Brief on Behalf of the Natural Resources Defense Council in Support of Petitions to the U.S. Environmental Protection Agency for Action Regarding the Proposed Pebble Mine Under Section 404(c) of the Federal Water Pollution Control Act

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JOEL R. REYNOLDS
TARYN KIEKOW
MATTHEW SKOGLUND

Attorneys for
NATURAL RESOURCES DEFENSE COUNCIL
1314 Second Street
Santa Monica, CA 90401
(310) 434-2300

1152 15th Street, N.W.
Washington, D.C. 20005
(202) 289-6800

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INTRODUCTION

On behalf of its 1.3 million members and activists, the Natural Resources Defense Council ("NRDC") submits this brief to the U.S. Environmental Protection Agency ("EPA") in support of pending petitions by nine federally-recognized tribes,[1] the Bristol Bay Native Corporation, and others (collectively "petitioners") requesting that EPA initiate action under section 404(c) of the Federal Water Pollution Control Act ("Clean Water Act"), 33 U.S.C. 1344(c) ("404(c)"), to prohibit, deny, or restrict the specification of the Pebble Mine site as a disposal area for the discharge of dredged or fill material in connection with the proposed Pebble Mine in Bristol Bay, Alaska.

For the reasons discussed in detail below, NRDC believes that the large-scale mining proposed at the Pebble Mine is irreconcilable with the health and integrity of the fishery, drinking water, wildlife, and recreational resources of the Bristol Bay watershed and, further, that EPA has the clear statutory authority to protect those resources as requested by petitioners. The Bristol Bay watershed feeds one of the world's most productive wild salmon fisheries, which supports indigenous people and their communities, a diverse array of wildlife, and a wide range of irreplaceable fishery and tourism-related economic and subsistence activities. Recognizing the unique importance of the area, offshore oil and gas exploration in Bristol Bay was banned in 2010, premised on the conclusion of federal regulators, as expressed at that time by U.S. Department of the Interior Secretary Ken Salazar, that Bristol Bay is "a national treasure

[1] Six federally-recognized tribes originally petitioned EPA. Those six petitioner tribes are Nondalton Tribal Council, Koliganik Tribal Council, New Stuyahok Traditional Council, Ekwok Village Council, Curyung Tribal Council and the Levelock Village Council. See Letter from Six Federal-recognized Tribes in the Kvichak and Nushagak River Drainages of Southwest Alaska to Lisa P. Jackson, Administrator of the U.S. Environmental Protection Agency (May 2, 2010). EPA later received additional requests from Ekuk Village Council, Clarks Point Tribal Council, and Twin Hills Village Council (collectively "Tribes").

that we must protect" and a resource "too special" to drill.[2]

The Pebble Mine and its associated infrastructure and facilities would unavoidably threaten this "national treasure." Given its sensitive and pristine location, the mine's massive scale, the low-grade quality of the ore, the particular characteristics of the ore body, the complex and near-surface hydrology of the area, the exceptional fishery resources in the region, and the absence of supporting infrastructure, development of the Pebble Mine would inevitably result in "unacceptable adverse effects" to these critical natural and recreational resources, which, under the terms of section 404(c), is the regulatory threshold for initiating the petitioned EPA action.

Equally certain is EPA's authority under section 404(c) to prohibit, deny, or restrict the use of an area as a disposal site for dredged or fill material when the discharge will have an "unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas."[3] Federally-recognized tribes in the region have requested that EPA use this authority to protect Bristol Bay from large-scale sulfide mining like the Pebble Mine, and their request has been followed by similar requests, including from the Bristol Bay Native Corporation (the largest development corporation and private land-owner in the Bristol Bay region, representing approximately 9,000 shareholders), commercial fishing interests represented by the Alaska Independent Fishermen's Marketing Association and the Bristol Bay Regional Seafood Development Association, the National Council of Churches, sportsmen's groups, chefs and restaurant owners, and conservation organizations. In addition, the Bristol Bay Native Association (a non-profit corporation and tribal consortium representing the 31 federally-recognized tribes in the Bristol

[2] U.S. Department of the Interior, Secretary Salazar Announces Comprehensive Strategy for Offshore Oil and Gas Development and Exploration, Press Release (Mar. 31, 2010 available at http://www.doi.gov/news/pressreleases/2010_03_31_release.cfm.

[3] 33 U.S.C. § 1344.

Bay region) approved resolutions requesting EPA to use its authority under section 404(c) to protect Bristol Bay.[4]

Petitioners have asked EPA to act proactively, in advance of any federal permit application or the issuance of any federal permit for the Pebble Mine, and have proposed various regulatory approaches to accomplish their shared goal of protecting the natural resources of the Bristol Bay region. Because NRDC believes that the subject petitions are supported by the facts, consistent with the overwhelming weight of scientific evidence, and correct as a matter of law, NRDC writes in support and respectfully urges that the relief requested be granted.[5]

STATEMENT OF FACTS

I. OVERVIEW OF THE BRISTOL BAY REGION

The Bristol Bay watershed is characterized by short, warm summers and long, cold winters, with annual average temperatures hovering around freezing.[6] Rain is moderate, and ranges from 460-810 mm annually.[7] The landscape has been shaped by past glaciations and the

[4] Bristol Bay Native Association, Resolution 2010-32 (Sept. 17, 2010); Resolution 2012-04 (Mar. 23, 2012) (on file with author).

[5] The requested relief is consistent with the federal government's trust responsibility to protect Native American tribes. In Seminole Nation v. United States, for example, the Court observed that "[the federal government's] conduct, as disclosed in the acts of those who represent it in dealings with the Indians, should therefore be judged by the most exacting fiduciary standards." 316 U.S. 286, 297 (1942). All agencies of the federal government are bound by this obligation to consider the Native Americans' best interests in their decisions and actions, including EPA. See, e.g., Nance v. EPA, 645 F.2d 701, 711 (9th Cir., 1981) ("It is fairly clear that any Federal government action is subject to the United States' fiduciary responsibilities toward the Indian tribes…. As a result of the letters from the Undersecretary of the Interior, and the Crow Tribe, and the failure of EPA to respond to those letters before approving the redesignation, the responsibility to exercise those fiduciary obligations is fairly placed upon the EPA.") In this case, this fiduciary obligation applies to EPA's decision whether to protect petitioners' subsistence fishing and hunting grounds from contamination and degradation caused by the permitting of the proposed Pebble Mine in the heart of the Bristol Bay watershed. See also Exec. Order No. 12,898, 59 Fed. Reg. 7,632-33 (Feb. 11, 1994) ("To the greatest extent practicable and permitted by law . . . , each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States . . . . "). See discussion infra at 56-58.

[6] The Nature Conservancy of Alaska, Alaska Peninsula and Bristol Bay Basin Ecoregional Assessment 15 (2003).

[7] Id.

dominant eco-region type is tundra.[8] About 7,600 people live in the region, in communities ranging in size and character from small rural villages to the region's largest city, Dillingham.[9] Approximately 70% of Bristol Bay residents are Alaska Natives (compared to 14.8% statewide),[10] and the principal economic activities in the region are related to commercial, recreational, and subsistence fisheries.[11] The Bristol Bay region is home to thirty-one federally-recognized tribes.[12]

Alaska Natives in Bristol Bay still utilize and rely on subsistence hunting and fishing extensively, collecting an estimated 2.1 million pounds of usable subsistence harvest per year.[13] The dollar value on this harvest is difficult to estimate, but has been placed at between $68 and $137 million.[14] Salmon accounts for one-half of all subsistence harvest by Bristol Bay residents,[15] and other fish account for another 10 percent.[16] Many residents mix cash and subsistence livelihoods, and commercial salmon fishing – the preferred commercial occupation – is the primary source of cash income for Bristol Bay residents.[17]

The Bristol Bay region lies near the "Ring of Fire"[18] and is known for significant volcanic and tectonic activity. Regular earthquakes also occur in the region, and in 1964 the

[8] Id. at 15-16.
[9] Id. at 20; John Duffield, Economics of Wild Salmon Watersheds: Bristol Bay, Alaska 11, University of Montana, Bureau of Business and Economic Research (2007).
[10] Duffield, Economics of Wild Salmon Watersheds, at 11; US Census Bureau, 2010 Census Data: Alaska, http://2010.census.gov/2010census/data/.
[11] Duffield, Economics of Wild Salmon Watersheds, at 11.
[12] Bristol Bay Native Association, available at http://www.bbna.com/tribal/tribalcouncils.html.
[13] John Duffield, Bristol Bay Wild Salmon Ecosystem Economics, 2008 Update (July 2009), at 3.
[14] Id. at 3, 13.
[15] Duffield, Economics of Wild Salmon Watersheds at 84.
[16] Id.
[17] Id. at 12.
[18] The "Ring of Fire" is the zone of earthquakes surrounding the Pacific Ocean, and about 90% of the world's earthquakes occur there. See United States Geological Survey, Earthquake Hazards Program, available at http://earthquake.usgs.gov/learn/glossary/?term=Ring%20of%20Fire.

region experienced the largest earthquake ever recorded in North America.[19] The Shumagin seismic gap, located along the Alaska Peninsula, is considered to have a very high probability of a major earthquake within the next few decades.[20]

The 40,000 square mile Bristol Bay watershed is considered an intact eco-region and has been formally recognized for the special quality of its natural resources by the creation of two national parks – Lake Clark National Park and Katmai National Park and Preserve – and the largest state park in the country, Wood Tikchik State Park. The largest fresh water body in Alaska – Lake Iliamna – is found just 25 miles to the southeast of the proposed Pebble Mine site.[21]

The region is known for its healthy populations of top-level predator species[22] and its high biological productivity, in part due to the exchange of nutrients between the Bering Sea and freshwater and terrestrial habitats in Bristol Bay.[23] Bristol Bay supports globally important commercial fisheries[24] and provides habitat for shorebirds, waterfowl, marine mammals,[25] and five species of Pacific Salmon,[26] including some of the largest runs of sockeye salmon in the world.[27] However, the region is not immune to outside ecological pressures; in the past 25 years,

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[19] The Nature Conservancy, An Assessment of Ecological Risk to Wild Salmon Systems from Large-scale Mining in the Nushagak and Kvichak Watersheds of the Bristol Bay Basin 18 (Ecology and Environment Inc., 2010).
[20] Id.
[21] Id. at 2-3; Alaska Geographic, Lake Clark National Park and Preserve, accessed at http://www.alaskageographic.org/static/212/lake-clark-national-park-and-preserve; Alaska Geographic, Katmai National Park and Preserve, accessed at http://www.alaskageographic.org/static/201/katmai-national-park.
[22] The Nature Conservancy of Alaska, Ecoregional Assessment, at 9.
[23] Alaska Dept of Fish and Game, Bristol Bay Critical Habitat Areas Management Plan Public Review Draft A-1 (2010), available at https://secure.wildlife.alaska.gov/refuge/pdfs/bb_public_review.pdf. **Note:** this document is a draft version.
[24] Id. at A-2.
[25] The Nature Conservancy of Alaska, Ecoregional Assessment, at 9.
[26] Id..
[27] Id. at 109.

for example, some anadromous fish populations have declined, and marine productivity has decreased in the region, possibly due to rising temperatures.[28]

Numerous mammals thrive in the Bristol Bay watershed, and many top level predators can be found there, including brown and black bears, wolves, wolverines, and lynxes.[29] The lowlands of Bristol Bay provide important habitat for many other species of mammals, including foxes, martens, beavers, and moose.[30] A recent study of Lake Clark National Park, located just northeast of Lake Iliamna, estimated that between 35 and 40 species of mammals could be found in the park.[31] The study focused on small mammals[32] and noted that some of the species found in the area included bats, several species of shrews, pikas and hares, and at least nine species of rodents.[33]

The Bristol Bay watershed is a particularly important region for caribou. The Mulchatna Caribou herd – the third largest in Alaska – ranges throughout the Bristol Bay region. While its numbers have fluctuated greatly, in 1996 the herd was estimated to contain 200,000 caribou[34]—over one-fifth of the state's estimated 900,000 wild caribou.[35] Several other herds make use of the region, including the Kilbuck, Nushagak, and North Alaska Peninsula herds.[36]

The region is also an important area for birds, including bald eagles. Its coastal wetlands, lagoons, and bays provide staging areas for large seasonal aggregations of waterfowl and

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[28] Id. at 19.
[29] Id. at 16.
[30] Alaska Department of Fish and Game, Our Wealth Maintained: A Strategy for Conserving Alaska's Diverse Wildlife and Fish Resources 39 (2006), available at http://www.adfg.alaska.gov/static/species/wildlife_action_plan/cwcs_main_text_combined.pdf.
[31] A.J. Cook and S.O. MacDonald, Mammal Inventory of Alaska's National Parks and Preserves: Lake Clark National Park and Preserve 23 (2004).
[32] Id. at 6.
[33] Id. at 23.
[34] Michael T. Hinkes et al., Influence of Population Growth on Caribou Herd Identity, Calving Ground Fidelity, and Behavior 69(3) Journal of Wildlife Mgmt. 1147, 1148 (2005), available at http://www.jstor.org/stable/3803353.
[35] Caribou (Rangifer tarandus granti) Species Profile, Alaska Dep't of Fish and Game, http://www.adfg.alaska.gov/index.cfm?adfg=caribou.main.
[36] Hinkes et al., supra, at 1148-1149.

shorebirds, such as the Beringian marbled godwit, Aleutian tern, and red-faced cormorant.[37] A number of bays within Bristol Bay have seasonal concentrations of over 100,000 birds, and three lagoons host concentrations of over 500,000 birds annually.[38] Furthermore, the Bristol Bay region provides wintering habitat for several other important bird species, including the Emperor goose, King eider, Steller's eider, and McKay's bunting.[39]

Bristol Bay – and the streams and rivers that feed it – is world renowned for the productivity and diversity of its salmon fisheries. The Kvichak River is home to the most productive sockeye salmon run on Earth,[40] and the Nushagak River supports the third largest King salmon run worldwide.[41] Five species of Pacific salmon can be found in the region, as well as several other anadromous species, including steelhead, rainbow smelt, and dolly varden.[42] Resident fish in the region include Arctic Grayling, Northern pike, multiple species of trout, Arctic Char, and whitefish.[43]

The Bay itself also supports diverse populations of marine species. More than 30 species of groundfish and shellfish depend on the bay,[44] including scallops, crab, and shrimp.[45] Pacific herring and pacific halibut are found in the region,[46] and the bay is also home to many marine mammals, including the Bristol Bay population of beluga whales, killer whales, gray whales, the endangered Steller's sea lion, Pacific walruses, two species of seals, and sea otters.[47] Lake

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[37] The Nature Conservancy of Alaska, Ecoregional Assessment, at 16-17.
[38] Id. at 17.
[39] Id.
[40] Id. at 103.
[41] Alaska Department of Fish and Game, Our Wealth Maintained, at 38 (2006).
[42] The Nature Conservancy of Alaska, Ecoregional Assessment, at 16.
[43] Id. at 44.
[44] Alaska Department of Fish and Game, Bristol Bay Critical Habitat Areas, at A-1.
[45] The Nature Conservancy of Alaska, Ecoregional Assessment, at 17.
[46] Id.
[47] Alaska Dept of Fish and Game, Bristol Bay Critical Habitat Areas, supra, at A-22.

Iliamna is home to freshwater harbor seals – one of very few seal populations worldwide to establish a permanent year-round presence in a freshwater environment.[48]

Considered together, these resources comprise a highly functioning, healthy, diverse, and naturally and economically sustainable ecosystem that, without exaggeration, can be characterized as unsurpassed anywhere in the world. It is truly, in the words of Interior Secretary Salazar, "a national treasure" that deserves and requires our protection.[49]

II. HISTORY OF THE PEBBLE MINE PROJECT

In July 2006, Northern Dynasty Minerals ("NDM") first applied for water rights permits in preparation for site exploration and construction of the Pebble Mine.[50] In September 2006, NDM submitted corrections to its surface water applications which were requested by the Alaska Department of Natural Resources (DNR).[51] Then, on September 5, 2006, NDM submitted its "Initial Application Package for Constructing a Dam," that, under state law, initiates the

[48] Hauser, Potential Impacts, at 2.

[49] U.S. Department of the Interior, Secretary Salazar Announces Comprehensive Strategy for Offshore Oil and Gas Development and Exploration, Press Release (Mar. 31, 2010).

[50] Northern Dynasty filed Application for Water Rights South Fork Koktuli River (LAS 25874) on July 7, 2006, Application for Water Rights North Fork Koktuli River (LAS 25871) on July 7, 2006, and Application for Water Rights Upper Talarik Creek (LAS 25876) on July 7, 2006. Alaska Dep't of Natural Resources, Div. of Mining Land and Water, Pebble Project, accessed at http://dnr.alaska.gov/mlw/mining/largemine/pebble/waterapp.htm. The State of Alaska's Department of Natural Resources (DNR) responded to Northern Dynasty's submission by stating that the submission was incomplete. The Alaska DNR requested, among other things, that Northern Dynasty submit more information for their proposals to use ground water, submit separate proposals for the use of surface water, and correct the name of the second proposal from North Fork Koktuli River to Unnamed Tributary of the North Fork Koktuli River. On June 26, 2006, the Alaska DNR issued three documents in response to Northern Dynasty's three submitted documents: ADNR Analysis of Application Completeness of July 7, 2006 Application for Surface Water Right- South Fork Koktuli River, ADNR Analysis of Application Completeness of July 7, 2006 Application for Surface Water Right- North Fork Koktuli River and ADNR Analysis of Application Completeness of July 7, 2006 Application for Surface Water Right. Id.

