage, that actually did all of the technical work.

Investigator: Ok, so there is a good relationship.

Oh yes, very good relationship. And the same team from the Army Corps of Engineers

that did the Donlin permit is doing the Pebble permit,

and James ran permitting for Donlin, for NovaGold-Barrick on the Donlin mine and we hired him when that was finished.

And this guy Dave Hobbie, when Trump was elected he had Hobbie sent to the White House to work on streamlining permitting process for Trump's infrastructure plans,

and Hobbie did all of that but then because Trump didn't get along well enough with the Republicans in the House he couldn't get his infrastructure plans through so that didn't happen.

But Hobbie took all that streamlining and much of it he applied to Pebble. This biggest thing that he did is, historically when you go through permitting the public or the people interested,

they only get to see the document when it's finished. They never get to see all of the detailed information. Hobbie he set up a website for Pebble and every time they asked us a question

– it's called an RFI, a request for information – it was published on the website. And every answer we provided was published on the website, and he would tell people

'When we have public hearings for 30 days, don't ask me for 60 days because all the information's there.

You go read the information now, you don't get any additional time in public hearings. And so that way you won't be surprised about the outcome.

And then once a month he would hold a public press conference where only press could call in and ask questions. One hour, once a month. So he was very transparent on what was going on.

Investigator: I hear you. That's great. Would you consider that the Army Corps, or the Corps of Army, is an ally in developing the

Pebble Tape Transcript 04 - Army Corps

project? They are on our side?

So, so when you look at statute The Clean Water Act, it says that the Army Corps of Engineers 'will issue a permit based on the least environmentally damaging practicable alternative.'

The law is affirmative that they have to issue a permit based on the least damaging alternative. And that's what drives the eNGO nuts because it doesn't say 'withhold the permit'.

It doesn't say 'issue the permit only if there's no damage.' It says 'it will issue a permit based on the least' – so I mean, you may still cause a lot of environmental damage

but if it's the least practicalble alternative you get your permit.

So, I'm gonna tell you guys a couple things that are...that we're sharing with our major investors that we don't want to be completely public at this point.

I made a phone call to the guy who runs the permitting process here in Anchorage who has become somewhat of a friend. I've known him for 25 years.

And said to him, "what the hell is going on?" and he just kinda laughed.

I can send you a copy of the letter that was the big controversy.

Investigator: That would be brilliant.

The guy that signed it is Dave Hobbie, that's who Tom knows and meets with Dave Hobbie. Tom talks with him every week and that's who Tom called on Saturday

to find out is there anything to this Politico story.

nothing is ever pre-approved. I don't want to say that that's the case because that's just not the way the government works here in America. So nothing is ever pre-approved.

But I have sat down with them, shown them what's gonna be in the document that I'm gonna send to them. They are pleased with what's there. They don't see any problems with what's there

I believe that they're going to approve it.

Investigator: Ok. But no guarantee, you mean? That's what you're saying?

TC: Well there's never a guarantee. There's never a guarantee.

Pebble Tape Transcript 04 - Army Corps

I: But all the signals are pretty positive?

Tom Collier: All the signals are very positive.

Investigator: And your discussions are happening at the highest level of the Army Corps with, what's his name? David uh-

TC: Dave Hobbie. And Dave is the guy who is the director of regulatory affairs in the Alaska District Corps of Engineers office.

And he's the decision maker. And that's who we've been speaking to, yes.

Investigator: And so essentially what you guys are discussing is that if the compensation plan that you

guys gonna present in 10 to 15 days follows what you presented with him a few days ago, there shouldn't be major sort of comments or asks for changes?

Tom Collier: That's correct. Let me tell you what he said- Let me tell you what he said exactly. So this is a guy who sent us a letter - and I'm sure you've seen the letter -

that outlined what he wanted in the way of a mitigation plan. We went and briefed him on the mitigation plan and he said to us 'This satisfies all of the issues we raised in our letter.'

So there were two things: there was a letter. That was the letter you were just talking about. And then there was a press release about the letter.

Investigator: From the Army Corps of Engineers?

Tom Collier: From the Army,

not the Corps of Engineers, so up several steps. And they Army said that the project could not be approved as it had been presented to the Corps of Engineers.

Now, what they meant to say is that we had to comply with the letter, alright?

But that's all they meant to say, is that we should comply with the letter.

Investigator: Essentially present a sound mitigation plan-

Tom Collier: That's correct.

Investigator: That will be discussed, approved -

Pebble Tape Transcript 04 - Army Corps

I mean just saying that's not the end of the process.

Tom Collier: Well it's pretty much the end of the process, yea. And so the Army press release was characterizing the letter,

it just did it by choosing poor language and that was misread by the press. Alright?

And just to prove that that's correct,

about five days after that we finally got the guy who runs the Corps of Engineers in Washington, DC – his name is Ryan Fisher –

and Ryan Fisher is the Deputy Assistant Secretary of the Army for Civil Works, which means he's the guy that runs the Corps of Engineers nationwide for Donald Trump.

And he said 'Don't misread the press release. All the press release was doing was talking about the letter, and you can see what the letter says.'

The letter says 'if they file a comprehensive mitigation plan that meets the requirements then they'll be able to get a Record of Decision.'

Investigator: Why is it that the Army came out with such a statement? Why did they need to do that?

Tom Collier: It looks to me like it was written by some dumb press release writer and nobody else looked at it. That's all I could tell.

Investigator: Hmm. Do you think it's politically motivated?

Tom Collier : I don't!

I mean if it was politically motivated we wouldn't have been able to get the guy who runs the Corps of Engineers to come in and say 'Don't – that doesn't matter.' Right?

He would have never come in and said 'It's the letter that you look at, not the press release'.

If it had been politically motivated.

and typically with the Army Corps of Engineers, if there's something that's going to be out of the ordinary they try and get us that information as soon as possible.

Like this mitigation plan, where we had to go from what was called out-of-kind out-of-watershed mitigation to in-kind in-watershed mitigation.

Pebble Tape Transcript 04 - Army Corps

As soon as that became the requirement they let us know and that was back in June so that allowed us to put the team into the field and get that work done

So we did have almost two months' notice on that. And then we spent, with two teams in the field getting all that work done.

So if we, if they'd been unpredictable then they would not have told us anything to begin with and we would have had to start the mitigation studies in September

and as it stood the mitigation studies took about six weeks in total, in the field.

Investigator: And was it the same with the northern route, when they decided to-

Ron Thiessen: And they gave us a heads up to the northern route before, and they said - they gave us a heads up so we could put documentation in place

if we wanted to challenge their decisions.
And remember I told you it was, you know, we were torn.

We had done all this work on the central, on the ferry alternative, and now we were going the northern corridor

and we were missing one land access agreement on the northern corridor,
so we did challenge them.

But at the end of the day the northern corridor is the better route and it makes it look better for the ultimate litigation against the Army Corps of Engineers.

Then again, they'd made changes, they didn't accept our proposition without any questions.
They made us make some changes.

Those all look good to the courts when the environmentalists sue the Army Corps of Engineers over the permits later this year.

Ultimately there's a few decisions that we can't manage and we have to be able to then manage the change.

And the Army Corps of Engineers knows that and they help us with that by giving us early advice,

Pebble Tape Transcript 04 - Army Corps

letting us know, no surprises, and with lots of time.

Pebble Tape Transcript 05 - Northern Corridor

So different parts of our project are at different levels of engineering.

So the mining would be at feasibility. The processing would be at feasibility.

But the infrastructure is probably pre-feasibility level. In fact, when we were using the southern route with the ferry, I'd say that was probably scoping level.

We'd not gone out and gotten detailed engineering studies on building the ferry, costing the ferry, and those kinds of things.

