PEBBLE WATCH *explores*

March 2014

Clean Water Act | 404(c) process | Watershed Assessment

Your guide to the U.S. EPA and Bristol Bay

Inside

Bristol Bay NATIVE CORPORATION
Land Department

On Feb. 28, 2014, the U.S. Environmental Protection Agency (EPA) announced that it is using its authority under Section 404(c) of the Clean Water Act, "to review potential adverse effects" of mining the Pebble deposit. Such a review has potential to limit permitting of the proposed mine—or could stop it altogether.

However, such a process is not expected to happen overnight.

EPA's announcement follows three years of study by the agency for its Bristol Bay Watershed Assessment. The final version of that risk assessment, published this January, helped inform EPA's action, and its conclusions will continue to be an important part of the conversation. In these pages, we summarize the final Assessment and describe the steps involved in the next process—the 404(c) process—which will include its own opportunities for public comment.

Mine scenarios used for the Assessment drew to some extent from preliminary mine plans; if developers or the state share alternate plans with EPA by the agency's deadline (April 29, 2014), the agency will have to consider those as well.

For updates, please follow our Facebook page, www.facebook.com/pebblewatch, or visit our website, at www.pebblewatch.com.

TIMELINE

Events leading up to EPA's process toward 404(c) action in Bristol Bay:

May 2010 – Requests for 404(c) action
Nine federally recognized Tribes and other organizations ask EPA to use Clean Water Act authority to stop Pebble mine development.

Feb 2011 – Study period
EPA announces its watershed assessment plan to assess risks. A study period begins, during which EPA interviews Bristol Bay area residents, collects scientific information, and gathers input from other government agencies and Tribes. EPA drafts the first version of the Assessment, providing public updates along the way.

May 2012 to Jan 2014 – Drafts/review/comments/revisions
EPA releases two draft assessments during this time, both followed by public input periods and peer review. Each draft lands in the top 10 of most-commented-on documents in EPA history.

Jan 2014 – Final assessment released
The final report finds that large-scale mining in the studied watersheds would have inevitable negative effects on salmon in Bristol Bay.

Feb 2014 – 404(c) action announced
EPA announces its intent to pursue the 404(c) process to protect Bristol Bay. "The Bristol Bay fishery is an extraordinary resource, worthy of out-of-the-ordinary agency actions to protect it," stated Gina McCarthy, EPA's Chief Administrator.

404(c) Clean Water Act

PROCESS

To use its Section 404(c) authority to protect the Bristol Bay fishery, EPA is required to follow systematic steps. Here's a guide to the process.

INTENT TO ISSUE PROPOSED DETERMINATION

EPA notifies Pebble Limited Partnership, the U.S. Army Corps of Engineers and the State of Alaska by letter that it intends to issue a Proposed Determination to withdraw, deny, prohibit or restrict the Pebble deposit area for discharge of dredge and fill material.

CONSULTATION PERIOD

A consultation process of at least 15 days* begins, giving project proponents the opportunity to demonstrate that no unacceptable adverse effects will occur.

PROPOSED DETERMINATION

A Proposed Determination is published with information on EPA's proposed prohibitions or restrictions on mining the Pebble deposit. Public notice is printed in the Federal Register.

PUBLIC REVIEW/COMMENT PERIOD

Comment period of at least 30 days,* includes one or more public hearings.

RECOMMENDED DETERMINATION

EPA Regional Administrator reviews public comments and prepares the Recommended Determination to withdraw or restrict the area from disposal and filling of dredge material. It is forwarded to EPA headquarters.

2ND CONSULTATION PERIOD

Within 30 days*, EPA contacts the Corps, the State of Alaska and Pebble Limited Partnership, and gives them 15 days* to take corrective action to prevent unacceptable adverse effects.

FINAL DETERMINATION

Within 60 days*, EPA modifies or rescinds the Recommended Determination and publishes notice of Final Determination.

Pebble Limited Partnership may then legally challenge the Final Determination.

At any point in this process, EPA could decide further review under Section 404(c) is no longer necessary.

***Any deadline may be extended for good cause.**
Extensions to public comment periods are published in the Federal Register.

TERMINOLOGY

Clean Water Act (CWA) – Passed in 1972, this law aims to maintain or restore the integrity of the nation's waters, including its wetlands. CWA regulates the discharge of wastewater, pollutants and dredge and fill materials into waters of the United States. The Act emphasizes conservation of waters for protection of fish and wildlife and for recreation purposes.