[51] NDM submitted Response to July 26, 2006 DNR Analysis of Application Completeness of July 7, 2006 Application for Surface Water Right- Unnamed Tributary (NK1.190) North Fork Koktuli River, Response to July 26, 2006 ADNR Analysis of Application Completeness of July 7, 2006 Application for Surface Water Right for the South Fork Koktuli River and Response to July 26, 2006 ADNR Analysis of Application Completeness of July 7, 2006 Application for Surface Water Right Upper Talarik Creek- September 21, 2006. Alaska Dep't of Natural Resources, supra.

application process for a certificate of approval for new dam construction in Alaska.[52] NDM requested permission to build two tailings[53] impoundments, A and G, which would contain the billions of tons of tailings to be generated by the project. Next, NDM submitted a separate application for ground water rights for the same area covered by the surface water applications.[54] In October 2006, DNR sent a letter to NDM announcing that its consistency review packet was complete and that the consistency review would begin the following day.[55]

On the same day, NDM responded to DNR by first acknowledging the notification that its consistency review package was complete, but nevertheless requesting that DNR suspend the consistency review until further notice. NDM's stated reason for seeking a hiatus in the application process was the need to gather more environmental data in support of its claim that environmental impacts from the proposed large-scale mining operations would be minimal.[56]

In August 2007, a wholly-owned subsidiary of Anglo-American PLC, a United Kingdom-based mining company, entered into a 50% partnership with a wholly-owned subsidiary of NDM to form the Pebble Limited Partnership ("PLP").[57] In order to retain its 50%

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[52] Dam Safety and Construction Unit, Water Resources Section, Division of Mining, Land and Water, Alaska Department of Natural Resources Guideline for Cooperation with the Alaska Dam Safety Program 31-33 (Alaska Department of Natural Resources, 2005), accessed at http://dnr.alaska.gov/mlw/water/dams/AK_Dam_Safety_Guidelines062005.pdf.

[53] As described in more detail, infra, "tailings" are the solid-water-chemical waste that results from the removal of ore from a deposit.

[54] These documents were Application for Groundwater Right South Fork Koktuli River (LAS 25873), Application for Groundwater Right Unnamed Tributary of the North Fork Koktuli River (NK1.190) (LAS 25872) and Application for Groundwater Right Upper Talarik Creek (LAS 25875). . Alaska Dep't of Natural Resources.

[55] Letter from Jim Renkert, Project Review Coordinator, to Michael Smith, Pebble Project Northern Dynasty Mines (Oct. 13, 2006), accessed at http://dnr.alaska.gov/mlw/mining/largemine/pebble/waterapp.htm. On October 13, 2006, DNR sent a letter accepting the groundwater rights application for filing with a priority date of September 21, 2006. DNR requests that Northern Dynasty "submit well logs and associated data for 150 plus groundwater level monitoring wells in the Pebble Project mine site area." The Department initiated the case file with the file number LAS 25873. Letter from Michael T. Smith, NEPA and Permitting Manager, to Thomas Crawford, Large Mine Coordinator Department of Natural Resources (Oct. 12, 2006), accessed at http://dnr.alaska.gov/mlw/mining/largemine/pebble/waterapp.htm.

[56] Id.

[57] Press Release, Anglo American PLC, Anglo American establishes 50:50 partnership in Pebble project with Northern Dynasty (Aug. 1 2007), accessed at http://www.angloamerican.com/aal/media/releases/2007pr/2007-08-01/.

interest in the PLP, Anglo-American is required to continue its staged investment of $1.425 billion to advance Pebble Mine toward permitting and operations. Both NDM and Anglo-American have equal rights of management, operatorship, and control in the PLP.[58]

In February 2011, NDM released a "Preliminary Assessment of the Pebble Project, Southwest Alaska" ("Wardrop report") that updated and substantially revised the project's economic analysis and environmental footprint.[59] The Wardrop report described a "large industrial facility" – an open pit mine, underground mining, tailings facilities, and associated infrastructure – located "within a vast region of Alaska notable for its undeveloped wilderness, isolated and sparsely populated communities, Alaska Native culture and traditional ways of life, significant salmon fisheries, and other fish and wildlife populations."[60] It contemplated three development cases – 25, 45 and 78-year plans – and selected the 45-year case as the "base case" for the Preliminary Assessment. Notably, although the Wardrop report only described development scenarios for the first 25 years,[61] it simultaneously concluded that "even the 78-year Resource Case would exploit only 55% of the total resource."[62]

In February 2012, PLP released an "Environmental Baseline Document" ("EBD") intended to characterize the environmental studies conducted by PLP or its predecessors at Pebble from 2004 to 2008.[63] Fully financed by PLP, the EBD purports to describe the existing physical and chemical (climate, water quality, trace elements), biological (wetlands, fish and aquatic invertebrates, wildlife, habitat), and social environments (land and water use, socio-

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[58] Id.
[59] Wardrop, Preliminary Assessment of the Pebble Project, Southwest Alaska (Feb. 17, 2011), report to Northern Dynasty Minerals Ltd., available at http://www.northerndynastyminerals.com/i/pdf/ndm/Pebble_Project_Preliminary%20Assessment%20Technical%20Report_February%2017%202011.pdf.
[60] Id. at 8.
[61] Id. at 6 ("Phases of development beyond 25 years will require separate permitting and development decisions to be made in the future…").
[62] Id. at 83.
[63] PLP, Environmental Baseline Document, available at http://www.pebbleresearch.com/.

economics, subsistence) within the Bristol Bay and Cook Inlet regions where development of the Pebble Mine is proposed.

III. DESCRIPTION OF THE PROPOSED PEBBLE MINE

PLP plans to build an enormous gold, copper, and molybdenum mine at the headwaters of Bristol Bay. Located between Katmai National Park to the south and Lake Clark National Park to the north,[64] the proposed Pebble Mine would be sited 25 miles north of Lake Iliamna – the largest freshwater lake in Alaska, a crucial incubator of Bristol Bay's wild salmon fishery, and a haven for a rare colony of freshwater seals as well as numerous other species.[65] The proposed Pebble Mile would be located in the Nushagak and Kvichak river drainages, a rich salmon spawning ground.[66] The mine footprint would cover at least 54 square miles (on 90 square miles of state land) and would include both an underground block caving mine at the Pebble East Deposit and an above-ground open pit mine at the Pebble West Deposit.[67] The total size of the mine has yet to be publicly disclosed and exploration is still ongoing,[68] with more of the potential mine deposit still being explored.[69] PLP has submitted no permit applications since NDM's 2006 water rights application, and a final mine plan has not been released.

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[64] The Nature Conservancy, An Assessment of Ecological Risk to Wild Salmon Systems from Large-scale Mining in the Nushagak and Kvichak Watersheds of the Bristol Bay Basin 2 (Ecology and Environment Inc., 2010); Alaska Geographic, Lake Clark National Park and Preserve, accessed at http://www.alaskageographic.org/static/212/lake-clark-national-park-and-preserve; Alaska Geographic, Katmai National Park and Preserve, accessed at http://www.alaskageographic.org/static/201/katmai-national-park.

[65] David Withrow an Kymberly Yano, National Oceanic and Atmospheric Association: National Marine Fisheries Service, Recent Counts of Freshwater Seals in Alaska's Lake Iliamna (2008). The Nature Conservancy, An Assessment, 2-3.

[66] The Nature Conservancy, An Assessment, 9.

[67] Id. at 3; Northern Dynasty Mines Inc., Pebble Project Application for Water Right, North Fork Koktuli River (July 7, 2006), available at http://dnr.alaska.gov/mlw/mining/largemine/pebble/2006/swnfkorig.pdf at Exhibit A, pp. 1-33; Knight Piesbold Consulting, Northern Dynasty Mines, Inc., Tailings Impoundment A Initial Application Report (Sept. 5, 2006) Figures, available at http://dnr.alaska.gov/mlw/mining/largemine/pebble/2006/damafig.pdf at Figure 3.1. See also Wardrop, Preliminary Assessment of the Pebble Project, 36-43.

[68] The Nature Conservancy, An Assessment, 2; Hodgson, Northern Dynasty's, 30.

[69] Pebble Partnership, Updated Mineral Resource Estimate for Pebble Prospect at 1 (Feb. 1, 2010), http://www.pebblepartnership.com/sites/default/files/pub/PEB-0028%20press%20release%20feb%202010%20Resource%20update.pdf.

A. The Underground and Open Pit Mines

An underground mine 5,000 feet deep is proposed at the Pebble East Deposit, to be accessed by block caving – a method that poses severe environmental risks to the surrounding landscape, water quality, and wildlife. With this approach, a main haulage shaft is dug beneath the deposit, the ore body above the haulage shaft is weakened with explosives, and then gravity forces the rubble into the haulage shaft from which it is removed.[70] This process can cause large amounts of subsidence, with a range of associated environmental impacts, including, for example, collapse of surface materials, degraded water quality, lowered water table, and chronically unstable ground.[71]

An open pit mine is proposed to access the ore lying closer to the surface at the Pebble West Deposit.[72] As described in 2006, the open pit would be at least 2 miles wide and 1,700 feet deep.[73] More recently, the 2011 Wardrop report described a 25-year mine plan that included an open pit over two miles wide and 2,500 feet deep[74] – which, if constructed, would make it one of the largest mines in the world and the largest open pit mine in North America.[75] The open pit mine is expected to generate significant amounts of dust from its operations due to the blasting,

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[70] Steve Blodgett, Technical Report on Underground Hard-Rock Mining: Subsidence and Hydrologic Environmental Impacts 5 (Center for Science in Public Participation, 2002); David Chambers, Block Caving at the Proposed Pebble Mine (Center for Science in Public Participation, 2008); Northern Dynasty Minerals Ltd., Maps and Models, "Block Caving," accessed at http://www.northerndynastyminerals.com/ndm/PD_MM.asp.

[71] Steve Blodgett, Subsidence Impacts at the Molycorp Molybdenum Mine Questa, New Mexico 2, 8, 12 (Center For Science in Public Participation, 2002); Blodgett wrote that at San Manuel, "[i]n 1965 the subsidence pit over the South ore body was more than 500 feet deep, 3000 feet long, and 2000 feet wide." Id. at 8. Blodgett reported that at the Questa mine, "[b]y 2002, the maximum depth of surface subsidence in Goat Hill Gulch was ~200 feet." Id. at 2. Blodgett also discussed massive surface subsidence in Blodgett, Technical Report, at 5. In this work Blodgett reported that at the Inspiration Copper Mine, "the subsidence had lowered the ground surface from 50-300 feet." Id. at 12. For an example of a rubble-ized subsidence, see Blodgett, Subsidence Impacts at the Molycorp Molybdenum Mine Questa, 4.

[72] Northern Dynasty, Maps and Models, Distribution of high/low grade mineralization and drilling at the Pebble deposit accessed at http://www.northerndynastyminerals.com/ndm/PD_MM.asp.

[73] The Nature Conservancy, An Assessment, 2.

[74] Wardrop, Preliminary Assessment of the Pebble Project, 37-38.

[75] William Hauser, Potential Impacts of the Proposed Pebble Mine on Fish Habitat and Fishery Resources of Bristol Bay 2 (2007).

hauling and drilling, and material handling,[76] as well as unspecified quantities of acid mine drainage from billions of tons of waste rock.[77]

B. The Tailings and the Tailings Dams

The proposed Pebble Mine is projected to generate at least 10 billion tons of waste rock that will be stored at the mine site.[78] This waste rock, or tailings, will contain sulfides, including pyrite,[79] which will comprise 3% of the total tailings.[80] Overall, sulfides will constitute 5% to 10% of the mine's tailings.[81] When sulfuric minerals are exposed to air and water, they oxidize and create acid mine drainage, which can, as discussed below, significantly decrease the pH levels of the watershed and make the affected streams uninhabitable for salmon and other aquatic organisms.[82]

To hold the waste, NDM proposed in 2006 to construct two tailings storage facilities located on an unnamed tributary of the North Fork Koktuli River and the upper reaches of the South Fork Koktuli basin. The dam on the South Fork of the Koktuli River – denominated tailings impoundment A – would hold roughly 2 billion tons of tailings solids.[83] Three embankments – raised in stages to their maximum height as the mining progresses – would ultimately reach heights of 700, 710, and 740 feet. Tailings impoundment G – on an unnamed tributary of the North Fork of the Koktuli River – would include two dams, at 450 and 175 feet

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[76] The Nature Conservancy, An Assessment, 49.
[77] The Nature Conservancy, An Assessment, 54; David M. Chambers, Pebble Engineering Geology Discussion of Issues, Center for Public Participation 3 (2007).
[78] Pebble Partnership, Updated Mineral Resource Estimate for Pebble Prospect at 1 (Feb. 1, 2010), http://www.pebblepartnership.com/sites/default/files/pub/PEB-0028%20press%20release%20feb%202010%20Resource%20update.pdf. See also Northern Dynasty Mines Inc., Tailings Impoundment G Initial Application Report, 2; Northern Dynasty Mines Inc., Tailings Impoundment A Initial Application Report, 2.
[79] Pyrite is the most common sulfide; when exposed to the atmosphere during mining and excavation, pyrite reacts with oxygen and water, causing acid mine drainage.
[80] Northern Dynasty Mines, Inc. Pebble Project, Application for Water Rights, South Fork Koktuli River, 3 (2006), accessed at http://dnr.alaska.gov/mlw/mining/largemine/pebble/waterapp.htm.
[81] Hodgson, Northern Dynasty Mines' Pebble Project, 33.
[82] The Nature Conservancy, Ecological Risk Assessment, 54.
[83] Northern Dynasty Mines Inc., Tailings Impoundment A Initial Application Report, 5.

high, and hold approximately 500 million tons of tailings solids.[84] The total lengths of these dams – as projected in 2006 – would be 9 miles, and the tailings compounds would cover 7,600 acres, or 12 square miles.[85] The largest of the embankments for tailings impoundment A – at 740 feet high and 4.3 miles long – would possibly be the largest dam in the world.[86] The dams would be built in stages. After a dam is filled at each stage, the height would be raised to the next level.[87] With capacity to hold only 2 billion – of the projected 10 billion – tons of mine waste, the tailings storage facilities would nevertheless completely submerge Frying Pan Lake, although NDM has conceded that additional tailings sites and dams would be needed as the size of the deposit expands.[88]

In 2011, NDM disclosed a new design for the tailings facilities.[89] Based on a 25-year mine plan, the 2011 Wardrop report described an enlarged tailings storage facility at Site G ("TSF G"). Created by three embankments – at 685, 400 and 100 feet – TSF G would hold approximately 2 billion tons of tailings.[90] As noted above, this would not supply enough tailings storage for either the 45-year "base case" upon which NDM based its financial analysis or the total anticipated waste in excess of 10 billion tons.

C. Other Structures

In addition to the pit, block caving, and tailings storage facilities, the proposed Pebble Mine would require a range of other structures that will disrupt the natural environment of

[84] Northern Dynasty Mines Inc., Tailings Impoundment G Initial Application Report, 5.
[85] The Nature Conservancy, Ecological Risk Assessment, 3; William J. Hauser, Potential Impacts of the Proposed Pebble Mine on Fish Habitat and Fishery Resources of Bristol Bay 6 (2007), available at http://www.renewableresourcescoalition.org/sites/www.renewableresourcescoalition.org/files/HauserSep07.pdf.
[86] Margaret Bauman, Size of Tailings Dam Sparks New Concerns Over Pebble, Alaska Journal of Commerce, October 15 2006, accessed at http://www.alaskajournal.com/stories/101506/hom_20061015043.shtml. China's Three Gorges Dam, often described as the largest dam, is 610 feet high and 1.3 miles wide. PBS.org, Great Wall Across the Yangtze, accessed at http://www.pbs.org/itvs/greatwall/dam.html.
[87] Northern Dynasty Mines Inc., Tailings Impoundment A Initial Application Report, 18. Northern Dynasty Mines Inc., Tailings Impoundment G Initial Application Report, 14.
[88] Hodgson, Northern Dynasty's Mines, 31.
[89] Wardrop, Preliminary Assessment of the Pebble Project, 51-54.
[90] Id. at 52.