And part of it was why do a feasibility study on three different alternatives when only one gets selected at the end of the day. So as it turned out we had three different infrastructure corridors

and we thought that the ferry route would be most acceptable because it was the least environmentally impactful. It had the smallest what's called wetlands footprint

but it and the western route had the least amount of engineering on them, both of them scoping level, whereas the northern route had pre-feasibility level engineering

and at the 11th hour the federal agencies asked us to change from the ferry route to the northern corridor. They preferred a larger wetlands footprint and no ferry on the lake.

Which is ok, we like the northern corridor better because it allows us to have a concentrate pipeline as opposed to the materials handling of trucking to the lake, unloading onto the ferry,

unloading across the lake, putting it on trucks, and then taking it down to the port.

So when the project was originally being considered 10 years ago the idea was that there would be a northern transportation corridor

and that's where all the investment occurred in terms of engineering work. At some point we considered it might be a railroad, at some point a road,

at some point it would have a slurry pipeline to take the concentrate. Different options were considered, but almost always the northern route.

When I came in my assignment from Ron was to kind of reconsider the project and design something we thought could get through the permitting process

Pebble Tape Transcript 05 - Northern Corridor

without as much controversy as the original project had engendered. So we did lots of things to the project. We made it smaller, we took out cyanide,

we redesigned tailings facilities, all kinds of things. One of the things we looked at was the transportation corridor and the Clean Water Act

focuses on the number of acres of what's called wetlands that you impact. And by going across the lake we didn't have a road that went across rivers and streams

and so it didn't impact as many wetlands. Forty percent fewer wetlands were impacted if we went across the lake with a ferry than if we did the road.

So Ron and I had this discussion, because from a mining perspective the road would actually have some advantages but from an environmental perspective

it looked as though a ferry made more sense. So Ron and I had a discussion as we were submitting our application, I said

"You know, Ron, the thing that could be best for us is if we submit the ferry route but the Corps of Engineers after they do their study tells us that they selected as an alternative the northern road." That's what happened here. The way the process works in America is you submit what you prefer to build, it's called your preferred alternative, and then the Corps identifies a number of other options. Ok? So other transportation corridor options for our project in addition to the two that we're now talking about. But after they did all the review they decided they preferred the northern route because we didn't have to use an icebreaker ferry on the lake and because we didn't because we didn't come as close to a bear preserve on the southern part of the road by going north. And so they kind of threw us under the bus to the alternative that actually made more sense to us from a mining perspective. And so now we're going to be building a northern corridor. We'll have a slurry pipeline as part of it so the concentrate will go down to the coast by pipeline. [47:05] And it makes a lot of things easier for us. It makes expansion much easier

That's what happened here. The way the process works in America is you submit

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and then the Corps identifies a number of other options. Ok? So other transportation corridor options for our project in addition to the two that we're now talking about.

Pebble Tape Transcript 05 - Northern Corridor

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And so they kind of threw us under the bus to the alternative that actually made more sense to us from a mining perspective. And so now we're going to be building a northern corridor.

We'll have a slurry pipeline as part of it so the concentrate will go down to the coast by pipeline.

And it makes a lot of things easier for us. It makes expansion much easier. It makes the construction much easier. Just a bunch of things become easier.

So while this was not something we sought, this was forced on us by the Corps of Engineers, it actually worked out to our benefit.

Investigator: And when you say it is easier for the expansion you mean post-20 years or...?

Tom Collier: Yes post-20 years. Because we don't have to, you know we just send more stuff through the pipeline. We don't have more trucks, we don't.. you know just more pipeline.

So it's perfect for that, essentially perfect for that.

Let's put a little history on right of way for a second. It is not unusual at all to get your record of decision and not have right of way agreements. Happens all the time in these projects. All the time

Now for us, we've got a little bit of a dilemma. It's gonna cost us more to get it quicker. We'd like to have it quicker because it answers questions that folks like you ask.

On the other hand we don't need it for three years. We've gotta go through state permitting for three years. We're not gonna be able to build a road until after that.

So the longer we wait the better the deal we get, right? And so I'm here doing this on a daily basis. You know do I want to pay a little more and get this done more quickly?

Do I want to drag this out and get a better deal? And that's where we are.

Pebble Tape Transcript 05 - Northern Corridor

it's like if you owned a piece of land out there near our project I've gotta build a road across it. So I'm coming out there and I've got two options.

I could buy your land or I can purchase from you a right of way to build the road and use the road only, ok? And some of them we're buying the land.

Some of them we're just getting the right of way. Either one works well for us.

Ronald Thiessen: Maybe [inaudible] around you. That's not always the case but sometimes you can go around the landowner.

You know it becomes well do I want this over my land or not because there's no other use for this land.

Yea but here's a point that they really haven't focused on yet. Ron mentioned the term 'go around' ok? So they had a small allotment,

BBNC owned a small allotment that the original proposal would have required that we put a road across. The final proposal however we went around it.

Yea I don't think they focused on that yet and I don't want to tell them publicly that we don't have to cross their land, but we don't have to so it doesn't matter what BBNC says.

Investigator: Why don't you want to tell them?

Because then I'm fearful they'll try to stop us some other way. Right now they think they've stopped us because we can't cross they're land. I'm happy for them to continue to think that, ok?

the fact that we proposed the ferry route and they forced us to choose the northern corridor route is proof that they took a hard look at the issue.

So it actually helps us, it doesn't hurt us. In addition, the fact that they are requiring a significant amount of mitigation proves that they've taken a hard look at the mitigation issue.

So these things that have been somewhat problematic for us to deal with as we've gone through this process actually help us enormously when we get into litigation.

Investigator: Ok, so you mean that actually it's almost like, it's good! It's almost good that-

Pebble Tape Transcript 05 - Northern Corridor

Tom Collier: It is very good for us to have proposed one thing and for the Corps to have told us to do something else. That shows that we didn't go in there and just get what we wanted! Alright?

They took a hard look at everything and made us do some other things. Yes, it's very good for us.

Investigator: And you said last time that when we – I think Ron said that you guys had foreseen that, you proposed this southern on purpose – was it?

Ronald Thiessen: No, what I said was that you know I, being a mining guy, always liked the northern corridor and I had problems with the ferry route because there was material handling.

But Tom wanted the ferry route because it had a lesser wetlands footprint and he thought that would appease, or appeal to, the EPA and the Department of Interior.

But, Tom did say wouldn't it be ironic if at the end of the day they pushed us back to the northern corridor.

I mean, you know – and then Ron you get what you want and I'm not really getting what I want. And that's actually what happened!

from the perspective of litigation, the northern corridor choice and the mitigation decision are very helpful to us. Those are not negatives. Those are real positives.

The mitigation is, we have to do a lot more work than we'd originally expected.

So that obviously means they're holding our feet to the fire.

Investigator: Ok, ok. And all that's gonna be proof of the integrity of the process later on?

And so that's all part of the strategy?

Ron Thiessen and Tom Collier: Yes.

Investigator: So you knew, Tom, where the wind was coming from!

No, sometimes you get lucky. But, you know, chuckles, and this, you know, while it's

nice that Ron gets his northern corridor, we put a lot of time and effort into the ferry route.

I think we would have all preferred that that had been the way this worked out. But it didn't, but it's not a downside to us.

Pebble Tape Transcript 05 - Northern Corridor

From the perspective of long-term future expansion of the mine, the northern corridor is best.

The fact that they made us take the northern corridor

will be very helpful to us as we go through litigation. Win-win!

Ronald Thiessen: And I think the northern corridor, most of the mining people will like it

because we get to ship the concentrate in a pipeline.

And that means far less material handling. You know, whereas the ferry required containers of concentrate and so you take them to the ferry, take them off the truck, you put them on the ferry,

you go across the lake, you take them off the ferry, you put them on a truck, you

take them to the coastal port, you take them off the truck and you put them on a barge,

you just – there's a lot more handling.