Dredge & Fill – Excavation in wetlands or other surface waters; depositing material (such as earth, clay, gravel, rock) in wetlands or other surface waters.

Section 404 – Part of the Clean Water Act; regulates dredge and fill materials entering wetlands, streams or other waters. Under Section 404, the U.S. Army Corps of Engineers issues permits for activities that would place fill in wetlands. The permitting process, overseen by EPA, requires that projects show they can take appropriate steps to avoid, minimize, and offset adverse impacts.

Section 404(c) – If a discharge of fill would result in a "significant loss or damage to fisheries, shellfishing, or wildlife habitat or recreation areas," Part C of Section 404 authorizes the EPA to withdraw, deny, prohibit or restrict those areas to discharge – before or after a permit has been submitted.

Federal Register – Journal of the federal government in which rules and public notices are published. Online version is searchable: www.federalregister.gov.

Determination – Decision by a federal agency. One of the first steps in the 404(c) process is publication of a Proposed Determination recommending limitations for discharge of dredge and fill material. This is typically followed by a Recommended Determination and, in some cases, a Final Determination.

FAQ

How often has EPA used its 404(c) authority?

The EPA's 404(c) authority has been used sparingly. According to the Corps of Engineers, 60,000 permits are processed each year. EPA has initiated the 404(c) process 29 times in the 42 years since the Clean Water Act was passed. In 13 cases, it issued restrictions (none in Alaska). In only one case were restrictions issued before a permit application had been submitted.

How long will this take?

Length of time for the 404(c) process has so far averaged about one year per 404(c) action. But the Pebble 404(c) could require more time due to an unprecedented amount of public interest.

Can permitting proceed during the 404(c) process?

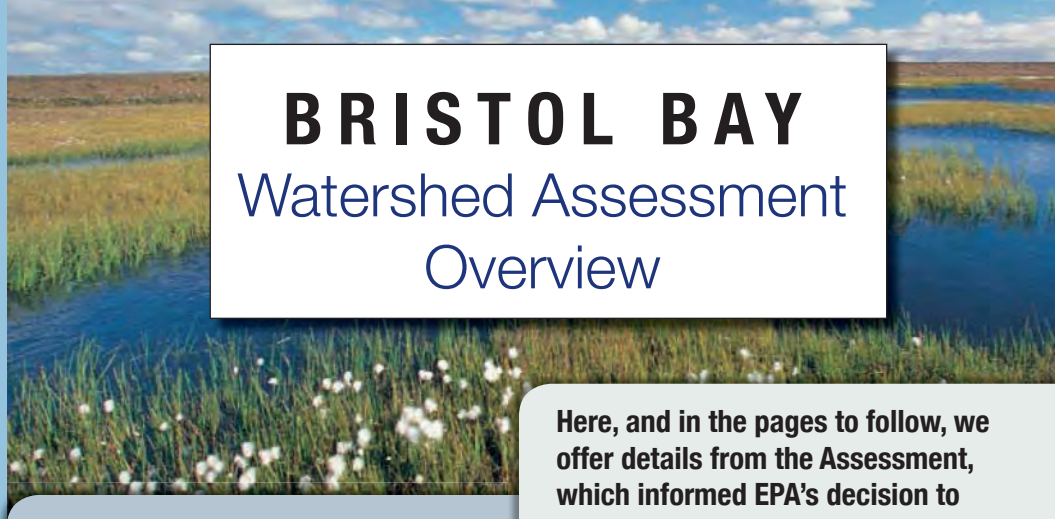
No. The Corps of Engineers may not issue a permit for fill in wetlands or streams associated with mining the Pebble deposit until the 404(c) process is complete.

Will EPA now attempt to restrict other mines or development in Alaska or the Lower 48?

EPA administration has said its decision to use Section 404(c) in Bristol Bay has no impact on other mine projects around the country or elsewhere in Alaska.

What if a 404(c) Determination is successfully challenged or rescinded?

For development to proceed, one of the most critical permits needed would be for Dredge and Fill. Applying for this permit would trigger the National Environmental Policy Act (NEPA) process, involving: multiple opportunities for public involvement; scientific analyses of environmental, economic and social impacts; and specific requirements to mitigate potential impacts. The NEPA process takes several years to complete.