Bristol Bay. First, PLP proposes to build a permanent deepwater port at Iniskin Bay on Cook Inlet to serve as a product load-out facility and to facilitate in-bound fuel, equipment, and supply shipments.[91] According to the 2011 Wardrop report, the port facility would be designed to accommodate shipping of at least 1.1 million tons of concentrate per year in 28 vessels, as well as 50 million gallons of fuel and 31 container barges per year.[92] Energy requirements for the proposed Pebble Mine would be met with a 378-megawatt natural gas-fired turbine at the mine site, as well as an 8-megawatt natural gas-fired generation plant at the port site.[93] PLP plans to transport liquefied natural gas from the Kenai Peninsula – across Cook Inlet to the port site via a 60-mile sea-bottom pipeline and then to the mine site via a 104-mile pipeline buried along a road corridor. A 104-mile road corridor (consisting of 86 miles of new road and 18 miles of existing road) would be constructed to connect the mine site to the port.[94] Four pipelines would be constructed between the mine site and the port to transport slurry, diesel fuel, and natural gas.[95] The road and pipelines alone are estimated to disturb approximately 12.5 square miles.[96]

STATUTORY AND REGULATORY BACKGROUND

I. CLEAN WATER ACT BACKGROUND

Section 404(c) of the Clean Water Act gives EPA the explicit authority to prohibit, deny, or restrict permitting by the U.S. Army Corps of Engineers' ("Army Corps") of dredge and fill projects when EPA finds that the discharge "will have an unacceptable adverse effect on

[91] Id., at 58.
[92] Id.
[93] Id. at 12, 58.
[94] Id. at 59.
[95] Id.
[96] Hauser, Potential Impacts, 12.

municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas."[97]

The purpose and meaning of this authority must be understood and applied in light of the goals of the Clean Water Act as a whole.[98] The purpose of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[99] To that end, Congress made it "the national goal that the discharge of pollutants into the navigable waters be eliminated . . . ."[100] Significantly, the statute also provides that "it is the national goal that wherever attainable, an interim goal of water which provides for the protection and propagation of *fish, shell fish, and wildlife and provides for recreation in and on the water* be achieved . . . ."[101]

With these words, Congress established a national goal of protecting fish, shellfish, wildlife and water-based recreation – the very resources that section 404(c) was enacted to protect. Other Clean Water Act provisions, too, focus on that language, indicating that Congress considered protection of those enumerated resources to be especially important.[102] Thus, the Clean Water Act sets two clear goals: eliminating water pollution and preserving the ecological functions of our nation's waterways, with a particular emphasis on protecting fish, shellfish, and wildlife.

II. SECTION 404(C)

Pursuant to section 404(c), EPA has explicit authority to prohibit, deny, or restrict the use of an area as a disposal site for dredged or fill material in order to avoid unacceptable

[97] 33 U.S.C. § 1344.
[98] Samantar v. Yousuf, 130 S.Ct. 2278, 2289 (2010) (quoting United States v. Morton, 467 U.S. 822, 828 (1984)).
[99] 33 U.S.C § 1251(a).
[100] Id. § 1251(a)(1).
[101] Id. § 1251(a)(2) (emphasis added).
[102] See, e.g., id. §§ 1326(a), 1330(a) & 1343(c).

environmental degradation.[103] Both the timing and its mandate to consider specific impacts on the environment are evident in the provision's text:

> *The Administrator is authorized* to prohibit the specification (including the withdrawal of specification) of any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area for specification (including the withdrawal of specification) as a disposal site, *whenever he determines*, after notice and opportunity for public hearings, *that the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas*. Before making such determination, the Administrator shall consult with the Secretary. The Administrator shall set forth in writing and make public his findings and his reasons for making any determination under this subsection.[104]

Supported by this language and the case law applying it, EPA has correctly interpreted this provision to mean that (1) the agency is authorized to act proactively even before the commencement of the Army Corps's section 404 permitting process; and (2) its discretion is limited to consideration of a number of specifically-enumerated environmental factors.[105]

A. EPA May Invoke Its 404(c) Authority Before the Commencement of the Permit Process.

The interpretation of any statute begins with its plain meaning.[106] By their terms, the first two clauses of section 404(c) provide that "the Administrator is authorized to prohibit the specification (including the withdrawal of specification) of any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area for specification (including the

[103] See generally Clean Water Act Section 404(c) "Veto Authority," available at http://www.epa.gov/owow/wetlands/pdf/404c.pdf.

[104] 33 U.S.C. § 1344(c) (emphasis added).

[105] A reviewing court will defer to an agency's reasonable interpretation of a statute it is charged with administering unless the statutory provision in question is unambiguous. Chevron v. Natural Resources Defense Council, 467 U.S. 837, 842-43 (1984). See also Mingo Logan Coal Company v. EPA, CA No. 10-0541 (ABJ) (D.D.C. March 23, 2012), at 22 ("The record expressly states that EPA's 404(c) authority will be exercised prior to the issuance of a permit, and it also reflects the Conferees' understanding that EPA's responsibilities were to be limited to those specifically assigned.").

[106] Milner v. Dep't of Navy, 131 S.Ct 1259, 1264 (2011), citing Park 'N Fly, Inc. v. Dollar Park & Fly, Inc., 469 U.S. 189, 194 (1985) ("Statutory construction must begin with the language employed by Congress and the assumption that the ordinary meaning of that language accurately expresses the legislative purpose.")

withdrawal of specification) as a disposal site, *whenever* he determines" the environmental impacts would be unacceptable.[107] This plainly worded passage provides that EPA is free to act proactively, before an area has been specified as a disposal site -- "whenever" the Administrator makes the required determinations.[108] The statute's application isn't limited to occasions where a permit application for a specified disposal site has already been filed, since the administrative action may take the form of a prohibition. In contrast to a "withdrawal" or "denial" of a permit or permit application, a prohibition by definition works to preempt the action it forbids, which, in this case, is the issuance of a permit.

This reading of the statute is consistent both with EPA's application of it and, on judicial review, with the courts' interpretation. A review of EPA's rulemaking and prior section 404(c) practice reveals a longstanding recognition that it may exercise its authority at any point before a permit is issued. Beginning with the promulgation of the rules governing section 404(c) implementation, the agency made this clear:

> The Administrator may exercise a veto over the specification by the U.S. Army Corps of Engineers or by a state of a site for the discharge of dredged or fill material. The Administrator may also prohibit the specification of a site under section 404(c) with regard to any existing or potential disposal site *before a permit application has been submitted to or approved by the Corps or a state*.[109]

In response to public comments critical of that rule, the agency first pointed to the plain language of section 404(c), advancing similar textual arguments.[110] EPA then directly addressed the rationale for its pre-permit authority, explaining that such authority

[107] 33. U.S.C. § 1344(c) (emphasis added).
[108] Id.
[109] 40 C.F.R. § 231.1(a) (emphasis added).
[110] Denial or Restriction of Disposal Sites; Section 404(c) Procedures, 44 Fed. Reg. 58076, 58077 (Oct. 9, 1979) ("EPA feels that the statute clearly allows it to use 404(c) before an application is filed.").

> will facilitate planning by developers and industry. It will eliminate frustrating situations in which someone spends time and money developing a project for an inappropriate site and learns at an advanced stage that he must start over. In addition, advance prohibition will facilitate comprehensive rather than piecemeal protections of wetlands.[111]

In response to comments concerned that the 404(c) regulations might have a significant adverse economic impact, EPA countered that "the use of 404(c) may well have some economic benefits that outweigh some of the costs, through the use of pre-application 'vetoes' before industry has made financial and other commitments which lock it into a particular project design and location."[112] Other comments argued "that pre-permit actions were inappropriate because it would be impractical to identify unacceptable adverse effects before a specific discharge is proposed."[113] The agency explained that "at least in theory, there are instances where a site may be so sensitive and valuable that it is possible to say that any filling of more than X acres will have unacceptable adverse effects."[114]

Over the course of EPA's application of section 404(c), the agency has consistently interpreted this statutory provision to permit proactive use. In exercising its veto authority in 1984, for example, the Administrator explained that

> [w]here the facts warrant it, I may prohibit all future discharges of all dredged or fill material at a site, whether or not the site has previously been specified in a 404 permit. If there is already a permit, my actions would be a 'withdrawal of specification'; if no permit has been issued, my action would be a 'prohibition of specification.'[115]

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[111] Id.
[112] Id.
[113] Id.
[114] Id.
[115] M.A. Norden Veto, Final Determination of the Administrator Concerning the M.A. Norden Site Pursuant to Section 404(c) of the Clean Water Act (June 15, 1984) at 16, available at http://water.epa.gov/lawsregs/guidance/wetlands/upload/NordenCoFD.pdf; see also 49 Fed. Reg. 29,142 (July 18, 1984).

More recently, in EPA's Notice of Proposed Determination involving the Spruce No. 1 Surface Mine in West Virginia, the agency stated that "EPA strongly prefers to initiate the § 404(c) process prior to issuance of a permit . . . ."[116]

This preference is well grounded. Notably, in the case of the Spruce No. 1 proceeding – the most recent application and judicial review of section 404(c) – EPA's decision to wait until *after* a section 404 permit had been issued was successfully challenged by the mining company whose permit was vetoed.[117] In Mingo Logan Coal Company v. U.S. Environmental Protection Agency, after reviewing the language of section 404(c), its legislative history, and the agency's rule-making record, the district court held that the statute does not give EPA the power to invalidate an approved section 404 permit and therefore that a veto under that section *must* be issued before the Army Corps acts:

> The Court concludes that EPA exceeded its authority under section 404(c) of the Clean Water Act when it attempted to invalidate an existing permit by withdrawing the specification of certain areas as disposal sites after a permit had been issued by the Corps under section 404(a). Based upon a consideration of the provision in question, the language and structure of the entire statutory scheme, and the legislative history, *the Court concludes that the statute does not give EPA the power to render a permit invalid once it has been issued by the Corps.* EPA's view of its authority is inconsistent with

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[116] Spruce No. 1 Mine Veto, Final Determination of the U.S. Environmental Protection Agency Pursuant to § 404(c) of the Clean Water Act Concerning the Spruce No 1 Mine, Logan County, West Virginia at 45, available at http://water.epa.gov/lawsregs/guidance/cwa/dredgdis/upload/Spruce_No-1_Mine_Final_Determination_011311_signed.pdf; 76 Fed. Reg. 3126 (Jan. 19, 2011), rev'd on other grounds, Mingo Logan Coal Company v. EPA, CA No. 10-0541 (ABJ) (D.D.C. March 23, 2012) (reversing EPA veto because issued after final Army Corps section 404 permit had been granted). See also, Big River Veto, Final Determination of the U.S. Environmental Protection Agency's Assistant Administrator for Water Pursuant to Section 404(c) of the Clean Water Act Concerning the Proposed Big River Water Supply Impoundment Kent County, Rhode Island (Mar. 1, 1990) at 4, available at http://water.epa.gov/lawsregs/guidance/wetlands/upload/BigRiverFD.pdf ("[T]he Section 404(c) regulations explicitly recognize EPA's authority to take actions pursuant to Section 404(c) in advance of and/or in the absence of a permit application (40 CFR §231.1(a))."; Everglades (Rem, Becker & Senior Corp.) Veto, Final Determination of the U.S. Environmental Protection Agency's Assistant Administrator for Water, Concerning Three Wetland Properties (sites owned by Henry Rem Estate, Marion Becker, et. al. and Senior Corporation) for which Rockplowing is Proposed in East Everglades, Dade County, Florida (June 15, 1988) at 4, available at http://water.epa.gov/lawsregs/guidance/wetlands/upload/RemFD.pdf ("Section 231.1 . . . states that EPA's Section 404(c) authority may be used to either veto a permit … (as in the case of the Rem site) or to preclude permitting either before the Corps has made its final decision . . . or in the absence of a permit application (as in the case of the Becker site).").

[117] Mingo Logan Coal Company v. EPA, CA No. 10-0541 (ABJ) (D.D.C. March 23, 2012).

> clear provisions in the statute, which deem compliance with a permit to be compliance with the Act, and with the legislative history of section 404.[118]

According to the court, it was "unreasonable to sow a lack of certainty into a system that was expressly intended to provide finality."[119]

For reasons both of statutory interpretation and economic certainty, therefore, it is not only appropriate but necessary for EPA to act proactively in exercising its authority under section 404(c). Where the environmental criteria identified in section 404(c) are met, the agency has the authority to protect the area and natural resources at risk. Delaying action in deference to the Army Corps would run contrary to the statute, to EPA's own administrative preference, and to the interest of all stakeholders in efficiency, certainty and avoiding a waste of resources.

B. "Unacceptable Adverse Effects"

EPA may act pursuant to section 404(c) if a future discharge is reasonably likely to cause "an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas."[120] As one court succinctly put it, "[EPA's] authority to veto to protect the environment is practically unadorned."[121] The agency's use of that authority is informed, however, by regulations governing the Army Corps' permitting of discharges of dredge and fill material.[122]

1. EPA Need Only Find a Reasonable Likelihood of "Unacceptable Adverse Effects"

EPA is not required to find with complete certainty that a potential discharge would cause adverse environmental effects. Rather, the agency need only find a *reasonable likelihood* that

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[118] Id. at 2 (emphasis added).
[119] Id. at 31. This result is not directly applicable to the petitions pending here since no section 404 permit has even been applied for – much less issued – for the Pebble Mine. NRDC believes, however, that EPA's reading of section 404(c) in the Spruce No. 1 Mine proceeding and subsequent court challenge is consistent with the statute and the Clean Water Act as a whole.
[120] 33 U.S.C. § 1344(c).
[121] James City County v. EPA, 12 F.3d 1330, 1336 (4th Cir. 1993).
[122] 40 C.F.R. § 231.2(e).

unacceptable adverse environmental effects will occur. By regulation, EPA has defined "unacceptable adverse effect" as an "impact on an aquatic or wetland ecosystem which is *likely to result* in significant degradation of municipal water supplies (including surface or ground water) or significant loss of or damage to fisheries, shellfishing, or wildlife habitat or recreation areas."[123] As the agency explained in defense of that regulation, "absolute certainty is *not* required. Because 404(c) determinations are by their nature based on predictions of future impacts, what is required is a *reasonable likelihood* that unacceptable adverse effects will occur — not absolute certainty but more than mere guesswork."[124]

2. Section 404(b)(1) Guidelines Direct EPA's Determination of "Unacceptable Adverse Effects"

EPA's rules governing section 404(c) provide that "[i]n evaluating the unacceptability of such impacts, consideration should be given to the relevant portions of the section 404(b)(1) guidelines (40 CFR part 230)."[125] EPA and the Army Corps have jointly promulgated the section 404(b)(1) guidelines at 40 C.F.R. § 230 in order to provide scientifically based and consistent standards for the Corps' permitting of dredge and fill projects. Those guidelines, which the Army Corps uses in the normal course of permitting such projects, also figure large in the 404(c) context. A determination that a particular discharge would not satisfy the section 404(b)(1) guidelines is indicative of section 404(c) applicability. Although the Army Corps is responsible for implementing those guidelines during the permitting process, as EPA explained when it published its 404(c) regulations, "[w]hile Congress had faith in the Corps' administrative experience, it recognized EPA as the 'environmental conscience' of the Clean Water Act."[126]

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[123] 40 C.F.R. fl 231.2(e) (emphasis added).
[124] Denial or Restriction of Disposal Sites; Section 404(c) Procedures, 44 Fed. Reg. 58076, 58078 (Oct. 9, 1979) (emphasis added).
[125] 40 C.F.R § 231.2(e).
[126] Denial or Restriction of Disposal Sites; Section 404(c) Procedures, 44 Fed. Reg. at 58081.

Part of the logic behind section 404(c) is that EPA has oversight responsibility to ensure sound environmental judgment in the Army Corps' administration of the section 404 permit program.

The regulations promulgated pursuant to section 404(b)(1) are expansive, relating to the environment, human health, practicable alternatives, water quality, indigenous communities, and economics. In considering whether to issue a permit, the Army Corps is permitted to consider the wide array of factors found in those guidelines, both environmental and non-environmental.[127] By contrast, in deciding whether to exercise its authority under section 404(c), EPA may consider only the portions of those rules relevant to evaluating adverse effects on the section 404(c) resources.

Nonetheless, EPA has found the following 404(b)(1) guidelines relevant to its 404(c) analysis:

- Significant degradation of waters of the United States (40 C.F.R. § 230.10(c))[128]
- Secondary effects (40 C.F.R. § 230.11(h))[129]
- Cumulative effects (40 C.F.R. § 230.11(g))[130]

Those guidelines have directed EPA's decision-making under section 404(c), informing the agency as to the types of factual determinations that it must make before reaching a decision.

[127] James City County v. EPA, 12 F.3d 1330, 1335 (4th Cir. 1993) ("Congress obviously intended the Corps of Engineers in the initial permitting process to consider the total range of factors bearing on the necessity or desirability of building a dam in the Nation's waters, including whether the project was in the public interest.").
[128] Spruce No. 1 Mine Veto, Final Determination.
[129] See, e.g., id. at 83 ("The adverse secondary effects discussed . . . include substantial changes in aquatic communities, such as loss of fish and salamander diversity and sensitive mayfly and stonefly taxa, as well as shifts to more pollution-tolerant taxa.").
[130] See, e.g., Everglades (Rem, Becker & Senior Corp.) Veto, 53 Fed. Reg. 30,093-094 (Aug. 10, 1988) (veto based in part on cumulative impacts as described at 52 Fed. Reg. 38,519 (Oct. 16, 1987)); See also Jack Maybank Veto, 50 Fed. Reg. 20,291 (May 15, 1985) (veto based in part on cumulative impacts to the area, including functional losses in the St. Helena Sound ecosystem, as described at 49 Fed. Reg. 30,112, 30,114 (July 26, 1984)); Sweeden Swamp Veto, 51 Fed. Reg. 22,977, 22,978 (June 24, 1986).

