



111 WEST 16TH AVENUE ▼ SUITE 400
ANCHORAGE, AK 99501
P 907.278.3602 ▼ F 907.276.3924

APPENDIX D

to

Comments of Bristol Bay Native Corporation
on

EPA Region 10's Proposed Determination to Prohibit
and Restrict the Use of Certain Waters within Defined
Areas as Disposal Sites: Pebble Deposit Area, Southwest
AK;

Docket ID No. EPA-R10-OW-2022-0418

Submitted to the U.S. Environmental Protection Agency
September 6, 2022

Appendix D—Scientific and Technical Reports Related to Army Corps Administrative Record (file no. POA-2017-00271) and Associated Environmental Impact Statement for the Proposed Pebble Mine Project

The Proposed Determination of the U.S. Environmental Protection Agency Region 10 Pursuant to Section 404(c) of the Clean Water Act—Pebble Deposit Area, Southwest Alaska (“2022 PD”) asks the public to submit comments that identify documents from the U.S. Army Corps of Engineers (“USACE”) administrative record that EPA Region 10 should consider in its decision-making process for this Clean Water Act (“CWA”) Section 404(c) action. Numerous highly-qualified scientific and technical experts submitted reports throughout the USACE CWA permitting process for the 2020 Mine Plan and associated National Environmental Policy Act (“NEPA”) process as well as during EPA’s peer-reviewed scientific process culminating in the 2014 Bristol Bay Watershed Assessment (“2014 Watershed Assessment”). These scientists closely reviewed baseline data and application materials from the Pebble Limited Partnership (“PLP”) and concluded that impacts such as those posed by PLP’s 2020 Mine Plan would cause significant adverse effects to the aquatic ecosystem.

Bristol Bay Native Corporation (“BBNC”) closely followed the 2014 Watershed Assessment, NEPA, and CWA processes for the proposed Pebble Mine and thus has extensive knowledge of the administrative records available to support EPA’s 2022 PD. In this Appendix, BBNC has attached the most relevant scientific and technical reports from these administrative records, the vast majority of which were also submitted to the USACE record during the permitting process.

These reports demonstrate the conservative nature of USACE’s Final Environmental Impact Statement findings and the concrete scientific basis for the EPA’s action to protect the headwaters of Bristol Bay from the unacceptable adverse effects from mining the Pebble deposit.

Wetlands and Aquatic Resources Technical Reports..... 1 - 540

a. Fennessy, Siobhan, *Comments on the Final Environmental Impact Statement on the Impacts to Wetlands and Other Waters* (Aug. 21, 2020)..... 2 - 30

b. Reeves, Gordon H. and Susan Lubetkin, *Uncertainties of the Analyses of Altered Flows as discussed in the FEIS* (Aug. 20, 2020)..... 31 - 50

c. Schweisberg, Matthew, *Pebble Mine Final Environmental Impact Statement (FEIS): Anticipated Adverse Impacts to Wetlands* (Aug. 22, 2020)..... 51 - 76

d. Yocom, Thomas G., *The Pebble Project Draft Compensatory Mitigation Plan (January 2020) provides no habitat replacement or preservation to offset thousands of acres of wetland and aquatic habitats that the Pebble mine would destroy, degrade, or fragment* (Aug. 19, 2020)..... 77 - 90

e. Yocom, Thomas G., *The Alaska District of the Corps of Engineers' Revised Preliminary Jurisdictional Determinations for POA-2017-271 Inappropriately Reduces Estimates of the Direct Impacts of the Pebble Project to Wetland and Aquatic Areas by Over 1200 Acres* (Aug. 19, 2020) 91 - 104

f. Yocom, Thomas G., *Review of Pebble Project FEIS Appendix B: Alternatives Development Process, How the Alaska District of the Corps biased its analysis to favor the applicant* (Aug. 19, 2020) 105 - 117

g. Albert, Dave M., *Direct loss of salmon streams, tributaries, and wetlands under the proposed Pebble Mine compared with thresholds of unacceptable adverse effects in the EPA Proposed Determination pursuant to Section 404(c) of the Clean Water Act* (June 21, 2019)..... 118 - 132

h. Schweisberg, Matthew, *Pebble Mine: Anticipated Adverse Impacts to Wetlands* (May 12, 2019) 133 - 150

i. Schweisberg, Matthew, *Compliance with Section 230.10(c) of the 404(b)(1) Guidelines, Proposed Pebble Mine Project* (June 11, 2019)..... 151 - 163