Investigator: I hear you, I hear you. And was this a surprise for you that they

choose that, or you were kind of, you knew that they would–

Ronald Thiessen: Hey Tom, It was a surprise.

Tom Collier: Yea it was clearly a surprise. It was a surprise.

Pebble Tape Transcript 06 - AK Senators

Murkowski? Senator Murkowski. That lady from Alaska. Senator Murkowski.

Well she can't make a negative decision. Could she slow down the ROD? Potentially she could. Senator Lisa Murkowski, her father was the Governor of Alaska, back three governors ago.

He is the governor that accompanied Bob Dickinson and I to London to meet Rio, BHP, and Anglo to invite them into the project. And so Rio came in as a shareholder, Anglo came in as a partner. Senator Murkowski, she's very political. She in her heart wants the project to go ahead. She will say things that appeal to sometimes people's emotions but that won't do any damage to the project overall. So Senator Murkowski we feel good about. Senator Sullivan – so Murkowski isn't up for election. When a Senator is not up for election, they don't do anything. Alaska has two senators. Every state has two senators. They're appointed for six

Senator Murkowski, she's very political. She in her heart wants the project to go ahead. She will say things that appeal to sometimes people's emotions

but that won't do any damage to the project overall. So Senator Murkowski we feel good about. Senator Sullivan – so Murkowski isn't up for election.

When a Senator is not up for election, they don't do anything.

This year Senator Sullivan is up for, and he's not as prestigious or long-serving. I think Senator Murkowski has had, this is, she's in her third six-year appointment.

And Sullivan's going into his second and so he's got a battle on his hands and we're trying to work with him to make sure he doesn't go and say something negative like

– and he won't say 'Don't build the mine', but he might say 'Don't issue the ROD until after the election'.

Investigator: Oh my god. Can he do that?

He can say that, but would it have any impact? It depends on whether Trump feels he's going to lose. Sullivan's a Republican senator and is it important that he gets elected.

If he says 'Delay the ROD' will that help him get elected?

It's an age-old practice where when you have constituents, you have important people who support you on two sides of an issue, alright,

Pebble Tape Transcript 06 - AK Senators

you try to find a way to satisfy them both.

You don't choose one or choose the other. You try to satisfy them both. The way that Senator Murkowski has done that is that when she's asked a question

she says things that don't sound supportive of pebble – but when it comes time to vote, when it comes time to do something, she never does anything to hurt Pebble, Ok?

Never. Alright? So let me give you a very specific example. So last year the House of Representatives, the national House of Representatives, Congress,

passed a what's called a rider to an appropriations bill. So a piece of legislation that would have prevented the federal government from funding the permitting process for Pebble.

It would have killed Pebble. Alright? It then goes to the United States Senate and the Senate has to consider this. The committee that it goes to is the committee that's chaired by Lisa Murkowski.

Ok? So Lisa Murkowski kills the bill. Right? It doesn't go anywhere. That's the end of it. No problem for us. Dead.

But in what's called the committee report, so this is something that's not voted on it's just a report that's issued by the committee at the time,

Lisa Murkowski says I've got some questions about this pebble project that I think need to be answered before it can move ahead. So she threw a bone to those constituents that are against us in the committee report but when it really mattered she didn't do anything. Ok? That's the way Lisa Murkowski is, and frankly that's the way a lot of senators and congressmen are in America is that they say things that satisfy one side of an issue but they don't do anything that would hurt the other side of the issue. And that's where Murkowski is. I: Wow, that's hard to understand but yea it is what it is. RT: It's called sitting on the fence. Don't get off on either side, just sitting on the fence.

So she threw a bone to those constituents that are against us in the committee report but when it really mattered she didn't do anything.

Well Lisa Murkowski is very unpredictable but she had some opportunities to kill this project if she wanted to and she didn't do it.

The most obvious one was the one I described to you when it was right

Pebble Tape Transcript 06 - AK Senators

there before her. All she had to do was kind of close her eyes and let it go past. But she didn't. She stopped it.

And so Lisa Murkowski is Lisa Murkowski. That's what she does. Now having said that, she's also with this president the single most unpopular senator of the 100.

So the fact that Lisa is saying things that aren't positive is not bad for us with the Administration.

Yea so both senators, Senator Sullivan and Senator Murkowski, also – they didn't misread the press release –

they relied upon a story that was printed in the newspaper that didn't have a named source. In other words it was a rumor that was printed.

And the two senators jumped out and said that they had heard, based on this news story, that the project was being delayed by the Trump Administration,

and they jumped on that and said that from their perspective was not a bad thing.

They were wrong. They're now embarrassed. Since it's the political season they're still trying to figure out what the hell they're gonna do,

but an interesting sideline of that – and I wish I could have thought about this – but it's kind of frozen them. They haven't been able to say anything about Pebble

since then because if they come out and say something, they're gonna have to admit that they were wrong about what they did.

So right now they're just kind of sitting over in a corner and being quiet, ok?

And that's – if they stay there–

Ronald Thiessen: Perfect for permitting!

Tom Collier: If it's just – gosh, it couldn't be a better thing for us

because these guys they can't cause us a problem.

This is not a process that involves US senators. So we get to our ROD,

whatever their position is, but if they're not making bad news stories for us if they're quiet.

So right now it's not such a bad situation for us. They're both in a corner being quiet.

Pebble Tape Transcript 06 - AK Senators

Well right now, he's off in a corner being quiet.
So I think that's our plan to work with him - is leave him alone and let him be quiet.

Investigator: Well that's a good policy. And you think that's-

And I mean it's not - we're talking - that's an exaggeration. We have a very close relationship with one of his top advisors who in fact - our - the guy who was my predecessor,

John Shively, rents an apartment in Alaska from his, from Sullivan's state director. And the two of them have worked together for 20 years so John knows her well and talks to her regularly.

And she's embarrassed that the senator got out there with the wrong message. But right now, John - who keeps informed with her, who keeps in touch with her -

has been told that he's just gonna be quiet. He's gonna try to ride out the election and remain quiet.

Pebble Tape Transcript 07 - AK Politics

I am registered in Alaska as what's called Undecided, an Independent. So I have not registered as a Democrat or a Republican, but I am a well-known Republican fundraiser.

I've supported all the Republican candidates in the state. I meet with the two senators, the congressman, the governor on a regular basis

and they welcome me as someone they know supports the Republican party. So just a little story about that. On Tuesday of this past week we had a primary election in the state of Alaska.

So what we're doing is choosing the candidates for the Republican party and the candidates for the Democratic party that will run for the state legislature in Alaska in November.

I've been a proponent in Alaska for getting the Republican party to be more focused and more disciplined on these elections.

There's been this crazy thing in Alaska where we've elected republicans that have gone down to our legislature and organized with Democrats as the majority party.

So they get elected as Republicans but they act as Democrats. So my view was, we gotta throw these guys out. Let's get rid of them.

So I organized, I was one of a number of organizers of a business group, we got together, raised money, we put together a campaign and we defeated them all!

We changed nine out of, there are let's see 40 uh, 50 seats that were up for election

and out of that 50 we threw out nine people that had not been supporting the governor and that had not been supporting Pebble.

It's gonna make for dramatic change in the legislature here in Alaska and I was a leader in that effort for the Republican party so my Democratic politics is really not a problem

Now having said that, it's entirely possible that we may have Biden as a President, and if we do I'm gonna brush off my Democratic credentials

and start using them a little more actively than I do.

Pebble Tape Transcript 08 - Corporate Structure

Yes the parent company is a Canadian-listed publicly traded company. It trades on the Toronto Stock Exchange and the New York Stock Exchange.