BRISTOL BAY
Watershed Assessment Overview

Here, and in the pages to follow, we offer details from the Assessment, which informed EPA's decision to pursue 404(c) action.

Major findings

Effects of normal operations

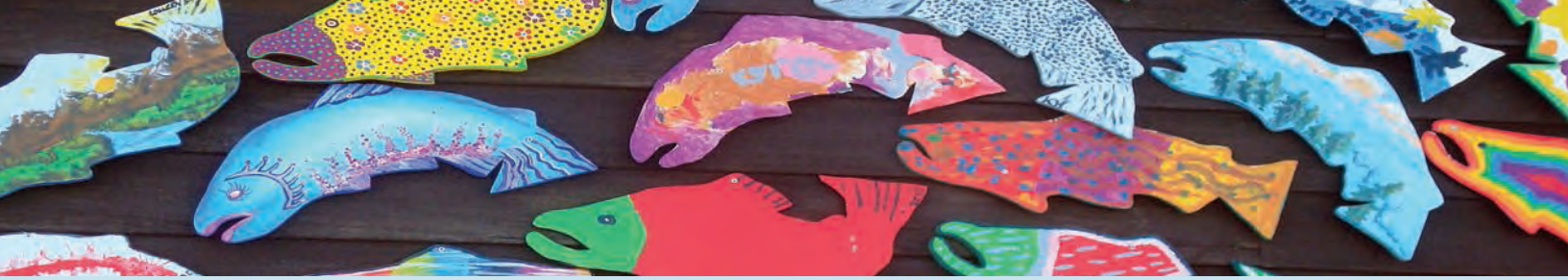
- Day-to-day operation of a large-scale mine would impact 24 to 94 miles of fish-bearing streams, and would eliminate up to 5,350 acres of wetlands, ponds and lakes.
- Up to 33 additional miles of salmon-bearing streams would be affected by altered streamflows.

Effects in case of failure

- Partial tailings dam failure would result in lost or low-grade fish habitat for decades and near-complete loss of some fish populations.
- Transportation corridor: Culvert failures, runoff or spills would put spawning areas at risk in 55 known salmon streams.
- Wastewater treatment plant failure would have direct and indirect adverse effects on fish in up to 62 miles of streams.
- Pipeline release of toxic copper concentrate or diesel fuel would contaminate salmon-supporting streams and wetlands.

Chapter guide

Chapter titles and page counts in the final Assessment are as follows:



BRISTOL BAY
Physical environment

Focus on Chapter 3

Chapter 3 details the physical environment of Bristol Bay's Kvichak and Nushagak watersheds, including factors that affect the health of salmon populations.

Existing development

Significant human development is absent from the area. EPA notes: human-caused modification of landscape is a contributing factor in areas that have lost native salmon populations.

Landscape & hydrology

Five "physiographic divisions" are described, from flat, rolling landscape to steep, glaciated mountains. Some areas serve as major water sources for lower portions of the watersheds. Identifying 18 hydrologic landscapes across the Nushagak and Kvichak river watersheds helps better evaluate streamflow and fish populations.

Groundwater

Groundwater and its interaction with surface water is important for high-quality salmon habitat. Salmon lay their eggs in areas where cold water flows over, upwells and downwells through porous gravel. Streamflow is also affected by contributions from groundwater.

Aquatic habitats

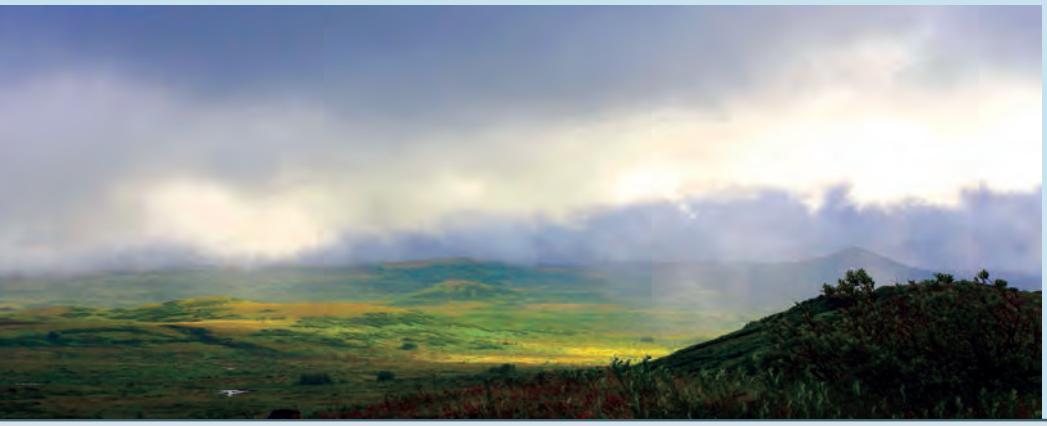
The resilience of the Bristol Bay watershed is linked to the complexity of its aquatic habitats. These habitats support a genetic diversity of salmon populations, which is a contributing factor to the success of the fishery.