j. Gracz, Michael, *Is a Finding of Significant Degradation in a 404(b)(1) Analysis of the Pebble Project Scientifically Supportable?* (May 24, 2019)..... 164 - 171

k. Yocom, Thomas G., *Determining the least damaging practicable alternative for the proposed Pebble Project: Potentially less damaging practicable alternatives are improperly dismissed in the DEIS* (June 6, 2019)..... 172 - 183

l. Yocom, Thomas G., *The Pebble Project DEIS provides no substantive proposals of compensatory mitigation losses for wetlands and aquatic areas* (June 6, 2019)..... 184 - 200

m. Yocom, Thomas G., *The Corps Determination of Basic and Overall Project Purposes Improperly Eliminates Consideration of Potentially Less Environmentally Damaging Practicable Alternatives* (June 6, 2019)..... 201 - 213

n. Utz, Ryan, *Misapplication of an environmental threshold in an ecosystem with exceptionally rich fisheries resources* (June 19, 2019) 214 - 228

o. Yocom, Tom G., *Questioning the Corps' Preliminary Jurisdictional Determination for POA-2017-271* (June 17, 2018) 229 - 268

Pages

p. Yocom, Thomas G., *Recommendations on the scope of analysis pursuant to the National Environmental Policy Act and Section 404 of the Clean Water Act* (June 17, 2018) 269 - 301

q. Mouw, Jason, *Review of USACE Pebble Project Permit POA-2017-271: Stream Crossings Along the Proposed Road Corridor* (June 27, 2018) 302 - 310

r. Mouw, Jason, *Review of USACE Pebble Project Permit POA-271-271 and Supporting Environmental Baseline Studies: Can Critical Assumptions be Validated to Support Assessment of Impact?* (June 19, 2018) 311 - 346

s. Leske, Kevin O., *Veto-ing the Veto?: Limited Options Remain Under Clean Water Act Section 404(c) for EPA to Allow Development of the Pebble Deposit*, Lewis & Clark Environmental Law Journal Vol. 48-4 (2018) 347 - 384

t. Yocom and Bernard, *Mitigation of Wetland Impacts from Large-Scale Hardrock Mining in Bristol Bay Watersheds*, Seattle J. Env't Law Vol. 3:71 (2013)..... 385 - 415

u. Yocom, Thomas G., *Review Comments on EPA's Bristol Bay Watershed Assessment: Habitat Loss*, prepared for BBNC (July 23, 2012)..... 416 - 423

v. Yocom, Thomas, G., *Review of Environmental Baseline Document Chapters Related to the Presence of Wetland and Aquatic Areas in the Vicinity of the Pebble Ore Deposit* (June 5, 2012) 424 - 446

w. Luetters and Sturdy, *Review of Pebble Mine Project Environmental Baseline Document, Chapter 14: Wetlands and Waterbodies* (2012)..... 447 - 450

x. Parasiewicz, Piotr, *A Review of PLP Environmental Baseline Documents: Instream and off-channel habitat distribution and modeling* (June 2012) 451 - 466

y. Riley and Yocom, *Mining the Pebble Deposit: Issues of 404 Compliance and Unacceptable Environmental Impacts* (December 2011) 467 - 540

Fisheries and Aquatic Ecology Technical Reports 541 - 1433

a. Lubetkin, Susan C. and Gordon H. Reeves, *A review of Pebble Project Final EIS Section 4.24, Fish Values: PHABSIM/HABSYN model estimates of salmonid usable habitat areas in the presence of Pebble Mine are baseless* (Aug. 19, 2020) 542 - 758

b. O'Neal, Sarah, *Pebble Mine Final Environmental Impact Statement (FEIS): Anticipated adverse impacts from the transportation corridor* (Aug. 20, 2020) 759 - 806

c. Reeves, Gordon H., *Review of Effects of the Proposed Pebble Mine on Fish Values in the FEIS: The Portfolio Effect* (Aug. 20, 2020)..... 807 - 815

d. Schindler, Daniel E., *Scientific Concerns About the Draft EIS for the Proposed Pebble Mine* (June 17, 2019) 816 - 823

e. Brennan et al, *Shifting habitat mosaics and fish production across river basins*, Science Vol. 364, Issue 6442, pp. 783-786 (May 24, 2019) 824 - 829

f. O'Neal, Sarah, *Technical comments regarding fish and aquatic habitat in the Pebble Project Draft Environmental Impact Statement* (July 1, 2019)..... 830 - 928