Investigator: And the New York as well, right. And this is HDI?
Ronald Thiessen: No this is Northern Dynasty.

I: This is Northern Dynasty, ok. Which you are the head of the company, right?

RT: I'm the CEO of Northern Dynasty.

And we have a couple of Alaskan subsidiaries. And each subsidiary owns one partnership unit of Pebble Limited Partnership. It is a bit funny, I'm a partner with myself.

But originally one of those partnership units was owned by Anglo. They exited. We bought that partnership back from Anglo for \$100,000. So now we end up owning both partnership units, separate, and the Pebble Limited Partnership still intact. And that's because an incorporated partnership in the United States is a very good structure from a liability standpoint but also tax efficiency. I: Oh really? Yea that makes sense. Liability, what do you mean? If there is any risk with the mine this statute would protect you, would protect us? RT: Yes, the liability stop said 'The Alaska Corporation'. I: Oh. RT: Doesn't go beyond. I: So you mean that HDI is completely protected? RT: It is. HDI is not, HDI provides services to Northern Dynasty and Pebble, but it doesn't own any of it. HDI is kind of a private services company. That's where a bunch of employees, we have the Vancouver office, you know. I: Ok. RT: HDI, it's a company we put together, it's like a management company. I: Ok. RT: But it, the only thing it owns is office furniture and office equipment. Then it has employee contracts. It's because, on a mining project like Pebble, in the early days you use a lot of geologists. I: Uh huh. RT: And very few engineers. I: Yes. RT: Then when you finish doing all the drilling then you start shifting to engineers, now where are the geologists gonna

separate, and the Pebble Limited Partnership still intact. And that's because an incorporated partnership in the United States is a very good structure from a liability standpoint

but also tax efficiency.

Yes, the liability stops at the Alaska corporation.

Ronald Thiessen: Doesn't go beyond.

Investigator: So you mean that HDI is completely protected?

It is but HDI is not, HDI provides services to Northern Dynasty and Pebble,

Pebble Tape Transcript 08 - Corporate Structure

but it doesn't own any of it. HDI is kind of a private services company.

That's where a bunch of employees, we have the Vancouver office, you know.

HDI, it's a company we put together, it's like a management company.

But it, the only thing it owns is office furniture and office equipment. Then it has employee contracts. It's because, on a mining project like Pebble,

in the early days you use a lot of geologists. And very few engineers. Then when you finish doing all the drilling then you start shifting to engineers, now where are the geologists gonna go?

So HDI has this, this inventory of skilled people and it sends the geologists, when the geologists are done they come back to HDI and then maybe they go to Poland to work on our Polish project.

Or they go to Arizona to work on the Florence project. And same with the engineers. I mean it's like fisheries biologists. We have one of the best fish biologists in all of North America.

He works here, he works for HDI. But when Pebble needs him he's working on Pebble. When Taseko needs him for Gibraltar or New Prosperity or Yellowhead, then he goes and works there.

Investigator: And so you were saying, what you were saying is that liabilities, risk wouldn't go beyond Pebble Limited? It would not touch Northern Dynasty?

Correct, correct. Just like, it was the same with Anglo.

under a limited liability partnership there's the general partner and the liability partners.

So the general partner, which is called Pebble Mines Corp,

takes most of the liability but only has one percent of the asset. And the limited liability partners have 99% of the assets and none of the liability.

Investigator: So the HDI, they're not total strangers right?

Ronald Thiessen: Oh I'm the CEO of HDI as well.

Investigator: As well, ok. So it's all part of you guys?

Ronald Thiessen: It's a private company.

There's only six partners, or six shareholders.

Pebble Tape Transcript 08 - Corporate Structure

Investigator: So in our case our investment would be with Northern Dynasty?

Ronald Thiessen: Yes, yes. Under the terms that we talked about, yes.

Investigator: Exactly so somehow protected for any, any sort of liabilities regarding the mine, the future, the tailing, the water, the salmon, you know what I mean.

Yes absolutely.

Ronald Thiessen: Oh you mean if there was a tailings disaster or something like that?

I: Yea, something like that.

RT: There would be no liability to you at that the Northern Dynasty level shareholder.

The actual liability is captured at the operating company level, which is under US terms it's called a limited liability partnership.

So there are partner companies and then there's the general partner. A general partner already exists, it's called Pebble Mines Corp. and there are two partners.

Now we, Northern Dynasty, happen to have both partnership units because we bought Anglo's unit back. When we find our final partners,

you know with one of the major mining companies in the world, they will then acquire that partnership unit from us and we'll go back to being two partners, two limited liability partners,

with a Pebble Mines Corp. And so you will be a shareholder of Northern Dynasty, which owns 50 percent of the project when the major mining company, or consortium companies, come in

and they will bring the capital to build the project.

Yea, you'd be several levels removed from the liability. The liability would be at the limited liability partnership level and there would be insurance on it plus the assets at that level.

You'd be two levels up because there's a US-based company that owns the share

– the units of the partnership and the shares of Pebble Mines Corp.

and then there's Northern Dynasty, the Canadian company.

I can send you a corporate organization chart.

Yes – we put a lot of thought into this overall corporate structure,

Pebble Tape Transcript 08 - Corporate Structure

from a tax standpoint, from a liability standpoint, all those features.

Pebble Tape Transcript 09 - Water Treatment

We also, part of our mitigation is atmospheric water and snow melt. We will capture and hold, normally freshet occurs in May and June.

And that water flushes down the streams out to the ocean but spawning doesn't occur till late July and August. So by then many of these streams are dry so they aren't spawning habitat.

Because of the water control system, so all of the water that comes onto a mine site in North America is called contact water.

And contact water, then you must gather it up and deal with it in an environmentally responsible manner. Many mines gather that water up, store it, and hope that it evaporates away.

That's the only way to get rid of it. What we're doing is we have water handling facilities that we are going to gather this water up, we're gonna store it,

and then we're building two large water treatment plants as part of our mine development. And at spawning time we'll put that water through the water treatment plant

and put it into three different streams to create spawning habitat. And we've got charts that say 'Ok, here's the volume of water, the meters, or yards, of channel

and this is what the impact will be to increase sockeye salmon, increase Coho salmon, increase spring salmon, or increase trout. We've got all of that done.

Once the mine is finished, and remember this mine is not gonna be finished for 180, 200 years. So it [water treatment facilities] will be there. And obviously if you refurbish regularly,

Once the mine is finished, and remember this mine is not gonna be finished for 180, 200 years. So it [water treatment facilities] will be there. And obviously if you refurbish regularly,

now we actually believe that this water that we gather up will qualify ultimately under environmental standards for discharge without treatment

We've said, so that we don't have to ask the question 'can we discharge it without treatment?' we're building the water treatment plants.

Ronald Thiessen: Anyway. And so we think after 10 or 12 years it'll be

Pebble Tape Transcript 09 - Water Treatment

so successful that the state's gonna say 'Can you do more of it in the area and we won't need water treatment.

Pebble Tape Transcript 10 - Trump Administration

Those of us who have been in government, I think you guys know that I used to work for President Clinton, in the Clinton Administration,

and so I have a sense of how government is supposed to work. Those of us who have that kind of experience in government are just flabbergasted frankly at the way this administration works.

The left hand often doesn't know what the right hands doing. But most importantly, there are people out there who take it upon themselves to make statements.

They're not attributed statements, so they're off the record statements but the reporters report them using a 'high, official, in-the-government-said'.

And that's what was going on with the Politico story, no source on the record and they were just flat out wrong. And so, by the end of the day on Saturday...

Investigator: What did your contact... Your contact is at the Army Corps?

Tom Collier: That's one of my contacts.

We must have placed more than two dozen calls in to different people at the White House.