Water quality

Water chemistry indicates undisturbed streams, with higher naturally occurring metallic content in some areas near the deposit. Water temperature varies by location and is influenced by groundwater inputs, upstream lakes and tributaries. Groundwater-surface water interactions help moderate the extremes of summer heat and winter cold.

Seismicity

Southwest Alaska is located along the Pacific plate subduction zone, an area where two plates of the Earth collide and can produce seismic events such as earthquakes. Long-term seismicity data specific to the Pebble deposit area, however, is lacking, making it difficult to evaluate the likelihood of future earthquakes in the area.



Climate change

EPA looked at future precipitation and waterflow possibilities based on a climate change model simulation. While uncertainties exist, the model predicts generally that the landscape will be warmer and wetter in the future, which likely would have negative effects on fish spawning and rearing.

Uses for the Bristol Bay Watershed Assessment

Education – More than 1,300 pages of Information about Bristol Bay, large-scale mining and Alaska Native cultures provides a resource for anyone studying the area, particularly stakeholders who want a better understanding of large-scale mining and its risks.

Permitting – As large-scale mining projects in the area move into the permitting phase, the Assessment will provide information for agencies, such as the U.S. Army Corps of Engineers, that would consider permits.

Policy – The Assessment can be used as a tactical document to guide policy decisions. For example, it informed EPA's recent decision to pursue a Section 404(c) permit veto under the Clean Water Act to limit development in the area.

Focus on Chapter 5

BRISTOL BAY
Values of concern

Chapter 5 is an overview of three "endpoints," or environmental values that would be impacted by large-scale mining.

Salmon and other fish

The Assessment emphasizes that Bristol Bay region fisheries are unique and have global conservation value and global cultural significance. The area is home to at least 29 fish species, including all five types of Pacific salmon. This compares to other parts of the Western United States, where salmon no longer exist in 40 percent of their historic breeding grounds.

More than half of Bristol Bay's sockeye salmon harvest comes from the Nushagak and Kvichak rivers. Success of this fishery is linked to the complexity of the physical habitat and the biological complexity of the fish populations. Studies of the Bristol Bay sockeye salmon populations show many genetic variations in these fish, which are adapted to specific local environmental conditions. This strengthens the population as a whole, creating a "biological portfolio effect" that can be likened to a financial portfolio, in which assets are spread out to increase financial stability.

Salmon & marine-derived nutrients

When adult salmon return from the ocean, they bring significant amounts of carbon, phosphorous and nitrogen that contribute to the health of the ecosystem. Salmon eggs and carcasses, and the macroinvertebrates that feed on them, are all food sources for other animals, which spread these nutrients throughout the ecosystem.

EPA's Assessment focuses only on "fish-mediated" impacts. This means the agency looked primarily at the potential impact of reduced salmon populations on wildlife and Alaska Native cultures, and not other direct impacts of large-scale mining.

Wildlife

The Bristol Bay area is home to large numbers of wildlife, and in this Assessment, EPA describes the life histories and abundance of brown bear, moose, caribou, gray wolves, bald eagles, waterfowl, shorebirds and land birds. Some of these are salmon predators or scavengers. Others benefit from increased vegetation supported by marine-derived nutrients entering the ecosystem from salmon consumption or salmon carcasses.