Pages

g.	Frissell, Christopher, A., <i>Failure to address Cumulative and Long-Term Effects of Bioaccumulation and Biomagnification of Contaminants, including Trace Metals and Hydrocarbons, in the Pebble Project DEIS</i> (May 31, 2019).....	929 - 957
h.	Frissell & O’Neal, <i>Direct and cumulative impacts of road system fugitive dust in the Pebble Project Draft EIS</i> (rev. June 16, 2019).....	958 - 987
i.	Reeves & Mauger, <i>Review of Water Temperature Impacts in the Proposed Pebble Mine Draft Environmental Impact Statement</i> (May 24, 2019).....	988 - 998
j.	Reeves et al., <i>Limitations of the PHABSIM Model to Evaluate Impacts to Fish Habitat near the Pebble Mine</i> (June 24, 2019)	999 - 1119
k.	Hovel, Rachel, <i>Assessment of Pebble Mine Draft EIS: Salmonid life history diversity and impacts to Iliamna Lake</i> (May 2019).....	1020 - 1042
l.	Woody, Carol Ann, <i>Comments on PLP Exhibit D – Buell & Bailey, Mitigation and EPA’s Bristol Bay Watershed Assessment Final Assessment</i> (June 14, 2014).....	1043 - 1045
m.	O’Neal, Sarah, <i>Comments on PLP Exhibit C – Ecofish literature review of successes and efficacy of fish habitat restoration and compensation projects in British Columbia</i> (May 16, 2014).....	1046 - 1051
n.	O’Neal, Sarah, <i>Comments on PLP Exhibit E – Quigley Mitigation/Habitat Compensation Memo</i> (May 16, 2014)	1052 - 1056
o.	Woody, Carol Ann, <i>Critique of Northern Dynasty’s Proposed Mitigation Strategies</i> (June 25, 2013)	1057 - 1067
p.	Woody, Carol Ann, <i>Assessing Reliability of Pebble Limited Partnership’s Salmon Escapement Studies</i> (June 25, 2012).....	1068 - 1093
q.	O’Neal, Sarah, <i>A Review of PLP Environmental Baseline Documents: Resident Fish and Juvenile Salmon Habitat, Distribution, and Assemblage</i> (April, 2012)	1094 - 1115
r.	O’Neal, Sarah, <i>A Review of PLP Environmental Baseline Documents: Aquatic Macroinvertebrates (Bristol Bay Drainages)</i> (April 2012)	1116 - 1129
s.	Woody and O’Neal, <i>Effects of Copper on Fish and Aquatic Resources</i> (March 2012).....	1130 - 1157
t.	Chambers, Moran, and Trasky, <i>Bristol Bay’s Wild Salmon Ecosystems and the Pebble Mine: Key Considerations for a Large-Scale Mine Proposal</i> (January 2012)	1158 - 1278
u.	Southwest Alaska Salmon Habitat Partnership, <i>Strategic Conservation Action Plan for Bristol Bay Watersheds</i> (2011)	1279 - 1337
v.	Woody & Higman, <i>Groundwater as Essential Salmon Habitat in Nushagak and Kvichak River Headwaters: Issues Relative to Mining</i> (July 10, 2011)	1338 - 1357
w.	Woody & O’Neal, <i>Fish Surveys in Headwater Streams of the Nushagak and Kvichak River Drainages Bristol Bay Alaska, 2008-2010</i> (Dec. 2010)	1358 - 1406
x.	Donaldson et al., <i>External Peer Review of Woody and O’Neal 2010 and Woody and Higman 2011, prepared for U.S. EPA</i> (Dec. 30, 2012).....	1407 - 1433