3. Significant Degradation

The section 404(b)(1) guidelines provide that no discharge of dredged or fill material shall be permitted if the discharge will cause or contribute to significant degradation of waters of the United States.[131] The guidelines state that impacts leading to "significant degradation" include:

> (1) Significantly adverse effects of the discharge of pollutants on human health or welfare, including but not limited to effects on municipal water supplies, plankton, fish, shellfish, 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, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes; and (3) Significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability. Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy.[132]

Section 230.11 provides that in evaluating those three categories of harm, EPA should engage a range of more specific factual determinations, including how the proposed discharge would impact the "physical substrate" of the water body,[133] "[w]ater circulation, fluctuation, and salinity,"[134] turbidity,[135] contaminant levels,[136] and the "aquatic ecosystem and organisms."[137] An

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[131] 40 C.F.R. § 230.10(c).
[132] Id.
[133] Id. § 230.11(a) ("Determine the nature and degree of effect that the proposed discharge will have, individually and cumulatively, on the characteristics of the substrate at the proposed disposal site.").
[134] Id. § 230.11(b) ("Determine the nature and degree of effect that the proposed discharge will have individually and cumulatively on water, current patterns, circulation including downstream flows, and normal water fluctuation. Consideration shall be given to water chemistry, salinity, clarity, color, odor, taste, dissolved gas levels, temperature, nutrients, and eutrophication plus other appropriate characteristics.").
[135] Id. § 230.11(c) ("Determine the nature and degree of effect that the proposed discharge will have, individually and cumulatively, in terms of potential changes in the kinds and concentrations of suspended particulate/turbidity in the vicinity of the disposal site.").
[136] Id. § 230.11(d) ("Determine the degree to which the material proposed for discharge will introduce, relocate, or increase contaminants.").
[137] Id. § 230.11(e) ("Determine the nature and degree of effect that the proposed discharge will have, both individually and cumulatively, on the structure and function of the aquatic ecosystem and organisms. Consideration shall be given to the effect at the proposed disposal site of potential changes in substrate characteristics and

element of each of those specific determinations is a consideration of the "[p]ossible loss of environmental values."[138]

4. Secondary Effects

In assessing impacts on section 404(c) resources, EPA should consider not only the direct impacts of the disposal of dredge and fill material into the disposal site, but also the secondary impact on the surrounding landscape. According to the section 404(b)(1) guidelines:

> (1) Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final section 404 action is taken by permitting authorities.
>
> (2) Some examples of secondary effects on an aquatic ecosystem are fluctuating water levels in an impoundment and downstream associated with the operation of a dam, septic tank leaching and surface runoff from residential or commercial developments on fill, and leachate and runoff from a sanitary landfill located in waters of the U.S. Activities to be conducted on fast land created by the discharge of dredged or fill material in waters of the United States may have secondary impacts within those waters which should be considered in evaluating the impact of creating those fast lands.[139]

This secondary effects rule requires that EPA take a broad view of the environment when it evaluates the impacts associated with a potential discharge.

5. Cumulative Effects

The section 404(b)(1) guidelines require that factual findings be made regarding cumulative effects on the surrounding landscape and that those findings be considered in determining whether a particular discharge would result in unacceptable adverse effects on the

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elevation, water or substrate chemistry, nutrients, currents, circulation, fluctuation, and salinity, on the recolonization and existence of indigenous aquatic organisms or communities.")

[138] Id. § 230.11(a)-(e).

[139] Id. § 230.11(h).

environment.[140] The section 404(b)(1) guidelines describe the factual finding that must be made with respect to cumulative effects as follows:

> (1) Cumulative impacts are the changes in an aquatic ecosystem that are attributable to the collective effect of a number of individual discharges of dredged or fill material. Although the impact of a particular discharge may constitute a minor change in itself, the cumulative effect of numerous such piecemeal changes can result in a major impairment of the water resources and interfere with the productivity and water quality of existing aquatic ecosystems.
>
> (2) Cumulative effects attributable to the discharge of dredged or fill material in waters of the United States should be predicted to the extent reasonable and practical. The permitting authority shall collect information and solicit information from other sources about the cumulative impacts on the aquatic ecosystem. This information shall be documented and considered during the decision-making process concerning the evaluation of individual permit applications, the issuance of a General permit, and monitoring and enforcement of existing permits.[141]

In practice, EPA uses the cumulative effects analysis to take into consideration other projects, proposed or authorized, that might contribute to additional adverse environmental effects in the vicinity of where the particular discharge would occur.[142] EPA will also look at past or present projects that may have affected the current baseline conditions of the region.[143] In other words, when the agency evaluates the potential effects of a particular project, it must also consider the consequences of those impacts in combination with other past or future discharges.

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[140] Id. § 230.11(g).
[141] Id. § 230.11(g).
[142] See, e.g., Spruce No. 1 Mine Veto, Final Determination at 73 ("EPA considered cumulative effects to the Coal River subbasin . . . and the Headwaters Spruce Fork sub-watershed . . . if the Spruce No. 1 Mine is constructed . . . and other reasonably foreseeable (proposed and/or authorized but not constructed) surface mining projects within the Coal River sub-basin are constructed."); Jack Maybank Veto, Final Determination of the Assistant Administrator for External Affairs Concerning the Jack Maybank Site on Jehossee Island, South Carolina Pursuant to Section 404(c) of the Clean Water Act (April 5, 1985) at 19, available at http://water.epa.gov/lawsregs/guidance/wetlands/upload/MaybankFD.pdf ("Direct wetland loss and associated impacts on fish, shellfish, and wildlife resulting from the proposed project are magnified when considered in the context of previous wetland alteration in the area of the Maybank Site.").
[143] Id. ("This cumulative effects analysis also takes into consideration the past and present mining projects within the sub-basin and sub-watershed, and the extent to which they have affected the current baseline conditions within the sub-basin and subwatershed.")

HISTORY OF THE TRIBES' PETITIONS

The need for the petitions that initiated this EPA proceeding arose out of the adoption in 2005 by the Alaska DNR of a land use plan for the Bristol Bay area. Although that plan was ostensibly intended to make the state permit review process more efficient,[144] DNR's process for developing the land use plan – and the resulting land use plan itself – were deeply flawed, including, among other things, its designation of the Pebble Mine site as land best suited for mineral development.[145]

The process laid out sixteen possible categories for land use in the Bristol Bay region. Although one of the major uses of land for Bristol Bay residents is supporting their subsistence lifestyle, subsistence use was not included as a category.[146] Furthermore, the category for Fish and Wildlife Habitat and Harvest Areas focused largely on marine resources and did not include moose or caribou among the species that could be considered for the designation, despite the fact that both species are harvested by both native and non-native hunters and are a part of subsistence use.[147] Finally, while DNR did include a category for recreational use, it excluded hunting and fishing from its definition of recreation.[148]

Most directly relevant here is the fact that, although the land on which the Pebble Mine would be located is used predominantly by local residents to support a subsistence lifestyle and by others for recreation based around fishing and hunting, DNR's land use plan ignored those current uses and elected instead to prioritize mineral extraction. Because the Army Corps will consider and likely rely on this fundamentally flawed land use plan in its decision whether to

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[144] Alaska Department of Natural Resources, Bristol Bay Area Plan For State Lands 1-4 (2005) accessed at http://dnr.alaska.gov/mlw/planning/areaplans/bristol/index.htm.
[145] Id., 3-102.
[146] Id., 3-73.
[147] Id., 2-9.
[148] Id., A-11.

grant a permit for the Pebble Mine, petitioner Tribes determined that EPA's intervention under section 404(c) is essential.

In May 2010, six federally-recognized tribes from the Bristol Bay region – including the Nondalton Tribal Council, Koliganik Tribal Council, New Stuyahok Traditional Council, Ekwok Village Council, Curyung (Dillingham) Tribal Council and the Levelock Village Council – sent a letter to EPA requesting that it proactively initiate a section 404(c) action to protect the Bristol Bay watershed before PLP could develop further plans for the Pebble Mine.[149] The letter laid out various reasons why proactive action by EPA is necessary, including (1) that the health of the Kvichak and Nushagak River drainages is essential to the wellbeing of the salmon on which Alaska Natives subsist and would be put at risk by permitting the Pebble Mine; (2) that the PLP has terminated its Technical Working Group, used to consult with federal and state officials about the environmental impact of the mine, and that the termination (and lack of cooperation that it reflects) will create an unacceptable information deficit for state and federal officials as the project review proceeds; and (3) that, as discussed above, the land's flawed classification of the site as mineral land – despite major subsistence and recreation uses – may result in the Army Corps issuing a permit for the Pebble Mine based on a fundamentally erroneous premise.[150]

In August 2010, the Bristol Bay Native Corporation sent a letter requesting EPA to protect Bristol Bay under section 404(c).[151] EPA also received additional requests from Ekuk Village Council, Clarks Point Tribal Council, and Twin Hills Village Council. In addition, EPA

[149] Letter from Six Federal-recognized Tribes in the Kvichak and Nushagak River Drainages of Southwest Alaska: Nondalton Tribal Council, Koliganik Tribal Council, New Stuyahok Traditional Council, Ekwok Village Council, Curyung Tribal Council and the Levelock Village Council to Lisa P. Jackson, Administrator of the US Environmental Protection Agency (May 2, 2010). Ultimately, EPA received petitions from nine federally recognized tribes, BBNC, commercial fishermen, sportsmen, conservationists, and others to initiate action under section 404(c).

[150] Id.

[151] BBNC, BBNC Submits Request to EPA to Protect Bristol Bay Resources, available at http://www.bbnc.net/index.php?option=com_content&view=article&id=144:bbnc-submits-request-to-epa-to-protect-bristol-bay-resources&catid=36:news-a-events&Itemid=44.

received letters supporting the initiation of a 404(c) action from the Alaska Independent Fishermen's Marketing Association, the Bristol Bay Regional Seafood Development Association, the National Council of Churches, and various other sportsmen and conservation groups.[152] In response to the concerns raised in these petitions, EPA announced on February 7, 2011 that it would conduct "a scientific assessment of the Bristol Bay watershed to better understand how future large-scale development projects may affect water quality and Bristol Bay's salmon fishery."[153] EPA's Office of Research and Development ("ORD") is currently conducting a detailed evaluation of potential risks from large-scale mining, which will form the core of the Bristol Bay Watershed Assessment. EPA plans to release the Draft Bristol Bay Watershed Assessment for public review and input in April 2012 and issue the Final Bristol Bay Watershed Assessment in November 2012.[154]

ARGUMENT

I. PEBBLE MINE WOULD HAVE UNACCEPTABLE ADVERSE IMPACTS ON THE BRISTOL BAY ENVIRONMENT

If the proposed Pebble Mine is built, it has a high likelihood of causing unacceptable adverse effects to local fisheries and wildlife, two of the central resources that section 404(c) is designed to protect.[155] The mine and its associated infrastructure would carve out huge swaths of

[152] See, e.g., Letter from Alaska Independent Fisherman Marketing Association to Lisa P. Jackson, Administrator of the EPA (May 13, 2010). Letter from Bob Waldrop, Executive Director of the Bristol Bay Regional Seafood Development Association to Lisa P. Jackson, Administrator of the EPA (June 20, 2010). EPA also received additional letters both supporting and opposing the agency's issuance of action under section 404(c).
[153] Press Release, United States Department of Environmental Protection, EPA plans assessment of Bristol Bay watershed (Feb. 7, 2011), accessed at http://yosemite.epa.gov/opa/admpress.nsf/0/8c1e5dd5d170ad99852578300067d3b3?OpenDocument.
[154] EPA's Bristol Bay Watershed Assessment Update (February 2012), available at http://www.epa.gov/region10/pdf/bristolbay/2012BBHandoutAFE.pdf.
[155] Our focus on these factors is meant not to suggest that the effects of the mine with respect to other 404(c) factors – such as shellfish beds and recreation – are irrelevant, but only to emphasize that the impacts to local fisheries and wildlife will be particularly severe. Furthermore, the available research particularly stresses the impacts to fisheries and wildlife, many of which also adversely affect recreation. While it is known that shellfish are abundant in the

land from the region, alter the water flow in the area, and severely pollute downstream watersheds. The mine would also cause increased traffic to the region and will undoubtedly spur the industrialization of the region as major infrastructure is introduced, thereby enabling not only the Pebble Mine but other large-scale mining in the region and further compounding impacts to fragile fish and wildlife populations.

The proposed Pebble Mine would also impact aquatic ecosystems, causing serious declines in the region's salmon population. Declining salmon populations would be detrimental to the productive Bristol Bay sockeye salmon fishery and would negatively impact the aquatic and terrestrial ecosystems of the region, which depend on salmon for nutrients. Dwindling salmon diversity would further stress the region's ecosystems. If the proposed Pebble Mine is built, it would have extreme impacts on the ecology and character of the region and would unquestionably cause "unacceptable adverse effects" to both salmon and wildlife.

A. Pebble Mine Would Seriously Impact the Region's Fisheries

1. Salmon Will Be Severely Impacted by Metal Leaching and Acid Mine Drainage.

Metal leaching and acid rock drainage are "the most costly and potentially environmentally damaging issue facing the mining industry," and the proposed Pebble Mine is no exception.[156] The rock associated with most metal mines, including the Pebble deposits, contains iron and other metal sulfides, which generate sulfuric acid when exposed to air and water.[157] Sulfuric acid causes acidification of nearby surface waters and dissolves metals in the

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area, and common sense would indicate that decrease in water quality will impact these shellfish, data on these impacts are less well developed.

[156] William A. Price, List of Potential Info. Requirements in Metal Leaching & Acid Rock Drainage Assessment and Mitigation Work 4 (2005), available at http://www.responsiblemining.net/pubs/MEND5.10E_Price_Final.pdf.

[157] Wild Salmon Center and Trout Unlimited, Bristol Bay's Wild Salmon Ecosystems and the Pebble Mine: Key Considerations for a Large-Scale Mine Proposal (January 2012), 27-32, available at http://www.wildsalmoncenter.org/pdf/PM-Report.pdf; See also Geoffrey Y. Parker et al., Pebble Mine: Fish,

surrounding rock, mobilizing them into solution. Some of these metals, such as arsenic, cadmium, copper, and lead, become available to the food chain and can threaten the surrounding ecosystems.[158] Metal leaching and acid rock drainage can originate from various aspects of the mine, including mine waste rock, tailings, and mine structures such as open pits.[159]

The threat of acid rock drainage and metal leaching is not limited to periods of construction and operation of the mine but persists in perpetuity. Acid rock drainage is often triggered when mines are abandoned and water is no longer pumped out of them and precipitation or groundwater is allowed to enter.[160] Acid rock drainage can have long lasting impacts; for instance, it continues to emanate from mines in Europe that were established over 1,500 years ago.[161] When, for whatever reason, the costs or obligations of mitigation or remediation are passed from the mining companies to public agencies (e.g., several recent large-scale mines in the U.S. have declared bankruptcy),[162] taxpayers necessarily must assume the responsibility of ongoing management, including ensuring that polluted water is treated and the integrity of the mine is maintained – forever.[163]

There are many challenges associated with mitigation,[164] and the successes of mitigation are questionable.[165] Despite this, the potential for acid drainage is often overlooked. One 2006

Minerals, and Testing the Limits of Alaska's "Large Mine Permitting Process" 15-16 (2008), available at http://www.law.duke.edu/shell/cite.pl?25+Alaska+L.+Rev.+1+pdf.

[158] Id.

[159] U.S. Envtl Prot. Agency, Acid Mine Drainage Prediction 2 1994, available at http://water.epa.gov/polwaste/nps/upload/amd.pdf.

[160] Ecology and Env't, Inc., 2010, An Assessment of Ecological Risk to Wild Salmon Systems from Large-scale Mining in the Nushagak and Kvichak Watersheds of the Bristol Bay Basin 54 (2010).

[161] S.R. Jennings et al., Acid Mine Drainage and Effects on Fish Health and Ecology: A Review 4 (Reclamation Research Group Publ'n, Bozeman, MT 2008), available at http://reclamationresearch.net/publications/Final_Lit_Review_AMD.pdf.

[162] Id. Examples include the Zortman Landusky Mine in Montana, the Summitville Mine in Colorado, and the Brohm Mine in South Dakota.

[163] Id.

[164] Among other factors, mitigation requires large amounts of data collection and must continue forever. This means mine structures are subject to extreme design, monitoring, maintenance, and repair requirements. See William A.

study, which examined acid rock drainage in 25 hard rock mines in the United States, found that nearly all of the mines that subsequently developed acid drainage underestimated or ignored the potential for acid drainage.[166] Furthermore, when the mine was near surface or ground water and there was a high potential for acid drainage – both true for the Pebble deposits – the surrounding water had an overwhelming likelihood of contamination.[167]

In the case of the Pebble deposits, there is significant potential for acid mine drainage.[168] The likelihood of such drainage is predicted by measuring the ratio of rocks with acid-forming minerals to rocks with neutralizing minerals.[169] Over 95% of the 399 samples taken from the proposed Pebble Mine area have been found to be acid-generating.[170] Furthermore, the Pebble deposits are located in an area with moderate precipitation, a high water table, countless small streams and tributaries, and geological formations that are susceptible to ground water movement, making acid drainage "highly likely."[171]

Both acid drainage and metal leaching present significant threats to ecosystems near mines. Acid drainage may cause receiving waters to have a pH as low as 2.0-4.5.[172] Streams affected by moderate acid are typically poor in taxa richness and abundance, and streams with a pH of 4.5-5.5 can be "severely impacted."[173] There is a complete loss of fish in 90% of streams

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Price, The Mitigation of Acid Rock Drainage: Four Case Studies from British Columbia 1, available at http://www.techtransfer.osmre.gov/nttmainsite/Library/proceed/sudbury2003/sudbury03/125.pdf.

[165] James R. Kuipers and Ann S. Maest, Comparison of Predicted and Actual Water Quality at Hardrock Mines: The reliability of predictions in Environmental Impact Statements ES-15 (2006), available at http://www.earthworksaction.org/pubs/ComparisonsReportFinal.pdf.