Alaska Native cultures

EPA describes the Yup'ik and Dena'ina of Bristol Bay as among the last intact salmon-based cultures in the world. Today, Alaska Natives in Bristol Bay maintain a subsistence lifestyle based on hunting, harvesting, processing, sharing and trading resources from the land (animals, fish and plants). For most Elders and culture bearers, wealth is equated not with monetary goods, but with stored and shared subsistence foods. A subsistence lifestyle is also supported by a market economy, much of which is driven by the commercial fishery and tourism. It is estimated that in 2009, Bristol Bay residents earned nearly $78 million of the income traceable to the salmon ecosystem.

From Appendix D

"Salmon and clean water are foundational to the Yup'ik and Dena'ina cultures in the Nushagak and Kvichak watersheds. The people in this region not only rely on salmon for a large proportion of their highly nutritional food resources; salmon is also integral to the language, spirituality, and social relationships of the culture. Because of this interconnection, the cultural viability, as well as the health and welfare of the local population, are extremely vulnerable to a loss of either quality or quantity of salmon resources."

BRISTOL BAY
Mining & minerals

Basics of copper mining

Porphyry copper is a low-grade ore that must be extracted from surrounding rock. It is expected that up to 99 percent of ore processed from the Pebble deposit would end up as tailings waste headed for storage. (See chart, Ch. 4, p. 14)

Building infrastructure – To develop a mine, operators must clear the site and build the infrastructure, which would likely include facilities for crushing and grinding the rock, waste rock disposal facilities, tailings dams, water supply and treatment plants, roads and pipelines, as well as buildings for offices and housing.

Extracting metals – For both open pit and underground mines, excavated rock is taken to a crushing plant to reduce the ore to a size of less than 15 centimeters. That material is trucked or sent by conveyer to a ball mill, where the particle size is further reduced.

The milled ore is put through a flotation process with a mixture of chemical reagents to recover copper, molybdenum and gold into a concentrate. Waste material is sent to a tailings storage facility. The concentrate may be fed through a second ball mill to grind the particles again. It is sent through another flotation process, then to a copper-molybdenum separation process.

The final three products are a copper (+gold) concentrate that goes to market via a pipeline, a molybdenum concentrate that is trucked out, and pyritic tailings that are stored in a tailings storage dam. Pyritic tailings can generate acid waste, which has toxic effects on aquatic life if not adequately contained.

Minerals

Mineral deposits found in the Bristol Bay area include large amounts of copper, as well as gold, molybdenum and smaller quantities of other metals. The Pebble deposit is one of the world's largest known copper porphyry deposits, with an estimated 11.9 billion tons of recoverable ore (worth $300 billion to $500 billion over the life of the mine). Ten additional blocks of mining claims have been filed near the Pebble deposit.

3 PHASES OF A MINE

Operation
The period of mine construction and ore extraction.

Closure
Mining operations cease; reclamation begins.

Post-closure
Monitoring and maintenance may be required for decades, centuries, or "in perpetuity."

Impacts, permitting and more

Chapter 4 also describes:

- Ways to reduce the impacts of large-scale mining, including best management practices, mitigation, remediation and reclamation. (EPA explores these concepts in detail in Appendices I and J.)
- The large mine permitting process in Alaska.
- Financial assurances developers must have in place before hard rock mining in Alaska.
- Characteristics of past, existing or potential large mines in Alaska. (Here's where you can see how Red Dog, Fort Knox, Greens Creek, Pebble and more compare to each other in size, amount of tailings and acid mine drainage potential.)
- Chemicals typically used in ore processing, as well as how cyanide is used in gold recovery.
- Tailings management techniques, including types of tailings dams.

PEBBLE DEPOSIT

Mine scenarios

To assess risks of large-scale porphyry copper mining in Bristol Bay, EPA developed three mine-size scenarios at the Pebble deposit in the headwaters of the Nushagak and Kvichak river watersheds. EPA based its analysis on the Pebble deposit because it has been studied most and is most likely to be developed in the near term.

Scenarios draw on "preliminary plans developed for Northern Dynasty Minerals (NDM), consultation with experts, and baseline data collected by the Pebble Limited Partnership to characterize the mine site, mine activities, and the surrounding environment." (Northern Dynasty owns 100 percent of the mineral claim on the Pebble deposit.)

Pebble 0.25	Pebble 2.0	Pebble 6.5
Assumes 250 million tons of ore extracted over 20 years. Similar characteristics as mines that could be developed in other parts of the Bristol Bay watershed.	Assumes 2 billion tons of ore extracted over 25 years. Scenario based largely on 2011 NDM Preliminary Assessment.	Assumes 6.5 billion tons of ore extracted over 78 years. Scenario based largely on 2011 NDM Preliminary Assessment.