Pages

Water Quality, Quantity, and Treatment Technical Reports	1434 - 1834
a. O’Neal, Sarah, <i>Toxicological shortcomings of the Pebble Project Final Environmental Impact Statement</i> (Aug. 22, 2020).....	1435 - 1468
b. Reeves, Gordon H., <i>Review of the Assessment of Water Temperatures</i> (Aug. 20, 2020)	1469 - 1479
c. Sobolewski, André, <i>Review of water treatment plants proposed in FEIS for Pebble Project</i> (Aug. 23, 2020).....	1480 - 1499
d. Zamzow, Kendra, <i>Pebble FEIS on discharge of selenium</i> (Aug. 15, 2020)	1500 - 1505
e. Prucha, Robert H, <i>Review of Groundwater Impacts in the Proposed Pebble Mine Draft EIS and Evaluation of Potential Impacts on the Coupled Hydrologic System</i> (June 6, 2019).....	1506 - 1573
f. Wobus, Cameron, <i>Memorandum: Comments on the Pebble Project Draft EIS</i> (May 30, 2019).....	1574 - 1591
g. Zamzow, K. et al, <i>Selenium issues in the Pebble Project draft EIS</i> (April 12, 2019).....	1592 - 1630
h. Zamzow, K. et al, <i>Fugitive Dust issues in the Pebble Project draft EIS</i> (May 30, 2019)	1631 - 1666
i. Sobolewski, André, Clear Coast Consulting, Inc., <i>Review of water treatment plans proposed for Pebble Project</i> (May 20, 2019)	1667 - 1684
j. Wobus et al., <i>Hydrologic Alterations from Climate Change Inform Assessment of Ecological Risk to Pacific Salmon in Bristol Bay, Alaska</i> (Dec. 8, 2015)	1685 - 1706
k. Riley, William M., <i>Review Comments on Selected Environmental Baseline Documents for the Pebble Mine Project</i> (July 22, 2012)	1707 - 1715
l. Zamzow, Kendra, <i>A Review of PLP Environmental Baseline Documents: Water Quality</i> (May 2012)	1716 - 1737
m. Stratus Consulting, <i>Review of Pebble Limited Partnership’s Environmental Baseline Document: Hydrologic Characterization</i> (May 25, 2012)	1737 - 1749
n. Stratus Consulting, <i>Review of Pebble Limited Partnership’s Environmental Baseline Document: Geochemical Characterization</i> (May 18, 2012)	1750 - 1769
o. Craven et al., <i>Laboratory Estimation of Cu-Dissolved Organic Matter Complexation and Its Relevance to Fish Toxicity in Streams Draining the Pebble Deposit in Alaska</i> (February 2011)	1770 - 1802
p. Moran, Robert E., <i>Pebble Mine: Hydrogeology and Geochemistry Issues</i> (September 2007)	1803 - 1834

Pages

Mine Engineering and Feasibility Technical Reports..... 1835 - 2046

a. Chambers, David M., *Significant Omissions in the Pebble Project EIS Final Environmental Impact Statement* (Aug. 19, 2020)..... 1836 - 1859

b. Chambers, David M., *Comments on Pebble Draft Environmental Impact Statement* (May 20, 2019) 1860 - 1874

c. Chambers, David M., *Why Pebble will be at least a 78-year mine* (March 14, 2019) 1875 - 1878

d. Borden, Richard K., *Pebble Mine Draft Environmental Impact Statement Summary Comments* (June 18, 2019) 1879 - 1884

e. Borden, Richard K., *Pebble Mine Draft EIS Comments on Alternatives Analysis, Cumulative Effects, Water Management, Wetlands Mitigation, and Air Quality* (June 17, 2019)..... 1885 - 1899

f. Borden, Richard K., *Pebble Mine Draft EIS Comments on Reclamation and Closure* (May 31, 2019)..... 1900 - 1910

g. Chambers and Levit, *Feasibility Studies for Alaska Mines* (March 28, 2018)..... 1911 - 1921

h. Chambers, David M., *Technical Note on Updates to PLP’s Proposed Project* (June 13, 2018) 1922 - 1927

i. Chambers, David M., *Long-term Risk of Tailings Dam Failure, NPS Series: Alaska Park Science – Vol. 13 Issue 2* (July 2015)..... 1928 - 1939

j. Chambers, David M., *Comments on EPA Second External Review Draft of An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska* (June 28, 2013)..... 1940 - 1967

k. Chambers, David M., *Peer Review Comments on PLP White Paper No. 1: Mitigating Risk in the Design and Construction of Tailings Dams in Alaska, July 20, 2012, Haile and Brouwer, Knight Piesold* (Oct. 23, 2012)..... 1968 - 1974

l. Levit & Chambers, *Comparison of the Pebble Mine with Other Alaska Large Hard Rock Mines* (February 2012) 1975 - 1987

m. Chambers & Higman, *Long Term Risks of Tailings Dam Failure* (Oct. 2011) 1988 - 2022

n. Brett et al., *External Peer Review of Chambers and Higman 2011 and Levit and Chambers 2012, prepared for U.S. EPA* (Dec. 30, 2012) 2023 - 2046

Economics Technical Reports..... 2047 - 2531

a. Borden, Richard, Midgard Environmental Services, *Review of the Pebble Mine Project Economic Contribution Assessment* (March 10, 2022)..... 2048 - 2052

b. Borden, Richard, Midgard Environmental Services, *Review of the Pebble Mine Project Preliminary Economic Assessment* (Dec. 1, 2021)..... 2053 - 2062

c. McKinley Research Group, *The Economic Benefits of Bristol Bay Salmon* (February 2021) 2063 - 2122