[166] Id. at ES-9.

[167] Id. at ES-12

[168] Kendra Zamzow, Acid Rock Drainage and Metal Leaching at the Pebble Mine, Pebble Science, 2, available at http://www.pebblescience.org/pdfs/Pebble_acid_mine_drainage.pdf. (PDF)

[169] Jennings, supra, at 8.

[170] Ecology and Env't, Inc., 2010, supra, at 55.

[171] Id. at 100.

[172] Jennings, supra, at 5.

[173] Ecology and Env't, Inc., 2010, supra, at 105.

in waters with a pH of 4.5 — and these effects become more severe as the pH decreases.[174] Instream pH levels below 5 have been predicted to occur up to 30 miles from the proposed Pebble Mine.[175]

Metal leaching is perhaps an even larger problem than acid rock drainage,[176] and increased metal concentrations in aquatic environments can negatively influence salmon and the resources they depend on. Copper and other heavy metals can contaminate fish due to both direct exposure and to contamination of their food resources.[177] While copper is essential to living organisms, even a minute increase in copper availability or exposure can be highly toxic to salmon at extremely low levels. It can be acutely toxic at just a few parts per billion, and chronic effects can occur if fish are exposed to an increase of copper in the parts per trillion range.[178]

A two to eight parts per billion increase of copper can negatively impact a salmon's olfactory sense, making it difficult for the fish to avoid predators, find mates, and return to their spawning grounds.[179] Exposure to elevated levels of copper can reduce salmon viability, increase susceptibility to infections, and increase mortality.[180] Effects from copper also include impaired brain functioning, difficulty breathing, and changes in blood chemistry and metabolism.[181]

Other metals in the mine can also be environmentally harmful. Several metals present at the Pebble deposits are on EPA's list of priority pollutants, including antimony, arsenic, chromium, lead, nickel, selenium, and zinc.[182] Some of these other metals can also cause serious problems for fish; for example, dissolved aluminum can precipitate and form mucus that clogs

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[174] Jennings, supra, at 5.
[175] Ecology and Env't, Inc., 2010, supra, at 112-113.
[176] Parker et al., supra, at 16.
[177] Ecology and Env't, Inc., 2010, supra, at 114.
[178] Ecology and Env't, Inc., 2010, supra, at 59.
[179] Zamzow PDF, supra, at 1.
[180] Ecology and Env't, Inc., 2010, supra, at 62.
[181] WSC, Bristol Bay's Wild Salmon Ecosystems and the Pebble Mine, supra, at 51-60.
[182] Ecology and Env't, Inc., 2010, supra, at 58-59.

fish gills.[183] Another example is yellow boy, which is formed when previously soluble iron precipitates as iron hydroxide.[184] Yellow boy has many effects on streams including oxygen removal, acidification, and depletion of the water's buffering capacity.[185] Furthermore, some interactions among metals (like copper and zinc) can produce synergistic effects, further damaging the ecosystem.[186]

2. Water Reduction Caused by the Mine Will Have Further Impacts on Fisheries

The proposed Pebble Mine will impact water flow in the region. As part of the documentation for its 2006 water permit applications, NDM requested the use of almost 35 billion gallons of water each year.[187] The effect of this initial requested use is that all of the surface and ground water within the area of the mine will be directed toward the mine's use.[188] According to one report, the mine's water use will destroy 68 miles of streams[189] and cause flow reductions to another 78 miles.[190] The report also estimated that at around 15 miles downstream from the mine, stream and river flow would be reduced by 8-16%.[191] This water extraction will greatly influence groundwater in the region, which is particularly important because the upper sections of the streams in the region are "gaining" streams, meaning they get much of their water

[183] Kendra Zamzow, Acid Rock Drainage and Metal Leaching at the Pebble Prospect, Pebble Science, available at http://www.pebblescience.org/pebble_mine/acid_drainage.html.
[184] Ecology and Env't, Inc., 2010, supra, at 105.
[185] Id. at 105-106.
[186] WSC, Bristol Bay's Wild Salmon Ecosystems and the Pebble Mine, supra, at 51-60.
[187] Robert Moran, Water-Related Impacts at the Pebble Mine, Pebble Science, available at http://pebblescience.org/pebble_mine/water.html. (Web Site)
[188] Ecology and Env't, Inc., 2010, supra, at 15. For a full discussion of the effects of the proposed Pebble Mine on surrounding waters, see Wild Salmon Center and Trout Unlimited, Bristol Bay's Wild Salmon Ecosystems and the Pebble Mine: Key Considerations for a Large-Scale Mine Proposal (January 2012), 51-67, available at http://www.wildsalmoncenter.org/pdf/PM-Report.pdf.
[189] Ecology and Env't, Inc., 2010, supra at 31.
[190] Id. at 107.
[191] Id. at 15.

supply from groundwater.[192] This groundwater is especially critical during summer and winter low flow periods.[193]

This flow reduction could be detrimental to salmon survival. Above the mine, fish stocks would be completely destroyed. Downstream from the mine stream, flows would be reduced, diminishing and degrading fish habitats.[194] Since the number of fish produced is determined by the quality and quantity of habitat available, this loss of flow is likely to cause reductions in resident and anadromous fish populations.[195]

The elimination of streams caused by the mine and the corresponding decrease in flow volumes downstream would result in greater competition for resources — especially food and cover — among fish in the region.[196] Low flow conditions are recognized as a potentially limiting factor in salmon populations and affect all life stages of fish.[197]

Several additional factors associated with low flow conditions would further stress salmon populations. First, low flow conditions lead to greater temperature fluctuations. Since temperature is a major controlling factor of fish survival and reproduction, temperature fluctuations pose a particular threat to salmon.[198] Temperature also influences the amount of dissolved oxygen in streams, with lower flow rates generally leading to less dissolved oxygen, which is a key limiting factor for fish survival.[199]

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[192] Id. at 18.
[193] Id.
[194] William J. Hauser, Potential Impacts of the Proposed Pebble Mine on Fish Habitat and Fishery Resources of Bristol Bay 7 (2007), available at http://www.renewableresourcescoalition.org/sites/www.renewableresourcescoalition.org/files/HauserSep07.pdf.
[195] Ecology and Env't, Inc., 2010, supra, at 15.
[196] Id. at 26.
[197] Id. at 31.
[198] Id. at 39.
[199] Id. at 40.

Low flow conditions will further degrade streams in several ways. They will cause an overall reduction in velocity, which will negatively impact salmon,[200] decrease dissolved oxygen in the substrate,[201] and increase sediment deposition downstream, decreasing water quality.[202] Overall, it is likely that the mine's water flow reductions would limit salmon growth and survival, lead to increased infection rates, and cause crowding, leading in turn to increased competition and predation.[203]

3. Subsidence Caused by the Block Caving Will Change Water Flow and Decrease Fishery Productivity

Precise details of the mine design have not yet been disclosed, but block caving has been proposed for the Pebble East deposit.[204] Although underground mining is often thought to be less environmentally damaging than open pit mining, large-scale underground mining can cause "catastrophic" impacts to overlying material and cause wide-ranging ecosystem effects.[205]

Underground mining operations are particularly prone to subsidence. First, in block caving, subsidence and collapse are encouraged: block caving is done by digging a series of tunnels under a deposit, then forcing the collapse of overlying substrate.[206] As ore falls and is subsequently removed, the material in higher levels will crack, which can lead to large surface subsidence.[207] Most hard-rock deposits contain faults and intrusions, hydrothermal alteration of rocks, and many clays and clay-like minerals, all of which reduce rock strength and make

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[200] Id. at 37.
[201] Id. at 38-40.
[202] Id. at 39.
[203] Id. at 37-39.
[204] David Chambers, Block Caving at the Proposed Pebble Mine, Pebble Science, available at http://www.pebblescience.org/pebble_mine/block_caving.html.
[205] Steve Blodgett & James R. Kuipers, Underground Hard-rock Mining: Subsidence and Hydrologic Environmental Impacts 9 (2002), available at http://www.csp2.org/REPORTS/Subsidence%20and%20Hydrologic%20Environmental%20Impacts.pdf.
[206] Id. at 5.
[207] Chambers, supra.

subsidence more likely.[208] Finally, water is removed from mine sites in order to facilitate the mining process — further weakening the surrounding area.[209]

Subsidence can have large impacts on both surface and ground water[210] and can cause both surface and ground water to be redirected.[211] Subsidence also leads to increased acid production and transportation from the mine.[212] Both the redirection of water flow and the increase of acid can have large impacts on local fisheries.

It is unlikely that subsidence can be mitigated. Mining companies have not managed to successfully reclaim or re-vegetate subsidence areas surrounding a block cave mine, and one researcher concluded that "[n]o evidence was found that subsidence effects at underground hardrock mines using block caving can be managed or mitigated short of not mining."[213]

4. Fugitive Dust Generated by the Mine Will Degrade Aquatic Habitats, Damaging Fisheries

The proposed Pebble Mine would negatively impact the ecology of the region through the generation of fugitive dust. Fugitive dust can be blown from many mine surfaces, including the mine itself, access roads, and tailings ponds, and it can also be generated by moving and storing mine materials.[214] One study predicted "conservatively" that fugitive dust would impact over 33 square miles surrounding the mine, but commented that the effects could be much wider.[215] Within the area impacted by the mine are 33 miles of ephemeral, intermittent, and perennial streams, including ten miles of anadromous waters designated by the Alaska

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[208] Blodgett & Kuipers, supra, at 23.
[209] Id. at 13.
[210] Id. at 10.
[211] Id. at 12.
[212] Chambers, supra.
[213] Steve Blodgett, Subsidence Impacts at the Molycorp Molybdenum Mine Questa, New Mexico i (2002), available at http://www.csp2.org/reports/Questa-Molycorp%20Subsidence%20Impacts%20-%20Blodgett%20Feb%202002.pdf.
[214] Ecology and Env't, Inc., supra, at 49-50.
[215] Id. at 53.

Department of Fish and Game.[216] Over the life of the mine, this area would be "significantly degraded," and the dust would impact both streams and vegetation.[217] Impacts caused by fugitive dust can be long-lasting, and ecosystems may be slow to recover.[218]

When fugitive dust is generated, it covers surrounding vegetation, causing increased mortality in plants. This can result in devegetation of large areas surrounding the mine, including areas that support salmon.[219] When vegetation is lost, surface runoff increases, which in turn leads to increased stream turbidity and sedimentation. Fugitive dust can also settle in water and smother both salmon eggs and organisms that serve as food for salmon.[220] Furthermore, fugitive dust can transport heavy metals into the surrounding water, air, and soil. This can be especially problematic in an area that is also exposed to acid mine drainage — which increases the bioavailability of copper[221] and harms sensitive salmon.

As the mine ages, copper from fugitive dust could affect benthic invertebrates, including mayflies, caddis flies, and stoneflies.[222] Such impacts to these populations would be "crucial" and most likely "long term."[223] These species are important food resources for salmon and other fish, so declines in these populations will negatively impact salmon species. Furthermore, copper could accumulate to concentrations that would cause acute or chronic effects in salmon directly.[224] As one study found: "a certainty exists that, even with mitigation measures employed

[216] Id.
[217] Id.
[218] Id. at 66.
[219] Id. at 50.
[220] Hauser, supra, at 1.
[221] Ecology and Env't, Inc., supra, at 78.
[222] Id. at 73.
[223] Id. at 53.
[224] Id. at 73.

at the mine, copper and other metals will likely be mobilized in runoff or leached into the surface and/or groundwater" over the life of the mine.[225]

5. Habitat Fragmentation of Salmon Populations Would Occur Due to Road Construction

Both NDM's 2006 applications and the 2011 Wardrop report discussed plans to construct a 104-mile access road connecting the mine to the proposed port at Iniskin Bay on Cook Inlet.[226] According to several studies, this road would cross at least 89 streams,[227] and may require up to 120 stream crossings.[228] Twenty-four of these streams have been documented to provide 1,200 acres of spawning habitat for sockeyes and other salmonids.[229] If the road corridor is constructed, connecting roads and spur roads would also likely be built – requiring still more stream crossings.[230]

It is likely that many stream crossings will be culverts instead of bridges. Culverts can serve as a barrier to fish and can "restrict or eliminate fish movement to upstream habitat and isolate or modify populations."[231] Such habitat fragmentation increases the chance that fish populations will be extirpated due to a lack of genetic diversity or chance events.[232] Culverts can be barriers to, or otherwise interfere with, fish movement for several reasons. They can create excessive water velocities and extreme turbulence — or the water running through the culvert can be too shallow for fish to traverse. Culverts can further block fish movement via weirs, baffles, or debris caught in the culvert. Finally, even if fish can physically swim through a

[225] Id. at 84.
[226] Wardrop, Preliminary Assessment of the Pebble Project, supra at 58-59.
[227] Ecology and Env't, Inc., 2010, supra, at 43.
[228] Hauser, supra, at 10.
[229] Id. at 11.
[230] Id. at 14.
[231] Ecology and Env't, Inc., 2010, supra, at 41.
[232] Id.

culvert, there may be "behavioral barriers" that prevent fish from attempting passage, as fish will often avoid long culverts, darkness, confined spaces, and shallow depths.[233]

Even if culverts comply with fish passage guidelines when installed, they may become impassable in the future.[234] Without "continual and proper" maintenance, culverts fail and become barriers to fish passage.[235] Of the 244 culverts examined in the Copper River, Alaska region, 64% were classified as impassable by fish, 32% "may or may not be passable," and only 4% were deemed passable.[236]

6. The Mine Presents a Risk of Catastrophic Damage

After ore is removed from a deposit, it is ground up and mixed with water and chemicals before the copper, gold, and other metals are separated out. The tailings are stored in perpetuity within large impoundments.[237] PLP initially proposed to extract 2.5 billion tons of ore from the Pebble deposits, which would require two tailings ponds with five total dams.[238] However, a more recent news release from PLP indicates that the deposit contains nearly 11 billion tons of ore.[239] Since mines are commonly expanded *after* operations begin, it is probable that PLP will seek to extract much more than the initial 2.5 billion ton estimate from Pebble Mine – or more perhaps even than the latest, much larger estimate.[240] Be that as it may, whatever the volume of ore mined, over 99% of it will be waste material to be stored in tailings facilities forever.[241]

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[233] Id. at 41-42.
[234] Id. at 45.
[235] Hauser, supra, at 12.
[236] Ecology and Env't, Inc., 2010, supra, at 46.
[237] Moran, supra. (Web Site)
[238] Ecology and Env't, Inc., 2010, supra, at 3.
[239] Pebble Partnership, Updated Mineral Resource Estimate for Pebble Prospect at 1 (Feb. 1, 2010), http://www.pebblepartnership.com/sites/default/files/pub/PEB-0028%20press%20release%20feb%202010%20Resource%20update.pdf.
[240] Ecology and Env't, Inc., 2010, supra, at 120.
[241] David M. Chambers, Pebble Engineering Geology Discussion of Issues at 11 Center for Public Participation (2007).

Tailings management is often considered the "most significant environmental challenge associated with mining projects."[242] Tailings impoundment dams fail at about ten times the rate of water retention dams,[243] and the rate of failure has actually increased in recent years.[244] Many of the dams that fail are relatively young (5-20 years old), and have been built in the "modern age" of engineering.[245]

At the Pebble Mine, the proposed dams would face several risks. First, the area lies within a zone of sporadic permafrost.[246] Permafrost can cause underground movement, which may pose major problems for tailings impoundments.[247]

Second, dams at the proposed Pebble Mine would face a particularly serious threat from earthquakes. The mine is located 125 miles from the Alaska Aleutian megathrust,[248] which has been responsible for several of the largest earthquakes ever recorded, including the 1964 Prince William Sound earthquake (magnitude 9.2) and the Aleutian earthquake (magnitude 9.1). Earthquakes can have far reaching impacts: in 2002, the 7.9 Denali earthquake ruptured surfaces over 200 miles away, and caused shocks 2,000 miles away.[249] Seismic mapping of the Pebble area is incomplete, and there is evidence that the nearest fault may be less than five miles from the mine.[250] Proposed tailings facilities for the Pebble Mine were designed in 2006 to withstand a

[242] T.E. Martin et al., Stewardship of Tailings Facilities, 20 Mining Minerals and Sustainable Development 2, 1 (April 2002), available at http://www.pebblescience.org/pdfs/tailings_stewardship-1.pdf.
[243] Michael P. Davies, Tailings Impoundment Failures: Are Geotechnical Engineers Listening?, Geotechnical News, 31, 32 (Sept. 2002), available at http://www.pebblescience.org/pdfs/Dam_failuresDavies2002.pdf.
[244] Id.
[245] Id.
[246] Northern Dynasty Mines Inc., Tailings Impoundment A Initial Application Report, 13; Northern Dynasty Mines Inc., Tailings Impoundment G Initial Application Report, 9.
[247] Earle A. Ripley, Robert E. Redman, & Adele A Crowder, Environmental Effects of Mining 65 (1996).
[248] Northern Dynasty Mines Inc., Tailings Impoundment A Initial Application Report 9, 11
[249] Bretwood Higman, Seismic Risk at the Pebble Mine, Pebble Science, available at http://pebblescience.org/pebble_mine/seismic_risk.html.
[250] Id.