And with none of those senior level officials-

Investigator: which level?

Tom Collier: I'm talking about at the level of the Chief of Staff and just below.

I'm talking about the very top levels of government, ok? Now in this administration they can't say to you 'The president is not going to do this'.

All they can say to you is if the president were gonna do this, I would know - and I don't know! And I can also tell you that this has not been discussed in the White House,

not even discussed in the White House. We had people who attended the senior level meetings of the campaign staff.

One theory here is that this is being driven by the campaign for some reason, right? The campaign staff said they had two extensive meetings over the course of the weekend

and this was not discussed in those meetings either. So, when we finally got to the bottom of it what we recognized is that someone in the administration had heard of this letter we got today.

Pebble Tape Transcript 10 - Trump Administration

We knew that the letter was coming. We've known it for weeks. It is not a significant letter. As Ron put it, it is a due course letter.

In the American government, particularly in this Administration, there are people who leak things on a regular basis. That's kind of how they try to do their business.

It's shocking to me. You know in the Clinton Administration they would have cut both my hands off if I had leaked something like this,

but here in this Administration there's no discipline, there's no accountability.

Pebble Tape Transcript 11 - EPA Veto

There is an ability for Trump, at the conclusion of this process, to veto the project but again Trump needs a scientific record to do that and he doesn't have one.

And Trump has some other problems. In order to veto this project as part of this process there is a set out course of action you have to take, certain steps you have to take at certain times.

You have to announce that you've got some questions that you think are important enough in order to keep this open to preserve the possibility of a veto.

And you have to do that at the time the Draft Environmental Impact Statement is published, so a year ago. That's called a 3A letter.

EPA filed a 3A letter. Yes, they preserved their right to be able to veto. But then – let me take you forward – the next step is they have to file a 3B letter, which says 'after looking at this further,

we still think we might file a 3B letter.' The 3B letter had to have been filed about nine months ago. They got a couple of extensions on it, but ultimately they decided not to file the 3B letter.

So they got out of the process. They did not check the box they gotta check in order to veto this! Now, the courts have never finally ruled whether a president could veto a project

without filing a 3B letter, but the process says he must file a 3B letter in order to veto. So we're in pretty good shape.

EPA has indicated its clear intent not – the Trump EPA – not to veto this process. And again, even if they decided they wanted to, they don't have a scientific record that justifies it.

So we're in – Practically there's no risk that the Trump EPA is gonna veto. There's just no risk.

Investigator: And have you confirmed all this with – what's the name of the administrator? Mr. Andrew Wheeler? Have you been able to confirm all that?

Tm Collier: Not with Andrew Wheeler, because Andrew Wheeler is recused.

We hired Andrew Wheeler's firm years ago to help us. So when Andrew Wheeler became the Administrator of EPA,

Pebble Tape Transcript 11 - EPA Veto

he had to put us on a list of things that he could not deal with while he was Administrator. He had to recuse himself. So he appointed the General Counsel of EPA to make all Pebble decisions.

Tom Collier: And yes, we have confirmed that with the General Counsel of the EPA.

Investigator: Who is this person?

Tom Collier: His name is Matt Leopold. Now, just to make things as complicated as they could possibly be, which is the way American politics works,

Matt Leopold has recently announced that he's leaving his job as General Counsel of EPA.

And it will be Matt's deputy that will be making those decisions

but we have confirmed this with both of them.

Investigator: So they are all in agreement that Pebble should go on?

And the interesting thing here about this decision that makes it better for us is if they do nothing, we prevail.

So they'd have to take some action in order to stop us, and there's just no way they're gonna put their head up and take this kind of action,

especially given the record they've developed so far where they officially said they were not gonna file a 3B letter.

Investigator: So they just have to look the other way and that's good for us

Tom Collier : That's correct. Go outside and take a smoke and we're done, right.

Pebble Tape Transcript 12 - More Mines

Pebble itself has 450 square miles of mineral claims, or I'm sorry 425 square miles of mineral claims, and so there could be more mines on the Pebble lands over time.

We have other sites that we've drilled into and we have ore-grade mineralization in other areas in that 425 square miles but we don't talk about it too much

because right now we want people to focus on only Pebble, not that there's gonna be a dozen mines built here, but it's gonna be Pebble alone in that area.

Investigator: But in your reality how many more mines are there gonna be?

Ronald Thiessen: Well you know there, so I mean listen the first mine is 180 years long, Pebble.

There's no rush for the other ones but I think ultimately, it's like you can say like Escondida, like Los [unclear], like Chuquicamata, you could see, you know, three to four mines in the area.

But that might be over a century.

Investigator: Yea, that's exactly what I was about to say. So that would be, say, three, four – in reality what's at stake here is three, four mines for a century in the region?

Ronald Thiessen: Yes

Have you shared your plan or what the plan is about of having several other mines in pebble with the Army Corps? What have they said about that?

Ronald Thiessen: So... Yes, we have.

More about the extension of the original mine to subsequent years. They took a look at downstream, the kinds of things that would need to be considered

and they did take some of that into account but because we are only applying for a 20-year mine life most of this will be addressed sometime in the next 20 years.

Investigator: Mhmm. And it's important to not make it public now I understand.

Ronald Thiessen: Yes.

So we've, with respect to other mines, typically we share that

Pebble Tape Transcript 12 - More Mines

information under the NDA with the other potential partners, the mining operating partners.

you can see it, there's a picture in our presentation and it's induced polarization. It's a picture of the 425 square miles and it's got a bunch of dots on it.

Each one of those little dots represents potentially another mine site.

And so the army corp when they made their decision, they took into account that. Its not Public but

Ron Thiessen: Yes

Investigator: -- ah. I understand

So they are already thinking along your side guys on the big development expansion and are planning in this way?

Ron Thiessen: Yes. Yes. We've told them that there are two ways we would expand.

The most obvious one is the extend the mine life, the mining license by 20 to 40 years,

once we know the next methodology, block caving, open pit, or a combination of the two.

And then the other expansion potential is to expand the mill from 180,000 tons a day to say 320,000 tons a day.

Why Pebble will be at least a 78-year mine

David M. Chambers, Ph.D., P. Geop.
Center for Science in Public Participation
March 14, 2019

When mining at the Pebble mine, as proposed in the Draft EIS, is completed, the only closure plan proposed is to backfill the pit open with tailings and waste rock, and flood the pit with water. This would “sterilize” the mineral resource, and would prohibit any future open pit mining. The pit would not only need to be drained of any accumulated water before additional mining could occur, but the backfilled tailings and waste rock would need to be removed. This would probably be prohibitively expensive for the foreseeable future.

The Pebble Project buildout – to develop 55 percent of the resource over 78-year period is the only alternative being considered that that proposes a credible project. The Proposed Project closure alternative could sterilize 88% of the mineral resource. It is virtually unheard-of in the mining industry to intentionally sterilize a known mineral resource, and most state and federal regulators also give credence to avoiding sterilization of a mineral resource. It is highly likely that investors would remove the board and management of a company that would propose this action. However, it is also obvious that Northern Dynasty has no intention of sterilizing this mineral resource, and every intention to proceed with mining the larger mineral resource after receiving its permits and beginning mining.

Backfilling the pit could also prevent mining of the underground mineral resource. When the backfilled tailings are saturated with water they will flow like a liquid. If there are any fractures that could connect the pit with the underground workings, the underground miners are at risk. This is exactly what happened at the Mufulira Mine in Zambia, killing 89 miners. Since this accident in 1970, mining engineers have been reluctant to mine under tailings because the fracture systems that would allow the migration of tailings to the underground workings are difficult to detect.