Pages

d. Power Consulting Inc., *Public Comments on the U.S. Army Corps of Engineers Pebble Project EIS Draft Environmental Impact Statement* (June 11, 2019)..... 2123 - 2166

e. Young & Little, *The Economic Contribution of Bear Viewing to Southcentral Alaska* (May 2019) 2167 - 2210

f. Wink Research & Consulting, *Economic Benefits of the Bristol Bay Salmon Industry* (July 2018)..... 2211 - 2300

g. Knapp, Gunnar, et al., *The Economic Importance of the Bristol Bay Salmon Industry* (April 2013) 2301 - 2400

h. Duffield et al., *Revised Final Report, Economics of Wild Salmon Watersheds: Bristol Bay, Alaska* (Feb. 2007) 2401 - 2531

Wildlife Technical Reports 2532 - 2667

a. Fennessy, Siobhan, *Comments on the Pebble Mine Final EIS on selenium and impacts to waterbirds* (Aug. 21, 2020) 2533 - 2548

b. Suring, Lowell H., *Brown Bears and the Pebble Project in Southwest Alaska* (August 2020)..... 2549 - 2605

c. Suring, Lowell H., *The Pebble Project and McNeil River Brown Bears* (April 2019) 2606 - 2653

d. Dawson, Natalie, *Potential environmental impacts to brown bears (Ursus arctos) with development of the Pebble Mine, Southwest Alaska* (June 2018) 2654 - 2667

Subsistence and Cultural Resources Reports..... 2668 - 2752

a. Callaway, Don, *A Statistical Description of the Affected Environment as it Pertains to the Possible Development of the Pebble Mine* (2012) 2669 - 2719

b. Callaway, Don, *Review of Chapter 21 Socioeconomics-Bristol Bay Region Pebble Project Environmental Baseline Document* (2012) 2720 - 2732

c. Information Insights, Inc., *Bristol Bay Regional Vision Final Report* (November 2011) 2733 - 2752

Spill Risk and Hazards Technical Reports 2753 - 4031

a. Lubetkin, Susan, *Alaska Mining Spills: A comparison of the predicted impacts described in permitting documents and spill records from five major operational hardrock mines* (April 2022) 2754 - 3323

b. Higman, Bretwood, *The Final Pebble EIS Understates Geological Hazards* (Aug. 18, 2020)..... 3324 - 3330

c. Lubetkin, Susan C., *A review of Pebble Project Final EIS Section 4.27, Spill Risk: current data complications and consequences of probability analyses* (Aug. 19, 2020) 3331 - 3698

Pages

d.	Wlostowski, Adam/Lynker Technologies, LLC, <i>Comments on Pebble Project Final EIS</i> (Aug. 7, 2020)	3699 - 3731
e.	Wobus, Cameron/Lynker Technologies, LLC and Bob Prucha/Integrated Hydro Systems, <i>Comments on Pebble Project Final EIS</i> (Aug. 19, 2020)	3732 - 3761
f.	Zamzow, Kendra/CSP2, <i>Pebble FEIS, comments on ore concentrate pipeline</i> (Aug. 16, 2020)	3762 - 3816
g.	Lubetkin, Susan, <i>A critique of the transportation corridor spill risk estimates of diesel, ore concentrate, and chemical reagents in the Pebble Project draft environmental impact statement</i> (May 20, 2019)	3817 - 3909
h.	Nuka Research and Planning Group, LLC, <i>Comments on the Draft EIS for Proposed Pebble Mine—Shipping Hazards and Spill Risks in Cook Inlet; Tsunamis and Port Infrastructure; Natural Gas Pipeline; Lake Iliamna Operations</i> (May 20, 2019)	3910 - 3924
i.	Higman & Riordan, <i>Comments on the 2019 Draft Environmental Impact Statement for the Pebble Mine—Geohazards; Earthquakes; Pit-Wall Stability; Tsunamis; Lake Iliamna Seiches</i>	3925 - 3946
j.	Borden, Richard K., <i>Pebble Mine Draft EIS Comments on Geotechnical and Spill Risks</i> (May 13, 2019)	3947 - 3955
k.	Wobus, Cameron/Lynker Technologies, LLC, <i>A Model Analysis of Flow and Deposition from a Tailings Dam Failure at the Proposed Pebble Mine</i> (March 12, 2019)	3656 - 4022
l.	Higman, Bretwood, <i>Critique of Pebble Limited Partnership’s Seismic Hazard Assessment</i> (2012)	4023 - 4031

Appendix D Reports submitted to EPA via email due to file size limitations of www.regulations.gov.