Names reflect the amount of ore (in billions of tons) extracted under each scenario.

While the agency has received criticism for using what it calls "hypothetical" scenarios, it emphasizes that they are based on realistic, modern mining methods and detailed information from the NDM report, in which preliminary plans were described as "economically viable, technically feasible and permittable."

EPA notes that all mining plans are in some respects "hypothetical," as they change over time, even during the permitting phase. Pebble Limited Partnership (PLP) spokesman Mike Heatwole told Pebble Watch in 2013 that mine plans do change throughout the permitting process. In essence, even if EPA had waited to analyze an official PLP mine plan, that would not be the final design.

Other critics of EPA's report said that the agency underestimated impacts of mining on Bristol Bay. EPA addresses this concern in Chapter 6 of its final report, acknowledging that the largest mine scenario it used is based on extracting 6.5 billions tons of ore, just over half of the estimated 11.9 billion tons of ore at the Pebble deposit.

"Were a mine to be developed that fully extracted this amount of ore, potential effects could be significantly greater than those estimated in the assessment." (Ch. 6, p. 4)

(Mine scenarios are detailed more fully in Chapter 6.)

Operation — Open pit method using drill and blast excavation techniques. Pit surface area: From nearly 1 to 11 square miles. Pit depth would range from nearly one-fifth to three-quarters of a mile.

Ore processing — Ore goes through an in-pit crusher and then a flotation system. Off-site processing would be required, so copper/gold slurry would be piped to Cook Inlet and then shipped; molybdenum would be bagged and trucked. The process produces a mix of potentially acid-generating and non-acid-generating tailings that would be kept in a tailings storage facility.

Tailings storage facility — The Pebble 0.25 scenario would require a 301-foot-high tailings storage facility. The Pebble 2.0 facility would be 685 feet high. Pebble 6.5 would require three facilities with a combined surface area of 30 square miles.

Waste rock pile — Billions of tons of waste rock could be processed later to extract additional minerals, but would likely be stored.

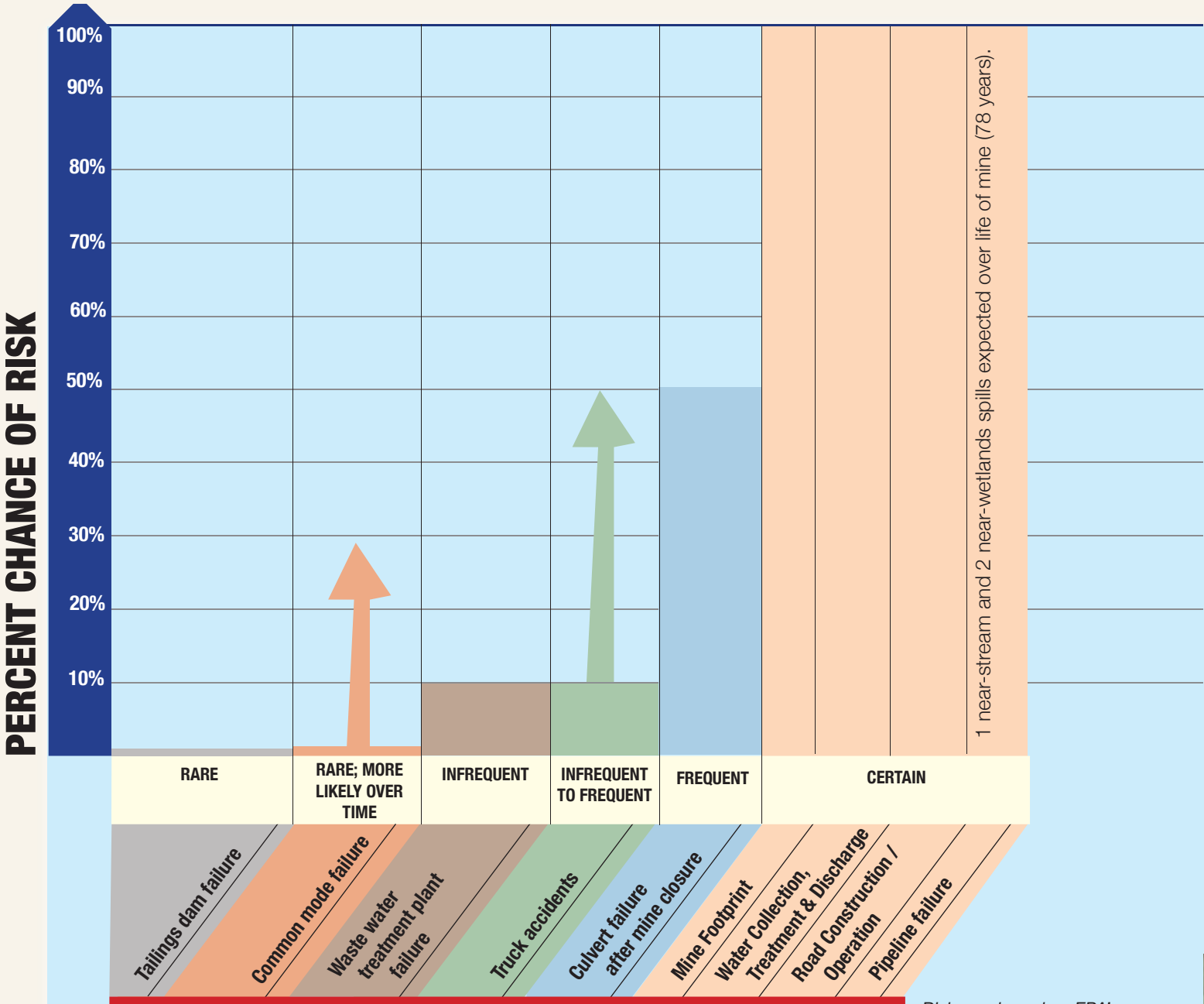
Water management — Significant impacts from large-scale mining relate to how the operation uses water. EPA created a water balance study showing water in, water out and consumptive water use for each mine scenario.