The Proposed Project alone is not likely to return a reasonable return on investment. At a minimum, open pit mining would be uneconomic for several generations, and a portion of the underground resource would also be not be minable until the backfilled waste from the pit could be removed. It is unlikely that investors would accept sterilization of the largest part of the mineral resource for the short-term profit to be gained from the proposed mine.

As a result the EIS is not analyzing the potential impacts of the project because the project really involves permanent storage of waste rock on the surface, rather than submerging waste in the pit, and a permanent pyritic tailings impoundment, rather than pyritic tailings being returned to the pit to be submerged under water. The danger to the public in allowing the Project to move forward as proposed is that a small, uneconomic project will be permitted to begin operation, but to achieve economic viability a larger project that will have drastically different impacts is really what will be implemented.

However, the 78-year alternative is not thoroughly analyzed in the EIS. In fact, the potential impacts of the Pebble Project Buildout are given short qualitative descriptions at best. The impacts for Land Ownership, Management, and Use; Socioeconomics; Recreation; Subsistence; Health and Safety; Transportation; Removal of Geological Resources; Soils and Erosion; Geohazards; Surface Water Hydrology; Surface and Ground Water Quality, and Sediment Quality; Fish and Aquatics; and, Vegetation contain 2-3 sentence general descriptions of the expected impacts from Pebble Project Buildout. There are no quantitative analyses in these sections.

There are no descriptions of potential impacts from the Pebble Project Buildout for Recreation; Commercial and Recreational Fisheries; Cultural Resources; Visual Impacts; Groundwater Hydrology; Noise; Air Quality; Wildlife Resources; and, Threatened and Endangered Species.

For Health and Safety and 4.10.6 Cumulative Effects it is noted:

The Pebble Project has the potential to result in increased health impacts, especially from increased impact durations from RFFAs, possible increased releases into the environment, and affected community exposure to potentially hazardous materials. The Pebble Project buildout would extend the operations of the project for an additional 78 years; however, this project is not part of the proposed action and would require additional permits and separate NEPA compliance.

This “separate NEPA compliance” response is clearly indicative of the lack of a detailed, quantitative analysis of the Pebble Project Buildout Alternative in the EIS.

Some of the critical analyses that are missing from the EIS include: Failure Mode Effects Analysis of the much larger dam that will be required for the second bulk tailings impoundment; and, FMEA for both the impoundments that will be required for the pyritic tailings. At present there is only FMEA for the proposed bulk tailings impoundment.

From Figure 1 (last page), note that half of the open pit and all of the large North Waste Rock facility lie in the Upper Talarik drainage, where in the EIS it is stated “*The only mine site features in the Upper Talarik Creek (UTC) watershed would be the WTP#1 discharge-east and a short section of the mine access road.*” (DEIS, ES-35)

The impacts related to the reasonably foreseeable 78-year mine will be significantly different than for the Proposed Project, and some level of quantification is needed for the 78-year mine for potential water quality and quantity impacts. Water treatment requirements will also significantly increase, but by how much? This is all information that should be easily within reach with existing engineering information.

The Pebble Project Buildout - develop 55 percent of the resource over 78-year period - is the only alternative considered in the EIS, including the Proposed Project, that could be considered as providing a reasonable return for those investors who were offered, and expect, a larger project. At the permitting stage, the normal procedure for the applicant company would be to first produce a pre-feasibility Study, which would analyze the economic viability of project to assure both investors and the company board members that this is a reasonable investment for the company. The Pebble Proposal is the only large mine proposal in Alaska in the last 20 years not to have a pre-feasibility study.

Lack of a pre-feasibility study may not only be indicative of the unrealistic proposal to backfill the open pit before the mineral resource is exhausted, but may also suggest that the company could not produce a pre-feasibility study which could both justify a financially viable mine, and meet the financial auditing requirements of the Canadian and US stock exchanges.

By its own definition, the Army Corps of Engineers is obligated to provide alternatives in an EIS that are both “reasonable and practical.” The only alternative proposed in the Draft EIS is to backfill the open pit with mine waste. Both engineers and investors know that backfilling the pit after 20 years of mining will not happen, so the closure alternative being analyzed in the Draft EIS is neither reasonable nor practical. The public is being denied the opportunity to meaningfully comment on the real impacts of the Pebble mine.

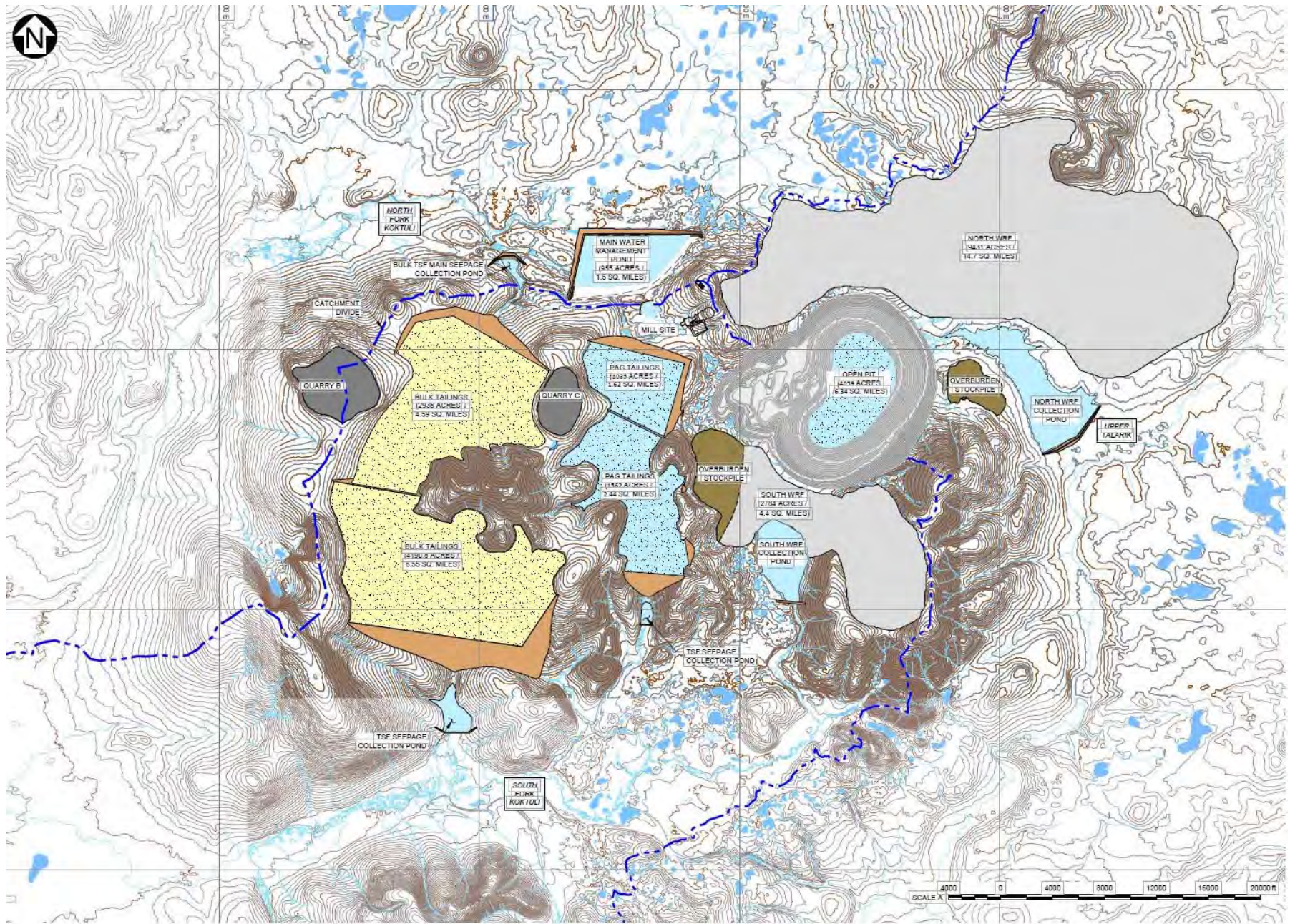


Figure 1 – 78-year mine buildout (Knight Piesold)