7.8 earthquake 18 miles from the fault, but if an earthquake occurred five miles from the mine, the force would be three times greater than an earthquake 18 miles away.[251]

Earthquakes can cause dam failures via several mechanisms. They can cause a dam to collapse outright due to shaking, or cause the dam to overflow due to a landslide.[252] Earthquakes can also cause static liquefaction — a process by which soil loses its strength and becomes like a fluid, seriously damaging or causing the collapse of structures on top of it.[253] Earthquakes can also cause subsidence near underground mine workings,[254] risking collapse or leakage. Finally, the cumulative effects of smaller earthquakes can lead to problems over time.[255]

Dam failures can also be triggered by other causes, including high rain events, hurricanes, or rapid snow melt or ice accumulation,[256] and impoundments are also susceptible to erosion and landslides.[257] Furthermore, although the process is not well understood, static liquefaction can occur even in the absence of seismic activity,[258] and these failures may be even more common than those induced by earthquakes.[259]

Since the 1970s, tailings dam failures in the United States have caused a cumulative volume of 10 to 179 million gallons of spillage every year.[260] Dams constructed upstream – like the ones at the proposed Pebble Mine – are particularly likely to fail.[261] Even if a containment

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[251] Id.
[252] Id.
[253] Institute of Professional Engineers of New Zealand, Liquefaction 1 (March 2011), available at www.ipenz.org.nz/ipenz/forms/pdfs/ChChFactSheets-Liquefaction.pdf.
[254] Higman, supra.
[255] Hauser, supra, at 15.
[256] Ecology and Env't, Inc., 2010, supra, at 91.
[257] Moran, supra. (Web Site)
[258] Davies, supra at 32-33.
[259] Id. at 32.
[260] Ecology and Env't, Inc., 2010, supra, at 91.
[261] Davies, supra, at 35.

dam remains relatively stable, the facility can still fail from an environmental perspective: dams can generate significant amounts of dust and can impact groundwater quality due to seepage.[262]

The impacts from tailings failures at mines similar to the proposed Pebble Mine can be far-reaching. The Bingham Canyon Mine – a copper, gold, and molybdenum mine similar to the proposed Pebble Mine but with about half the ore – has contaminated 60 square miles of groundwater.[263] At Pebble, failure of one of the proposed mine tailings dams could lead to the release of billions of tons of mine waste and hundreds of billions of gallons of contaminated water.[264] Depending on which dam failed, even a modest "lower than expected" failure could have "extraordinary" run out distances, and reach 270 km to Bristol Bay itself.[265] Furthermore, this run out distance is an estimate based on the original 2.5 billion tons mining proposal; an amount much less than the mine may actually produce.[266] A dam failure would cause several waves of impacts: the initial toxic run would obliterate biota in its path and would be followed by a silt plume that would smother benthic organisms, which would in turn be followed by long-term metal oxidization that would release acid and heavy metals, further damaging the affected region.[267] Recovery could take many years to decades, and "should a dam fail, it is highly certain that impacts would be significant to catastrophic for affected watersheds, and that a long-term recovery period could be expected."[268]

7. The Mine Risks Damage to Fisheries through Use of a Wide Range of Chemicals

The proposed Pebble Mine may also impact aquatic ecosystems through chemical spills. Mines utilize a wide variety of ecologically harmful substances, such as explosives, fuels and

[262] Martin, supra, at 9.
[263] Moran, supra. (Web Site)
[264] Ecology and Env't, Inc., 2010, supra, at 90.
[265] Id. at 95.
[266] Id. at 99.
[267] Id. at 90.
[268] Id. at 99.

oils, antifreeze, water treatment chemicals, herbicides and pesticides, and road de-icing compounds, any of which may be released into surface and ground water.[269] Spills could cause "critical" impacts if they occurred in spawning or rearing habitats,[270] or cause particular harm when occurring simultaneously with other mine impacts.

Furthermore, cyanide is often used during mining of copper, gold, and molybdenum.[271] Much of the information on cyanide indicates that it breaks down quickly and mostly harmlessly—but this is neither complete nor correct.[272] Cyanide should be listed as a potential concern whenever it is used in mining,[273] because it reacts readily with almost any other available chemical and can form hundreds of compounds, many of which can persist in the environment.[274] These compounds can accumulate in plants and can be chronically toxic to fish. As a result, it is "likely that the negative impacts to aquatic organisms, especially sensitive fish populations, from releases of cyanide…is underestimated and undetected…."[275]

Finally, four pipelines would be constructed to transport copper-gold slurry, diesel, and natural gas between the mine to port site.[276] Potential effects from slurry pipeline breaks and spills can be serious. These breaks and spills occur frequently in mining operations,[277] and a pipeline break could lead to thousands of gallons of slurry entering sensitive anadromous streams, carrying metals and other harmful components.[278] Physical effects of a spill could

[269] Moran, supra. (Web Site)
[270] Ecology and Env't, Inc., 2010, supra, at 65.
[271] Robert E. Moran, Cyanide in Mining: Some Observations on the Chemistry, Toxicity, and Analysis of Mining-Related Waters 2, available at http://www.claim-gv.org/docs/morancyanidepaper.pdf. (Cyanide)
[272] Id. at 1.
[273] Kuipers and Maest, supra, at ES-15.
[274] Moran, Cyanide, supra, at 1.
[275] Id.
[276] Wardrop, supra at 59.
[277] Ecology and Env't, Inc., 2010, supra, at 85 (2010).
[278] Id. at 86.

include embeddedness in riffle and spawning areas and increased stream turbidities.[279] A spill could also lead to long-term bio-uptake and transfer of metals within the food chain.[280] "Depending on the size, time and location of a pipeline spill, a slurry pipeline break could impact thousands to hundreds of thousands of adult salmon and high-value resident fish, and hundreds of thousands to millions of juvenile fish."[281]

8. These Impacts Will Act Cumulatively to Further Degrade Bristol Bay Fisheries

All of the aforementioned stressors occur simultaneously, thereby creating synergistic effects.[282] With regard to salmon fisheries, each stressor would slowly reduce salmon resilience,[283] and stressors would act in combination to reduce habitat and food resources, increase metal bioavailability, and reduce genetic variability and disease resistance.[284] Because salmon are crucial players in ecosystem health, these impacts may severely limit ecosystem productivity.

In addition, the impacts of Pebble Mine on the Bristol Bay fisheries are larger than at first glance. While the mine will outright eliminate some populations of salmon, many aspects of the mine – such as the mine site itself, the access road, and the pipelines – will also cause habitat fragmentation in salmon populations.[285] Smaller populations are more vulnerable to extirpation,[286] causing greater impacts to local salmon populations. This elimination of many small populations of salmon would have crucial effects on the fishery. Bristol Bay's salmon

[279] Id. at 89.
[280] Id.
[281] Id. at 85
[282] Id. at 115.
[283] Id. at 116.
[284] Id.
[285] Hauser, supra, at 12.
[286] Ecology and Env't, Inc., 2010, supra, at 41.

fishery is made up of many distinct, locally adapted populations,[287] and the success and health of the Bristol Bay fishery depends on the fact that different populations do well in different years.[288] It is estimated that the Bristol Bay salmon return is over twice as stable due to this diversity than if it was made up of only one population.[289] This diversity is "critical" for keeping the fishery stable and productive,[290] but the proposed Pebble Mine has the potential to greatly reduce this diversity.

B. Pebble Mine Would Cause Unacceptable Adverse Effects to Bristol Bay Wildlife

1. If Salmon Fisheries Are Degraded, Degradation of the Entire Ecosystem Will Follow

Salmon are a resource base "that supports much of the coastal ecosystem," and salmon have been called a "keystone" species[291] and a "cornerstone" species[292] because of their importance to the greater ecosystem. Because a wide number of animals feed on salmon[293] – and because salmon hugely affect ecosystem productivity and regional biodiversity due to nutrient transportation[294] – what harms salmon also harms the wildlife that depend on them.

Salmon are invaluable to the ecosystem as a food source. Numerous species consume salmon at all life stages, from salmon eggs to spawned-out carcasses.[295] Salmon provide food

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[287] Ray Hilborn et al., Biocomplexity and Fisheries Sustainability, 100 PNAS 6564, 6564 (2003), available at http://www.pnas.org/content/100/11/6564.
[288] Christopher Habicht et al., Genetic and Ecological Divergence Defines Population Structure of Sockeye Salmon Populations Returning to Bristol Bay, Alaska, and Provides a Tool for Admixture Analysis, 136 Transactions of the American Fisheries Society 82, 82 (2007), available at http://doc.nprb.org/web/publication/project_0303_Habicht%20et%20al%202007.pdf.
[289] Daniel E. Schindler et al., Population Diversity and the Portfolio Effect in an Exploited Species, 465 Nature 609, 609 (2010), available at http://www.nature.com/nature/journal/v465/n7298/abs/nature09060.html. (Population Diversity)
[290] Id.
[291] Hauser, supra, at 5.
[292] Mary F. Willson et al., Expanding Perspectives on Fish-Wildlife Interactions, 48 BioScience 455, 456 (1998), available at http://www.fish.washington.edu/people/naiman/contemporary/papers/willson.pdf. (Fish-Wildlife)
[293] Hauser, supra, at 5.
[294] Mary F. Willson and Karl C. Halupka, Anadromous Fish as Keystone Species in Vertebrate Communities, 8 Conservation Biology 489, 490 (1995), available at http://www.jstor.org/stable/2386604. (Keystone Species)
[295] Id. at 492.

sources to all types of terrestrial mammals, including carnivores and "herbivores,"[296] many types of birds,[297] and a wide variety of fish.[298] Furthermore, salmon provide important food resources for several marine species as well, including beluga whales and sea lions, which will follow salmon hundreds of kilometers upstream.[299] Salmon are important to more than megafauna; algae, fungi, bacteria, and many populations of invertebrates feed on salmon carcasses, and these species in turn affect the ecosystem as a whole.[300]

Scientists believe that the presence of salmon, and the seasonal nature of their availability, has shaped the evolution of aquatic and terrestrial consumers and that in many cases there has been co-evolution between predators and prey.[301] Special effects of salmon consumption have been demonstrated in species as diverse as brown bears, mink, and bald eagles.[302]

Salmon are also crucial to the ecosystem because they transport nutrients into freshwater ecosystems. Salmon serve as a "conveyor belt," carrying nutrients to freshwater ecosystems.[303] Salmon accumulate over 95% of their biomass in the ocean,[304] and when they return to freshwater, a "large fraction" of their marine-derived nutrients is incorporated into freshwater

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[296] Id.
[297] Id.
[298] Id.
[299] Id. at 493.
[300] Willson et al., Fish-Wildlife, supra, at 457.
[301] Id.
[302] Willson and Halupka, Keystone Species, supra, at 493.
[303] Daniel E. Schindler et al., Pacific Salmon and the Ecology of Coastal Ecosystems, 1 Frontiers in Ecology and the Environment 31, 31 (2002), available at http://www.jstor.org/pss/3867962. (Pacific Salmon)
[304] Id. at 32.

and terrestrial food webs.[305] Because salmon can migrate over 1,000 kilometers inland, these nutrient gains occur throughout a wide geographical area.[306]

These salmon nutrients are particularly important because, in aquatic salmon ecosystems, primary production is often severely nutrient-limited.[307] Salmon also provide a plentiful supply of both phosphorus and nitrogen.[308] Furthermore, any reduction in salmon populations might severely impact this conveyor belt, as it has been predicted that the presence of salmon creates a positive feedback loop. Nutrients brought by spawning salmon enhance juvenile salmon growth and survivorship; declining numbers of spawning salmon can thus lead to reduced survival of juvenile salmon, which can in turn further reduce nutrients in affected ecosystems.[309]

Salmon-derived nutrients also make their way into nearby terrestrial ecosystems. For example, bears can transport extremely high proportions of salmon into terrestrial habitats.[310] In addition to mammals, other animals are also responsible for transporting salmon away from streams, such as birds and insects.[311] Once a carcass is transported into the terrestrial ecosystem, it is consumed by a variety of scavengers.[312] Nutrients leach into the soils by excretion and

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[305] M. Ben-David et al., Fertilization of Terrestrial Vegetation by Spawning Pacific Salmon: The Role of Flooding and Predator Activity, 83 Oikos 47, 47 (1998), available at http://faculty.washington.edu/kerrb/BenDavid_et_al1998.pdf.

[306] Scott M. Gende et al., Pacific Salmon in Aquatic and Terrestrial Ecosystems, 52 BioScience 917, 918 (2002), available at http://www.nps.gov/glba/naturescience/loader.cfm?csModule=security/getfile&pageid=120186.

[307] Robert J. Naiman et al., Pacific Salmon, Nutrients, and the Dynamics of Freshwater and Riparian Ecosystems, 5 Ecosystems 399, 401 (2002), available at http://www.fish.washington.edu/people/naiman/CV/reprints/naiman_ecosys_salmon_2002.pdf.

[308] Id. at 402, Schindler et al., Pacific Salmon, supra, at 32.

[309] Schindler et al., Pacific Salmon, supra, at 32-33.

[310] C. Jeff Cederholm et al., Pacific Salmon Carcasses: Essential Contributions of Nutrients and Energy for Aquatic and Terrestrial Ecosystems, 24 Fisheries Vol. 10, 6, 11 (1999), available at http://www.nativefishsociety.org/conservation/wild_population/annotated_bib_salmonids_hatcheries/nutrient_enrichment/Pacific.pdf.

[311] Gende et al., supra, at 919.

[312] Schindler et al., Pacific Salmon, supra, at 34.

decomposition, and are taken up by the vegetation,[313] and it is thought that salmon play a "significant role" in the productivity of riparian ecosystems.[314]

Salmon's ecosystem contributions are extremely far-reaching. For example, since bear densities are correlated with salmon availability, and bears are important seed dispersers, the presence of salmon leads to better dispersal of seeds.[315] As another example, salmon can lead to higher densities of insectivorous birds along salmon streams. Insectivorous birds eat insects that destroy vegetation, so increased salmon often leads to increased vegetation.[316]

Finally, salmon also act as ecosystems engineers. They are an important source of mechanical energy, and intensively and regularly disturb benthic communities. This alters the composition of sediments and changes the topography of the substrate, which has many effects on the ecosystem, including increasing the survival of salmon eggs.[317]

2. The Proposed Port Presents a Significant Threat to the Endangered Cook Inlet Beluga Whales

Another threat the proposed Pebble Mine presents is to Cook Inlet beluga whales – a highly endangered, genetically distinct, and geographically isolated species. The mine's port would be built in Cook Inlet's Iniskin Bay. A distinct stock of beluga whales live in Cook Inlet.[318] This population has declined from as many as 1,300 individuals in the late 1970s to 284 individuals most recently.[319] The National Marine Fisheries Service ("NMFS") predicted that beluga whales have a 26% chance of extinction within 100 years and a 70% chance of extinction

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[313] Id.
[314] Cederholm et al., supra, at 12.
[315] Gende et al., supra, at 923.
[316] Id.
[317] Schindler et al., Pacific Salmon, supra, at 33.
[318] Beluga Whale (Delphinapterus leucas), NOAA Fisheries Office of Protected Resources, available at http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/belugawhale.htm.
[319] NOAA Fisheries News Release, NOAA's Annual Survey of Cook Inlet Belugas Finds Population at Second-Lowest Level (January 9, 2012), available at http://www.fakr.noaa.gov/newsreleases/2012/cibelugas010912.htm.

within 300 years.[320] If the current population of beluga whales disappears, it is "highly unlikely" that other belugas would repopulate Cook Inlet.[321]

NMFS listed Cook Inlet beluga whales as endangered under the Endangered Species Act in 2008 and designated critical habitat in 2011.[322] NMFS designated more than 3,000 square nautical miles of Cook Inlet "critical" to the species' survival, including much of Iniskin Bay.[323]

The mine threatens the whales in several ways. First, the dredging necessary to create the port has the potential to re-suspend contaminants in the water. Dredging in other places has "seriously impacted" other populations of belugas.[324] Second, the port will cause higher traffic in the area, leading to increased water pollution and contaminants, vessel traffic, and noise. In addition to the increased risk to belugas of ship strikes associated with significantly increased vessel traffic, the noise generated by this increase – resulting both from engine noise and cavitation around the propeller – is a particular threat because belugas have sensitive hearing and depend for their survival on their ability to hear and be heard. For example, beluga whales have been observed to react to ice breaking ships at distances of over 80 km, and were affected for more than two days following the event.[325] Belugas use sound to communicate, navigate, breed, locate prey, and avoid predators, and the inevitable increase in both ambient noise and acute exposure to noise associated with port construction and operation poses a serious risk to this already endangered population.[326]

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[320] National Marine Fisheries Service, Conservation Plan for the Cook Inlet beluga whale (Delphinapterus leucas) 1 (2008), available at http://www.nmfs.noaa.gov/pr/pdfs/species/belugawhale_conservationplan.pdf. (Conservation Plan)
[321] Id.
[322] 73 Fed. Reg. 62927 (Oct. 22, 2008); 76 Fed. Reg. 20180 (Apr. 11, 2011).
[323] 76 Fed. Reg. at 20180.
[324] National Marine Fisheries Service, Conservation Plan, supra, at 55.
[325] Id. at 58-59.
[326] Id. at 58.

C. Pebble Mine Would Cause Additional Future Impacts to the Ecology of the Region

All of the impacts discussed above relate directly to the proposed mine itself. However, if the Pebble Mine is built, it would inevitably attract additional mining and industrial development in the area, resulting in still larger impacts to the region.