Attachment E

March 28, 2019

Shane McCoy
United States Army Corps of Engineers – Alaska District
Anchorage Field Office, Regulatory Division (1145) CEPOA-RD
1600 A Street, Suite 110
Anchorage, Alaska 99501-5146

Subject: Pebble Mine Project Economics

Dear Mr. McCoy,

I write to express my professional opinion that the mine plan being evaluated by the Pebble Mine Environmental Impact Statement (EIS) process is almost certainly not economically feasible. I come to this conclusion based upon the only publicly available preliminary economic assessment performed on the Pebble project in 2011 as modified to account for the significantly lower grades, lesser ore production and likely higher initial capital costs of the new project detailed in the December 2018 Draft EIS (DEIS) Project Description. The assumed EIS mine plan produces about half as much metal for sale over its life than the smallest mine plan assumed in the 2011 economic evaluation. Based upon the economic assumptions made in the 2011 assessment, the EIS mine plan will make roughly 15 billion dollars less profit from the sale of concentrate than the smallest 2011 mine scenario and is likely to have a strongly negative net present value (NPV).

While I am aware of the Pebble Partnership's reluctance to share any capital cost information, the technical rigor of the EIS process may be compromised if no cost data are available to help select the "least environmentally damaging practicable alternative." To help ensure the integrity of the EIS process, and in fairness to local communities, the State of Alaska and to shareholders, I believe the Pebble Partnership is obligated to publicly release a new preliminary economic assessment for the proposed smaller and lower-grade mine that the Army Corps of Engineers is currently reviewing.

Professional Background

I am an environmental scientist and manager with over thirty years of experience in the mining and consulting industries. During my 23 years with the global mining company Rio Tinto I participated in and contributed to more than twenty financial and technical assessments of new major capital projects, divestments and potential acquisitions. I have performed environmental and permitting work at over fifty mines, projects and operations. This included over seven years as Head of Environment for Rio Tinto's Copper, Copper & Diamonds and Copper & Coal Product Groups. I have published numerous papers on mine environmental

performance and management in peer reviewed scientific journals, conference proceedings and books. I am intimately aware of the environmental challenges, issues and costs posed by the responsible development, operation and closure of large copper mines.

The 25-Year Mine Case Evaluated in 2011

In 2011 Northern Dynasty Minerals Limited commissioned Wardrop to complete a Preliminary Assessment of the Pebble Project. The Northern Dynasty website directs interested parties to a web location where this document can be viewed, although the reader is cautioned that the 2011 study “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.” The preliminary assessment performed financial evaluations on 25-, 45- and 78-year mine scenarios. However, the discussion below is focused on the 25-year mine scenario as this most closely resembles the 20-year mine life proposed in the DEIS Project Description (Appendix N). The 25-year mine case was predicted to have an up-front capital cost of 4.7 billion dollars required to process a total of 1990 million tons of ore. The NPV of the project was predicted to be 3.8 billion (pretax) in 2011 dollars assuming a seven percent annual discount rate.

Because future income and costs are discounted, NPV estimates are highly sensitive to costs and revenue in the early years of the economic assessment. The project value is particularly affected by the construction capital costs which, by necessity, must be incurred before any ore production and concentrate sales can occur. Pebble’s assumed construction costs of \$4.7 billion are anomalously low compared to other large copper mines that have been studied or built over the past five to ten years. For example, over six billion dollars was spent on construction of the Oyu Tolgoi copper mine in Mongolia which went into production in 2013 after four years of construction. The Las Bambas copper mine in Peru spent more than seven billion dollars on construction before going into production in 2016. The Cobre Panama copper mine is currently in construction but its capital cost estimate from 2012 is also about six billion dollars. All of these copper mines are open pits with conventional concentrators similar to what is proposed at Pebble. The nearby Donlin gold mine in Alaska is also estimated to have a construction cost of seven billion based for the most part upon a 2011 economic evaluation. Part of the apparent discrepancy in capital cost can be attributed to the removal of \$1.3 billion in capital from the 2011 Wardrop construction cost estimate because “it has been assumed in the financial evaluation that the Pebble Partnership will enter into strategic partnerships as needed to develop, finance and operate a number of infrastructure assets – including the transportation corridor (port and road) and the power plant.” However, it is unclear who would partner with the Pebble project in order to provide this extra capital. As such, this assumption is considered speculative. Adding this \$1.3 billion back into the capital cost estimate for the Pebble 25-year mine case brings the total construction cost up to six billion dollars which is a little more in line with these other projects.

However, actual construction costs could be significantly greater than six billion. In every analogue case cited above, 1) the design ore throughput is less than what was proposed in the

2011 study at Pebble, 2) the analogues in many cases are located closer to existing infrastructure and, perhaps most importantly, 3) none of them is located in as sensitive an environmental setting as Pebble. In 2013 Anglo-American withdrew from the Pebble Partnership after expending roughly \$500 million on the project. According to a document prepared by Kerrisdale Capital (2017), which reportedly interviewed several of the Anglo-American personnel involved in the Pebble project, the actual capital cost for construction of Pebble could exceed ten billion dollars. If true this would have made the NPV of the 25-year mine case strongly negative. The withdrawal of all other large-scale and experienced mining investors (Mitsubishi in 2011, Rio Tinto in 2014 and First Quantum in 2018) may also have been due, in part, to skepticism about the financial viability of the projects evaluated in 2011 as well as the substantial permitting and environmental risks posed by the project.

Comparison between the 2011 and the 2018 EIS Mine Plans

Given the lower average grades, smaller production totals and likely equal or greater construction capital required for the 2018 EIS mine plan, it is almost certain to be less profitable than the 25-year mine plan evaluated by Wardrop in 2011. Some key differences in project ore feed and contained metal are contained in the table below.

	EIS 20-Year Mine	Wardrop 25-Year Mine	EIS/Wardrop
Copper Grade	0.29%	0.38%	76%
Copper Total Production	7.4 billion pounds	15 billion pounds	49%
Gold Grade	0.27 grams/ton	0.34 grams/ton	79%
Gold Total Production	12.1 million ounces	23 million ounces	53%
Molybdenum Grade	154 ppm	182 ppm	85%
Moly Total Production	398 million pounds	725 million pounds	55%

Almost every mining project attempts to target the highest-grade portions of the ore body early in the mine life in order to pay for the very large up-front capital costs associated with mine construction as soon as possible. However, due to the geometry of the Pebble ore body, and given the absolute need to lower the large environmental impacts and risks associated with mining in the sensitive Pebble setting, the EIS mine plan actually targets relatively low-grade portions of the ore body and only mines about ten percent of the total estimated resource. In sum the value per ton of ore mined by the 20-year EIS plan is about 21% lower than the average ore mined in the 25-year plan. The total mass of all copper, gold and molybdenum produced is almost half. This has a profound negative impact on the likely economics of the mine being evaluated by the EIS. A comparison of the profits generated by concentrate sales from the two projects can be made using the life of mine average net smelter return per ton of ore milled calculated in 2011 minus the average total operating costs per ton of ore milled. For the 25-year mine plan this equates to: $(\$27.45/\text{ton} - \$11.16/\text{ton}) * 1990 \text{ million tons of ore} = \32 billion . For the 20-year mine plan this equates to: $(0.79 * \$27.45/\text{ton} - [\$ 11.16/\text{ton} - 2.30/\text{ton}]) * 1300 \text{ million tons of ore} = \17 Billion^1 . Thus, the mine currently being evaluated in

the EIS process makes \$15 billion less profit from concentrate sales. When this difference is apportioned by year and a discount rate of seven percent per year is applied, this equates to a five billion dollar reduction in NPV between the 25-year plan evaluated in 2011 and the 20-year EIS case. It is certainly acknowledged that these are approximate, back-of-the-envelope calculations but the strategic implications for overall project economics are significant and will be extremely difficult to offset.