First, it is fairly standard practice for the mining industry to secure a permit for a smaller mine and then later request permits for expansion.[327] NDM's original plan was to extract 2.5 billion tons of ore; however, a news release by the PLP in 2010 indicated that the Pebble deposit contains almost 11 billion tons of mineral resources.[328] As such, it is reasonably foreseeable – indeed highly probable – that the mine will expand far beyond the initial 2.5 billion tons. Furthermore, once the mine is built – introducing critical infrastructure for development – it will open the region for industrial scale mining even beyond the Pebble Mine project.[329]

Second, development of the mine, and the roads associated with it, would open access to the region. It is foreseeable that the proposed roads will generate a wide range of increased traffic in the area, in the form of industrial, commercial, and other development and attendant activities. These indirect effects will likely be cumulative and lead to the construction of still more roads and trails—which will in turn lead to more stream crossings, increased human and vehicle waste, increased competition for fish and wildlife, and increased demand for groundwater.[330]

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[327] Ecology and Env't, Inc., 2010, supra, at 120-21.
[328] Pebble Partnership, Updated Mineral Resource Estimate for Pebble Prospect at 1 (Feb. 1, 2010), http://www.pebblepartnership.com/sites/default/files/pub/PEB-0028%20press%20release%20feb%202010%20Resource%20update.pdf.
[329] Hauser, supra, at 16.
[330] Id. at 14.

Beyond the direct harm to the region posed by the proposed Pebble Mine, therefore, the potential indirect impacts of the project pose an additional, significant threat to the resources of the region that section 404(c) was enacted to protect.

II. EPA SHOULD EXERCISE ITS AUTHORITY UNDER SECTION 404(C) AND PROHIBIT THE SPECIFICATION OF THE PEBBLE MINE AREA AS A DISPOSAL SITE FOR DREDGED AND FILL MATERIAL

As explained above, the best available science provides a compelling and legally sufficient factual basis for EPA to find that "unacceptable adverse effects" within the meaning of section 404(c) will occur in the Bristol Bay watershed as a result of development of the Pebble Mine. Granting of the pending petitions is therefore warranted.

A reviewing court will apply a deferential standard when evaluating the legality of EPA's section 404(c) determination. Under the Administrative Procedure Act, agency action must be set aside if it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law," or if it fails to meet statutory, procedural, or constitutional requirements.[331] A court may not vacate an agency's decision unless it

> has relied on factors which Congress had not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.[332]

In past cases where EPA's section 404(c) decisions have been challenged, the courts have applied that deferential standard of review.[333] The agency has intervened under section 404(c) on

[331] 5 U.S.C § 706(2)(A)-(D); Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402, 414 (1971).
[332] Motor Vehicle Mfrs. Assn. of U.S. Inc. v. State Farm Mut. Automobile Ins. Co., 463 U.S. 29, 43 (1983).
[333] City of Alma v. United States, 744 F. Supp. 1546 (S.D.Ga. 1990); Creppel v. U.S. Army Corps of Engineers, 1988 WL 70103, Civ. A. No. 77-25, 1988 WL 7010 (E.D.La June 29, 1988).

thirteen prior occasions.[334] Except where it did so after the final issuance of an Army Corps permit, its intervention has withstood judicial challenge.[335]

A. The Discharges Associated with the Pebble Mine Would Violate the Section 404(b)(1) Guidelines and, as a Consequence, Section 404(c)

EPA's regulations provide that "[i]n evaluating the unacceptability of [404(c)] impacts, consideration should be given to the relevant portions of the section 404(b)(1) guidelines."[336] This regulation regarding "significant degradation on water of the United States" has figured prominently in EPA's past section 404(c) actions. Other guidance regarding "secondary effects" and "cumulative effects" further inform the agency's consideration of unacceptability under section 404(c). Consistent with the substantive criteria provided in those regulations and guidelines, EPA should find that the effects of the proposed Pebble Mine – or indeed any large-scale mine in the area – would result in "unacceptable adverse effects" on the fisheries, wildlife, and recreation in the Nushagak and Kvichak drainages within the meaning of section 404(c).

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[334] For a detailed description, see William M. Riley and Thomas G. Yocum, Mining the Pebble Deposit: Issues of 404 compliance and unacceptable environmental impacts, Prepared for the Bristol Bay Native Corporation and Trout Unlimited (December 2011) at 39-41, Table 3.

[335] See, e.g., Bersani v. EPA, 850 F.2d 36 (2d Cir. 1988); Alameda Water & Sanitation Dist. v. Reilly, 930 F. Supp. 486 (D. Colo. 1996); City of Alma v. United States, 744 F. Supp. 1546 (S.D. Ga. 1990); but see Mingo Logan Coal Company v. EPA, CA No. 10-0541 (ABJ) (D.D.C. March 23, 2012) (reversing EPA veto issued two years after final Army Corps section 404 permit had been granted). In James City County v. EPA, 12 F.3d 1330 (4th Cir. 1993), the Fourth Circuit ultimately upheld EPA's decision to veto a dam permit issued by the Army Corps of Engineers after a series of remands. See 758 F. Supp 348 (E.D. Va 1990)(overturning EPA's veto), 955 F.2d 254 (4th Cir. 1992) (affirming in part and remanding). On remand, EPA again vetoed the permit and the veto was again challenged. See 1992 WL 315199, 23 Envtl. L. Rep. 20,228 (E.D.Va. Aug 05, 1992)(overturning EPA's veto). On final appeal, the Fourth Circuit reversed, concluding EPA's veto decision – which was based on harm to existing fish and wildlife species, damage to the ecosystem, destruction of wetlands, and inadequate mitigation – was not arbitrary and capricious. See 12 F.3d 1330 at 1339.

[336] 40 CFR § 230.10(c) states in relevant part:

> Significantly adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes; and . . . Significantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability. Such effects may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy.

1. The Pebble Mine Would Cause Significant Degradation to the Waters of the United States, which Supports a Finding of Unacceptability Under Section 404(c)

The analysis under the "significant degradation" regulation includes three types of effects: 1) "[s]ignificantly adverse effects of the discharge of pollutants on human health or welfare"; 2) "[s]ignificantly adverse effects of the discharge of pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems"; and 3) "[s]ignificantly adverse effects of the discharge of pollutants on aquatic ecosystem diversity, productivity, and stability."[337] Here, each of the enumerated effects supports a finding of "significant degradation" under section 404(c).

a. The Significant Adverse Effects on the Life Stages of Aquatic Life and Other Wildlife Dependant Species Are Unacceptable Under Section 404(c)

The combined effects of acid mine drainage, high levels of copper and other contaminants, and reduced stream flow will disrupt the life cycles of the aquatic species and the terrestrial wildlife that depend on them. Bristol Bay provides one of the world's largest runs of sockeye salmon and Alaska's largest run of Chinook salmon. Both species are critically important to the health and survival of other species in the region, and both species are particularly sensitive to the kinds of impacts associated with large-scale metallic sulfide mining generally – and Pebble Mine specifically. Moreover, because of its proposed location at the headwater streams of the Nushagak and Kvichak drainages, the project presents an especially acute threat. Those streams are important spawning grounds for the region's salmon. Reduced flow downstream would impact all life stages, including the migration of adults, the viability of eggs, the emergence of fry, and the timing of smolt migration. As discussed in detail above, these

[337] 40 C.F.R. § 230.10(c).

impacts would reverberate through the ecosystem and disrupt the life stages of a wide variety of other species.

The relationship between salmon and other wildlife in the region is complex and highly evolved. Growth rates, litter size, and reproductive success of a variety of species are determined in part by the robustness of the salmon population. For example, the scientific literature documents that brown bears are larger in the Bristol Bay watershed due to their high-protein salmon-based diets, minks time their reproduction with the availability of salmon, and bald eagles experience greater reproductive success because of these fisheries.[338] Because substantial scientific evidence establishes that the effects of large-scale metallic sulfide mining would endanger the life processes of aquatic and terrestrial species in the watershed, EPA should grant the pending petitions for action under section 404(c) to prevent this significant and likely degradation.

b. The Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity, and Stability Are Unacceptable Under Section 404(c)

The habitat destruction, compromised water quality, and reduced water quantity associated with the proposed Pebble Mine – or any other large-scale mining effort in the region – will dramatically impact the aquatic ecosystem's diversity, productivity, and stability. Principally, this will happen by way of harm to the region's salmon populations. Salmon interact with the flora and fauna of the region in myriad distinct and important ways, many of which have been described above. At a more general level, however, salmon are an indispensable species in the watershed's aquatic ecosystems. Indeed, they are a keystone species and their presence in the

[338] Willson and Halupka, Keystone Species, supra, at 493; The Nature Conservancy of Alaska, Ecoregional Assessment at 75, 103.

watershed is essential to maintaining the structure and character of the ecosystem.[339] The loss of salmon will severely diminish ecosystem "diversity, productivity and stability."[340] The sheer magnitude of the proposed mine and the vulnerability of a keystone species place the Bristol Bay watershed at a high risk of significant adverse effects. Accordingly, the pending petitions should be granted, and EPA should initiate action under section 404(c).

c. The Significant Adverse Effects on Human Health or Welfare Are Unacceptable Under Section 404(c)

It is appropriate to consider the effects of the proposed Pebble Mine on human health to the extent that the effects are tied to one of the section 404(c) factors. Here, human health and welfare are inextricably tied to the availability of a productive salmon fishery and healthy wildlife in and around Bristol Bay. Alaska Natives and Bristol Bay residents in the watershed depend – and have for generations – on salmon for their subsistence, and reduced salmon stocks will seriously threaten their health, their way of life, and the survival of their communities. As discussed *supra* at note 5, this connection between the people, the fish, and the wildlife of the Bristol Bay region and the threat to it posed by the Pebble Mine is not only relevant to a determination under section 404(c), but it implicates the federal government's trust responsibilities and raise significant environmental justice concerns.

Although the salmon fisheries are the heart of subsistence in the region, one study found that, excluding Dillingham (a regional center and the only town with more than 1,000 people), villages in Bristol Bay averaged 113 pounds of large land mammal harvest per person.[341] That is

[339] William J. Hauser, Potential Impacts of the Proposed Pebble Mine on Fish Habitat and Fishery Resources of Bristol Bay 5 (2007), available at http://www.renewableresourcescoalition.org/sites/www.renewableresourcescoalition.org/files/HauserSep07.pdf.
[340] 40 C.F.R § 230.10(c).
[341] Davin L. Holem, Harvests and Uses, 22, 136. Dillingham had 2,443 people in 2002. The next largest town was Togiak with 700 people.

61% of the 185 pounds of red meat and poultry that the average American consumed in 2000.[342] The subsistence harvesting of land mammals makes up about 31% of residents' total subsistence harvest, with salmon and other fish constituting an additional 60%. Overall, the residents of Bristol Bay average 315 pounds of subsistence meats per year.[343] Moreover, almost everyone in most rural Bristol Bay communities uses meat gathered through subsistence hunting; those who did not hunt received the meat through communal resource distribution networks. For instance, 81% of the area's population reported using caribou meat, 73% reported using moose and 9% reported using bear.[344] In addition to salmon, moose, caribou, and bear, Bristol Bay residents also harvest small mammals, birds and their eggs, and plants.[345]

The six villages that first petitioned EPA all depend on a subsistence lifestyle. Nondalton gathers an average of 358 pounds of subsistence per person in the village each year. New Stuyahok gathers 700 pounds per person, Levelock gathers 884 pounds per person, Ekwok gathers 797 pounds per person, Curyung (Dillingham) gathers 242 pounds per person, and Koliganek gathers 830 pounds per person.[346] All but one of these villages gathers substantially more subsistence than the area's average of 315 pounds per person.[347] Furthermore, each of these villages has its traditional subsistence area close to the location of the mine or in the Nushagak watershed area. The Koktuli River, whose tributaries will be used to store the tailings, feeds into

[342] Mildred M. Haley, Changing Consumer Demand for Meat: The U.S Example, 1970 to 2000, Econ. Research Serv., USDA, WRS01-1, 2001, at 42, accessible at www.ers.usda.gov/publications/wrs011.
[343] Duffield at 84.
[344] Holem, 31, 55, 85.
[345] James A. Fall, Subsistence Harvests and Uses of Wild Recourses in Iliamna, Newhalen, Nondalton, Pedro Bay, and Port Alsworth, Alaska, 2004 39 (Alaska Department of Fish and Game, 2006).
[346] Id., 88.
[347] Id., 84.

Nushagak River and is part of its watershed.[348] Thus, contamination of the Koktuli River may affect all of the villagers who fish in the Nushagak watershed.

Under these circumstances, EPA can properly find that the adverse environmental effects of the Pebble Mine will significantly jeopardize human health and welfare, and it should grant the requested relief.[349]

2. The Cumulative Impacts of the Pebble Mine Are Unacceptable Under Section 404(c)

The cumulative effects of the discharges directly associated with the proposed Pebble Mine – and the additional development that will necessarily accompany large-scale metallic sulfide mining in the region – would be significant and adverse. Permitting Pebble Mine will inevitably and irrevocably open the region to significant industrial development inconsistent with the sustainable use and conservation of its natural resources.

EPA should anticipate and consider cumulative effects, including the discharges that may result as a consequence of building a power plant to run Pebble Mine, the roads and culverts over which trucks will travel on their way to Cook Inlet, the pipelines carrying slurry, natural gas, and diesel, and the dredging and infrastructure required to build a deepwater port in the Cook Inlet. The agency should also consider the likelihood that Pebble Mine will expand as the ore body is developed, causing greater impacts than current projections estimate. Finally, EPA should consider, in the wake of a permit being issued for Pebble Mine, the numerous other mining claims that currently have been staked but whose success or failure are dependent on the industrial foundation that Pebble Mine would provide in this pristine, now-undeveloped region.

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[348] US Dep't of the Interior, Bureau of Land Mgmt., Alaska, Bay Proposed Resource Management Plan/Final Environmental Impact Statement Released December 7, 2007 (2007), accessible at http://www.blm.gov/ak/st/en/prog/planning/Bay_Plan/bay_feis_documents.html. See maps Map 3.52 "Subsistence Use Area, Dillingham," "Map 3.53 Subsistence Use Area, Ekwok," "Map 3.58 Subsistence Use Area, Koliganek," "Map 3.59 Subsistence Use Area, Levelock," "Map 3.62 Subsistence Use Area, Nondalton," "Map 3.68 Subsistence Use Area, New Stuyahok."

[349] See discussion supra at n.5.

Based on the threat of cumulative impacts, EPA should grant the petitions for action under section 404(c).

B. The Requested Action is Consistent with EPA's Past Section 404(C) Actions

Granting of the petitions here would be consistent with EPA's past exercise of its section 404(c) authority. The agency has intervened under section 404(c) on thirteen prior occasions,[350] and, except where it acted after the issuance of a final permit by the Army Corps, its intervention has been upheld.[351] In this case, the scale and scope of the potential significant adverse impacts of the Pebble Mine in the Nushagak and Kvishak drainage substantially exceed those threatened by the projects the agency has considered in past 404(c) determinations. Based on the overwhelming evidence that mining in the pristine Bristol Bay watershed will have devastating and unavoidable consequences, EPA's intervention under section 404(c) would be upheld in this case.

1. The Fisheries Impacts Would Surpass Those EPA Has Addressed in Prior 404(c) Determinations and Warrant a Finding of Unacceptability.

Potential impact on fisheries has been an important consideration in EPA's past actions under section 404(c).[352] In several cases, the agency has focused on the diversity of fish species affected, recreational fishing considerations, the monetary value of the fishery, and the health of the existing fish populations.[353] The salmon of Bristol Bay sustain a commercial fishery worth between $318 and $572 million annually, offer significant recreational value, and support Alaska

[350] Riley and Yocum, Mining the Pebble Deposit: Issues of 404 compliance and unacceptable environmental impacts, at 39-41, Table 3.
[351] See, e.g., James City County v. EPA, 12 F.3d 1330 (4th Cir. 1993); Bersani v. EPA, 850 F.2d 36 (2d Cir. 1988); Alameda Water & Sanitation Dist. v. Reilly, 930 F. Supp. 486 (D. Colo. 1996); City of Alma v. United States, 744 F. Supp. 1546 (S.D. Ga. 1990); but see Mingo Logan Coal Company v EPA, CA No. 10-0541 (ABJ) (D.D.C. March 23, 2012) (reversing EPA veto because issued after final Army Corps section 404 permit had been granted).
[352] M.A. Norden Veto, 29 Fed. Reg. 29,142 (July 18, 1984); Bayoux Aux Carpes Veto, 50 Fed. Reg. 47267-01 (Nov. 15, 1985); Spruce No. 1 Mine Veto, supra.
[353] Id.

Natives who hunt and fish for their subsistence.[354] Central to the cultural heritage of the people who live in the region, salmon are also an irreplaceable keystone species that play an equally critical role in defining the ecological characteristics of the region. In addition, Bristol Bay is one of the last places on earth to produce abundant sockeye salmon runs.

The circumstances here are therefore even more compelling than those considered in other section 404(c) proceedings where fisheries impacts were comparatively small. Never before has EPA had to consider the fate of such a culturally and ecologically important fishery. The special significance of salmon to the Bristol Bay watershed, its people, and its wildlife – and the threat to all of them if the proposed Pebble Mine is permitted – strongly support EPA action in this case.