The 25-year mine plan also appears to have significantly underestimated operational and closure costs associated with perpetual water treatment. On average the mine area receives more than 50 inches per year of precipitation. This is more than four times the average annual evaporation. The ore body and much of the associated country rock is also prone to acid rock drainage. Given these conditions it is almost certain that any open pit mine will create perpetual water management and treatment liabilities. According to the December 2018 Project Description, the mine will have an annual average surplus of 29 cfs (13,000 gallons per minute) for the maximum mine footprint. This will likely increase to almost 20,000 gpm in the early years of closure when long-term water storage in the tailings pore space is no longer available, before major reclamation works are completed and during the initial stages of tailings drain-down. Even after the potentially acid forming tailings and waste rock are submerged in the fully developed pit lake and the tailings have been capped with an infiltration-limiting cover, a water management liability of roughly 3000 gpm or more will likely persist in perpetuity². DEIS water quality predictions confirm that most of this water will need to be treated to meet the extremely strict water quality criteria needed to protect salmon and other aquatic species.

By necessity, Pebble has proposed a very costly and complex multistage water treatment process which to my knowledge has not been attempted for such high flows anywhere else in the world. Applying a treatment cost of \$5.80/1000 gallons³ to these flows predicts that during operation up to about \$40 million/year may be required for water treatment, that early in closure this could raise to \$55 million/year and then decline to roughly \$8 million/year in perpetuity. However, the 2011 Wardrop study only assumed a water treatment cost of 6.3 million per year during operation and was largely silent about any closure water treatment liabilities. Applying a seven percent discount rate to these values during operation and to the first hundred years after closure yields an NPV cost which is approximately \$400 million higher for the life of mine project than assumed in 2011.

Financial and Permitting Implications

As shown in the table below, when the higher construction costs; higher operational and closure expenditures for water treatment; and much lower revenue from concentrate sales are factored into the Wardrop study's 25-year mine plan economic evaluation, the 20-year mine plan being considered by the Pebble EIS has a negative NPV of approximately three billion dollars. This should only be considered a conceptual level approximation of the project's actual NPV. While a new rigorous economic evaluation may make the NPV less or more negative, I

believe it is very unlikely to make the project have a positive rate of return on what is likely to be an extremely large and risky capital investment.

	NPV
Estimated NPV of the 2011 Wardrop 25-Year Mine Plan ⁴	+\$3.8 Billion
Capital for Access Corridor and Power Plant added back into construction cost	-\$1.3 Billion
Lost revenues from decreased concentrate sales	-\$5 Billion
Refined perpetual water treatment costs	-\$0.4 Billion
Conceptual NPV of the EIS 20-Year Mine Plan	-\$3 Billion

If the base case mine plan assumed for the EIS is not economic, then the entire permitting process risks being compromised because the impacts and risks being evaluated are much smaller than those required for a full-scale economically viable project. In other words, the EIS is not evaluating the “least environmentally damaging practicable alternative.” This situation would also place prospective developers in a difficult situation because in order to create a profitable operation they would either need to 1) immediately begin a new EIS for a larger economically viable mine plan or 2) knowingly permit, fund and build an uneconomic mine in the hopes that a later EIS and permitting process would allow a larger, economically viable operation. In either case, a larger open pit mine would almost certainly take on many of the characteristics of the 25-year case assessed by Wardrop in 2011 and the Pebble 2.0 scenario evaluated by the USEPA in 2014 with billions of tons of additional waste rock production, much larger tailings dams and a step-change increase in disturbed footprint.

At a minimum relative capital costs for different development and design options need to be evaluated by the Army Corps of Engineers so a meaningful options analysis can be conducted on practicable alternatives. To help ensure the integrity of the EIS process and in fairness to local communities, the State of Alaska and to shareholders, I believe the Pebble Partnership is obligated to publicly release a new preliminary economic assessment for the proposed smaller and lower-grade mine that the Army Corps of Engineers is currently reviewing.

Sincerely,



Richard K. Borden

Owner Midgard Environmental Services LLC
 4507 South Gilead Way
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Footnotes:

¹ Given the assumed long-term metals prices, net smelter return and net operating cost values are from a 2011 study (Wardrop, Preliminary Assessment of the Pebble Project, Southwest Alaska, February 17, 2011) all cost are in 2011 dollars and have not been escalated to 2019 dollars. The net smelter return calculated for the 25-year mine plan in 2011 is multiplied by 0.79 to account for the 21% lower average ore grades (in copper equivalents) of the proposed EIS mine. Similarly, the total operating cost per ton of ore milled is reduced by \$2.30 to account for the negligible waste rock stripping of the EIS case compared to a stripping ratio of 1.5 assumed in the 25-year mine plan ($[1.5/2.5] \times [\text{Wardrop net mining cost per ton of ore}]$).

² In order to prevent groundwater outflow from the pit, the pit lake will need to be maintained at a lower level than the surrounding groundwater surface in perpetuity. The water removed from the pit lake will require treatment before release. This is conservatively assumed to be 1300 gpm based solely on the ultimate pit footprint, annual average precipitation and annual evaporation. In this extremely wet climatic setting a good infiltration-limiting soil cover on the bulk tailings storage facility is likely to allow infiltration of approximately 20% of incident rainfall based on historic cover performance across the world. Based on the bulk tailings footprint, annual rainfall and this rate of infiltration, seepage of about 1400 gpm is likely to persist in perpetuity even after operational drain down is complete.

³ In 2013 the Canadian Mine Environmental Neutral Drainage program completed a study of more than 100 mine water treatment plants which were predominantly located in the USA and Canada. The average water treatment plant operational cost in the study was \$1.54 per 1000 liters (\$5.82 per 1000 gallons). The US and Canadian dollar were at near parity for 2013 when the study was completed. In reality the Pebble water treatment strategy is much more complex than the average treatment plant in the review and so its costs per 1000 gallons are likely to be higher. (Review of Mine Drainage Treatment and Sludge Management Operations, MEND Report 3.43.1, 2013).

⁴ Given the lack of any new published capital cost data for the EIS mine plan, this assumes construction capital costs are roughly the same for the 25-year and 20-year projects. There are likely to be some incremental capital cost savings for the 20-year mine because ore throughput is about 20% lower, so construction costs for the concentrator and associated support infrastructure will also likely be lower. Initial truck and shovel fleets are likely to be less costly for the 20-year mine plan because of the much lower waste rock stripping ratios. The length of the access road corridor is also less in the new mine plan. However, these cost savings will almost certainly be offset by capital cost increases associated with new or redesigned infrastructure such as: 1) a new complex stand-alone pyrite tailings management system covering 1.7 square miles, 2) much larger and more costly water management infrastructure than envisioned in 2011; 3) construction of two ferry terminals on Lake Iliamna and the purchase of large ice-breaking ferry; and 4) tailings embankment construction with a more stable embankment outer slope of 2.6:1 (horizontal to vertical) versus the 2:1 slope assumed in

2011 which will likely require significantly more material quarrying and movement. Similarly, there is a lack of any information on sustaining capital for the 20-year plan, so it is assumed that sustaining capital requirements are the same for the first twenty years of the two plans. Although the 25-year mine plan has additional sustaining capital requirements for years 21 to 25, at a seven percent discount rate the value of any late capital expenditures is reduced by roughly 80% in the NPV calculations and has a negligible impact on overall project economics.