2. The Size and Scope of the Project Support a Finding of Unacceptability Under Section 404(c)

The sheer size and scope of Pebble Mine surpass any other project EPA has reviewed under section 404(c). One way to compare the proposed Pebble Mine with past cases is by measuring the area of inundated surface directly impacted by the proposed dredge and fill. Under current estimates, the proposed Pebble Mine would eliminate approximately 68 linear miles of stream channel.[355] In EPA's final determination in the Spruce Mine case, the agency placed significant weight on the many miles of streams in jeopardy. In that case, EPA stated in the final determination:

> The filling in and complete destruction of the 6.6 miles of streams at issue here is a large impact and clearly adverse to the wildlife that will be buried under thousands of tons of excess spoil. These adverse impacts are particularly large in context of the evidence that these streams are some of the last, rare and important high quality streams in the watershed. That context also leads to the

[354] John W. Duffield, et al, Bristol Bay Wild Salmon Ecosystem Economics – 2008 Update, at 7 (July 2009).
[355] Ecology and Env't, Inc., 2010, An Assessment of Ecological Risk to Wild Salmon Systems from Large-scale Mining in the Nushagak and Kvichak Watersheds of the Bristol Bay Basin 31 (2010).

> conclusion that this adverse impact is one that the aquatic ecosystem cannot afford.[356]

The Pebble Mine is expected to destroy over 9,200 acres of habitat, including wetlands, open water areas, and streams.[357] In other cases, EPA has concluded that the destruction of less than 1,000 acres of inundated wetlands could support a determination of unacceptability.[358] In other words, the size of the proposed Pebble Mine project is unprecedented in comparison to past section 404(c) proceedings. A mere calculation of the number of inundated acres affected, however, does not fully capture the scope of what is at stake in the case of Pebble Mine. Not only does such a measure ignore the many cumulative and secondary effects of large-scale mining in the region – detailed at length above – but it ignores the pristine quality and enormous scale of the ecosystem that Pebble Mine would jeopardize. Never before has a potential discharge so manifestly threatened such an abundance of pristine wilderness at once.

3. The Impacts on Headwater Streams Are Significant and Support a Finding of Unacceptability Under Section 404(c)

In the Spruce Mine proceeding, EPA emphasized that the discharges at issue would have impacted important headwater streams in the region. Just as important as the project's size was the agency's recognition of the important function headwater streams provide in a healthy, functioning ecosystem. Taking note of the science, EPA wrote:

> Many studies now point to the role headwater streams play in the transport of water, sediments, organic matter, nutrients, and organisms to downstream environments; their use by organisms for spawning or refugia; and their contribution to regional biodiversity . . . . Additionally, destruction or modification of headwater streams has been shown to affect the integrity of downstream

[356] Spruce No. 1 Mine Veto, Final Determination at 20.
[357] Riley and Yocum, Mining the Pebble Deposit: Issues of 404 compliance and unacceptable environmental impacts, at 29.
[358] See, e.g., Big River Veto, 55 Fed. Reg. 10,666 (Mar. 22, 1990) (575 acres of wetland); Sweedens Swamp Veto, reported at 51 Fed. Reg. 22,977, 22,978 (June 24, 1988) (32 acres of wetland); Jack Maybank Veto, 50 Fed. Reg. 20,291 (May 15, 1985) (900 acres of wetland).

> waters, in part through changes in hydrology, chemistry and stream biota . . . .[359]

At least as devastating as what was proposed at the Spruce Mine in West Virginia, Pebble Mine would appropriate all of the ground and surface waters within the proposed area of the mine, including the headwaters of the North and South Forks of the Koktuli River and the Upper Talarik Creek. Those headwaters would be subject to mine use over the entire life of the mine – severely limiting the extent to which salmon can return to their upstream spawning area and jeopardizing important aquatic and riparian habitats. If EPA carefully considers the effects on headwater streams, it must find that the proposed Pebble Mine poses unacceptable environmental impacts to the Bristol Bay watershed.

C. EPA May Not Engage in Cost-Benefit Analysis to Reach a Decision Under Section 404(c)

Although the mining industry will offer self-interested claims that EPA should consider the potential economic cost of section 404(c) relief – and PLP can be expected to do so here – those claims have no legitimate legal or factual basis. EPA's power under section 404(c) is at once wide in its discretion and narrowly focused on the environmental priorities of the Clean Water Act. Section 101 prioritizes the goal of protecting fish, shellfish, wildlife and recreation on the water[360] – and section 404(c) does so, too. By contrast, neither section contains any reference to, or authority for considering, the potential economic impact of approving or disapproving a challenged development – or deciding a request for action under section 404(c). Economic considerations are irrelevant and may not be considered.

The Court of Appeals for the Fourth Circuit has considered the relationship between the Army Corps' role in the section 404 permitting process and EPA's 404(c) authority.

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[359] Spruce No. 1 Mine Veto, Final Determination at 20.

[360] City of Alma v. United States., 744 F. Supp. 1546, 1562 (S.D.Ga.1990) ("[T]he CWA grants EPA wide discretion to employ section 404(c) as it deems appropriate.")

Significantly, it concluded that section 404(c) permits EPA to consider the environment at the exclusion of other values.[361] The Army Corps, on the other hand, must consider an array of factors bearing on the desirability of permitting the construction of a dam – or in issuing any dredge and fill permit under section 404 – including whether the project is in the public interest.[362] Because EPA's authority to veto is based only on its obligation to protect the environment,[363] the Court of Appeals observed that EPA's authority "is practically unadorned," holding that the agency may rest its decision to intervene under section 404(c) solely on a finding of unacceptable adverse effects to the environment.[364] Without exception, all the district courts that have addressed the issue have adopted that same reasonable interpretation of section 404(c).[365]

The provision's legislative history suggests that Congress intended section 404(c) to serve purely as an environmental check on the Army Corps' permitting authority under section 404. An early House amendment to the bill would have given the Army Corps the power to administer the permitting of dredged or fill material without EPA oversight. Instead, the Army Corp would have been, by itself, "required to determine that the discharge would not unreasonably degrade or endanger human health, welfare, or amenities or the marine environment, ecological systems, or *economic potentialities*."[366] That scheme for the section 404 permit program did not survive the House and Senate conference committee. According to the

[361] James City County v. EPA, 12 F.3d 1330, 1336 (4th Cir.1993).
[362] Id. For a full discussion of public interest considerations, see Wild Salmon Center and Trout Unlimited, Bristol Bay's Wild Salmon Ecosystems and the Pebble Mine: Key Considerations for a Large-Scale Mine Proposal at 41-46.
[363] James City County v. EPA, 12 F.3d at 1336.
[364] Id.
[365] Id.; See also Creppel v. U.S. Army Corps of Engineers, Civ. A. No. 77-25, 1988 WL 70103 (E.D.La June 29, 1988). ("The plain language of section 404(c) does not require a balancing of environmental concerns against "the public interest." There is no mention of this kind of 'statutory balancing' . . . .").
[366] JOINT EXPLANATORY STATEMENT OF THE COMMITTEE OF CONFERENCE, Pub. L. No. 92-500 reprinted in 1 Legislative History of the Federal Water Pollution Control Act Amendments of 1972, at 325 (1973).

conference committee report:

> The conferees agree that the Administrator of the Environmental Protection Agency shall have authority to prohibit specification of a site and deny or restrict the use of any site for the disposal of any dredge or fill material which he determines will adversely affect municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas.[367]

It was this formulation of section 404(c) that made its way into the final version of the bill. The decision to abandon the language of economics and rest the oversight authority with EPA suggests what courts and EPA have always understood: that section 404(c) was intended to fulfill the environmental and ecological priorities of the Clean Water Act.

EPA's own understanding of its enabling statute is in keeping with the courts' interpretation. The agency has defined "unacceptable adverse effect" as "impact on an aquatic or wetland ecosystem which is likely to result in significant degradation of municipal water supplies (including surface or ground water) or significant loss of or damage to fisheries, shellfishing, or wildlife habitat or recreation areas." Significantly, in EPA's statement of purpose that accompanied the rulemaking, the agency explained that "section 404(c) does not require a balancing of environmental benefits against non-environmental costs such as the benefits of the foregone project. This view is based on the language of 404(c) which refers only to environmental factors."[368] EPA emphasized that "there is no requirement in 404(c) that a cost/benefit analysis be performed, and there is no suggestion in the legislative history that the word 'unacceptable' implies such a balancing."[369]

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[367] Id.
[368] Denial or Restriction of Disposal Sites; Section 404(c) procedures, 44 Fed. Reg. 58076, 58078 (Oct. 9, 1979) ("When Congress intended EPA to consider costs under the Clean Water Act, it said so.").
[369] Id.

Accordingly, any claim by PLP of potential economic hardship if the pending 404(c) petitions are granted must be rejected.

D. EPA Must Act Proactively to Prevent Large-Scale Mining in the Nushagak and Kvichak Drainages

As discussed above, EPA is entitled to intervene under section 404(c) before the commencement of the section 404 permit process begins. There is ample evidence to support proactive action here given the sheer magnitude of the anticipated development in the pristine Nushagak and Kvichak drainages and the broad consensus that Pebble Mine, if constructed, will result in unavoidable and unacceptable impacts on one of the country's most outstanding fisheries. In light of all that is understood about the impacts of large-scale mines on landscapes and ecosystems – and the sensitivity of the wilderness at stake in Bristol Bay – there is no need to defer 404(c) action once EPA concludes its Watershed Assessment. Moreover, acting early will protect PLP and other parties with mining claims in the watershed from investing additional resources on a mining project manifestly unsuited to a region like the Bristol Bay watershed. Simply stated, there is nothing to be gained – and significant resources to be lost – by prolonging the uncertainty that surrounds the proposed Pebble Mine.

As a matter of law, there can be no question that EPA has the power to act proactively under section 404(c). As reviewed at length above, the agency's 1979 section 404(c) implementing regulations provide that EPA may "prohibit [such discharges] . . . *before* a permit application has been submitted to . . . the Corps."[370] The agency explained in response to comments[371] that "at least in theory, there are instances where a site may be so sensitive and valuable that it is possible to say that any filling of more than X acres will have unacceptable

[370] Id.(emphasis added).
[371] Id.

adverse effects."[372] The Bristol Bay watershed is precisely such a place and therefore warrants proactive use of the section 404(c) power.

Notable beyond the fact of EPA's section 404(c) authority, however, is the risk that, by failing to act proactively, EPA may be deemed to have exceeded it. In a recent decision of the federal district court in the District of Columbia, the agency's veto of the Spruce No.1 Surface Mine permit was vacated solely on the ground that the subject permit had already been granted by the Army Corps.[373] Having reviewed the language of the statute, its legislative history, and EPA's implementing regulations, Judge Amy Berman Jackson concluded that "the clear import of the provision, as all the parties agree, is that Congress gave EPA the right to step in and veto the use of certain disposal sites at the start, thereby blocking the issuance of permits for those sites."[374] The problem in the Spruce case, the court held, was that EPA had waited too long to act:

> The Court concludes that EPA exceeded its authority under section 404(c) of the Clean Water Act when it attempted to invalidate an existing permit by withdrawing the specification of certain areas as disposal sites after a permit had been issued by the Corps under section 404(a). Based upon a consideration of the provision in question, the language and structure of the entire statutory scheme, and the legislative history, the Court concludes that the statute does not give EPA the power to render a permit invalid once it has been issued by the Corps.[375]

Noting that "the agency has never before invoked its 404(c) powers to review a permit that had been previously duly issued by the Corps,"[376] the court granted summary judgment in favor of the permit holder, concluding that section 404(c) did not authorize EPA to veto a permit once it

[372] Id.
[373] Mingo Logan Coal Company v. EPA, CA No. 10-0541 (ABJ) (D.D.C. March 23, 2012).
[374] Id. at 12.
[375] Id. at 2.
[376] Id. at 29.

has been issued.[377] Whether or not this decision is ultimately upheld on appeal, it clearly reflects the risk of waiting.

Similarly, as a matter of fact, it is not only reasonable but necessary for EPA to act now. Although EPA can't yet know final design details for the Pebble Mine, more than enough information exists at this time for the agency to find with absolute certainty that the project, if allowed to proceed, risks enormous harm to the resources protected by section 404(c). Over the last several years, NDM has filed multiple applications with the Alaska DNR that identify the scale of what the mining partnership has planned. In addition, NDM described its most current planning in the Wardrop report issued just last year.[378] Those applications and reports reveal more than enough for EPA to conclude that opening up the watershed to large-scale mining would dramatically – and irreparably – alter the physical and ecological features of the Bristol Bay watershed in the specific respects enumerated in section 404(c).

The proposed mine will include both an underground block caving mine at the Pebble East Deposit and an above-ground open pit mine at the Pebble West Deposit and would destroy over 9,200 acres of habitat.[379] At its smallest, the open pit mine is projected to span over 2 miles and reach a depth of 2,500 feet.[380] Even at that scale, the Pebble Mine would be one of the largest mines in the world and the largest open pit mine in North America.[381] Tailings dams would be constructed to store 2 billion tons – and, more likely, more than 10 billion tons – of mine tailings in perpetuity.[382] The mine will remove over 35 billion gallons of water annually

[377] Id. at 33-34.
[378] Wardrop, Preliminary Assessment of the Pebble Project, at 36-47.
[379] Riley and Yocum, at 36.
[380] Wardrop, at 37.
[381] William Hauser, Potential Impacts of the Proposed Pebble Mine on Fish Habitat and Fishery Resources of Bristol Bay 2 (2007).
[382] Wardrop, at 52.

from wild salmon habitat.[383] Given that scale, EPA doesn't need a design blueprint to evaluate the environmental consequences of such a project in the Nushagak and Kvichak drainages. Mining development at that scale cannot exist in this watershed without dramatically compromising its physical, chemical and biological integrity.

EPA is currently conducting a Bristol Bay Watershed Assessment to better understand the consequences of large-scale development on water quality and the salmon fishery. This assessment will provide significant additional information regarding the impacts of mining in the watershed – information that would otherwise emerge during the 404 permitting process under the Clean Water Act. Because EPA will provide notice and public comment for the Watershed Assessment – and the assessment will be peer reviewed[384] – the agency will have a full factual record, tested by public notice and comment, on which to base its 404(c) decision. When EPA promulgated the section 404(c) regulations, the agency clearly understood and explained that this process would suffice no matter the status of the section 404 permit process.[385] Indeed, EPA rejected a separate procedure for the agency to follow when acting before the submission of a section 404 permit application.[386] In this case, EPA's own Watershed Assessment will therefore provide an extensive factual record upon which to initiate proactive action under section 404(c).

Acting proactively will allow EPA to engage in what it describes as "comprehensive planning rather than piecemeal decision making."[387] Addressing this issue at the front end – before permitting begins in earnest – will clarify the long-term future for large-scale metallic sulfide mining projects in the region. Environmentally, a proactive approach reflects good

[383] Moran, Water-Related Impacts at the Pebble Mine.
[384] EPA, Bristol Bay, available at http://yosemite.epa.gov/R10/ecocomm.nsf/bristol+bay/bristolbay.
[385] Denial or Restriction of Disposal Sites; Section 404(c) procedures, 44 Fed. Reg. 58076, 58077 (Oct. 9, 1979).
[386] Id.
[387] Id.

government practice by ensuring that an otherwise piecemeal approach to large-scale metallic sulfide mining in the region does not allow risky projects to slip through the cracks.

For all these reasons, EPA should act now and grant the pending petitions under section 404(c).

CONCLUSION

If ever there were a case for which section 404(c) is intended, it is this one. The proposed Pebble Mine would have devastating and unavoidable impacts on the fisheries, wildlife, ecology, and local communities that depend on the abundance of natural resources in and around Bristol Bay. Based on substantial evidence of those resources, the environmental risks generally associated with large-scale metallic sulfide mining, and the particular dangers of such mining in the Bristol Bay watershed, EPA intervention under section 404(c) of the Clean Water Act is not only warranted but necessary. The potential for environmental degradation of protected resources in this case far exceeds that found in any previous case in which EPA has invoked its section 404(c) authority.

Considering all of the circumstances, therefore, NRDC respectfully urges EPA, upon completion of its Watershed Assessment and before the section 404 permit process commences, to grant petitioners' requests that the agency initiate action under section 404(c) to prohibit, deny, or restrict the specification of the Pebble Mine site as a disposal area for the discharge of dredged or fill material in connection with proposed large-scale mining. In the alternative, NRDC supports the request made by BBNC that EPA, upon completion of its Watershed Assessment and before the section 404 permit process commences, initiate action to restrict mining the Pebble deposit by (1) prohibiting the discharge of dredged or fill material from the Pebble deposit to wild salmon spawning and rearing habitat; (2) prohibiting the discharge of

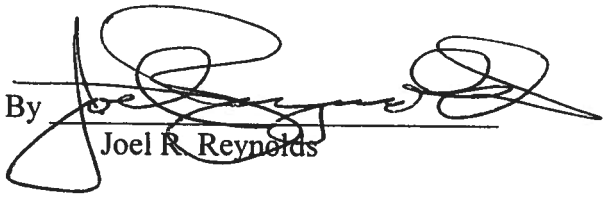
dredged or fill material from mining the Pebble deposit that does not meet testing requirements demonstrating that such material is not toxic to aquatic life; and (3) prohibiting the discharge of dredged or fill material from mining the Pebble deposit where runoff and seepage would require treatment in perpetuity.

Dated: March 28, 2012

Respectfully submitted,

JOEL R. REYNOLDS
TARYN KIEKOW
MATTHEW SKOGLUND

Attorneys for
NATURAL RESOURCES DEFENSE COUNCIL



By _____
Joel R. Reynolds