Transportation corridor — An 86-mile two-lane road between the mine site and Cook Inlet would haul goods in and out of the mine area, cutting across many streams, rivers and wetlands. The corridor would include four pipelines for copper (+gold) concentrate, diesel fuel, natural gas and return water.

Post closure site management — After closure, the mine pit, waste rock piles and tailings storage facilities are left behind. Water and seepage capture/treatment systems would need to be maintained for hundreds or thousands of years.

BRISTOL BAY
Risks of mining

Chapters 7-11 address risks associated with large-scale mining infrastructure at the Pebble deposit, based on relevant historical failure rates, interpreted "cautiously." This graphic lists the main risks and their probabilities.



EFFECTS	
Complete loss of habitat in short-term low-quality habitat for decades; far-reaching effects.	Blocked /washed out culverts can block fish and degrade salmon habitat.
Multiple failures from a large event (like an earthquake) would cause effects listed here.	Degraded fish habitat, including destruction or modification of streams, wetlands and ponds, stormwater runoff, dust, sediment and possible invasive species; toxic effects on fish.
Toxic leachate mixes with untreated wastewater and is toxic to invertebrates and possibly fish.	
Toxic chemical or molybdenum spills would likely degrade salmon habitat.	

Risks are based on EPA's Pebble 2.0 and Pebble 6.5 mine scenarios that would extract 2 billion to 6.5 billion tons of ore from the estimated 11.9 billion-ton deposit. If the entire ore deposit were extracted, risks would be greater.

For detail on probabilities and consequences, see EPA's table, Chapter 14, p. 5.

Focus on Chapters 12 to 14

Chapter 12 describes effects of salmon loss or reduction on wildlife and Alaska Native cultures, Chapter 13 covers the risk posed by multiple mines, and Chapter 14 provides an overview, with risk organized by "endpoints," such as fish, wildlife and Alaska Native cultures.

Risks to Alaska Native cultures

As one of the last intact salmon-based cultures in the world, Alaska Native cultures in the Bristol Bay region were of particular interest in EPA's Assessment. How would reductions or loss of salmon affect the cultures that rely on them? EPA states that fish-mediated effects would vary based on the magnitude of salmon resources lost. However, even routine operations likely would cause some loss of fish, as well as a perception of lower quality fish (resulting in decreased consumption). This would affect the health, social networks, cultural cohesion and spiritual well-being of Alaska Native cultures in the region.

Loss of wetlands, ponds & lakes

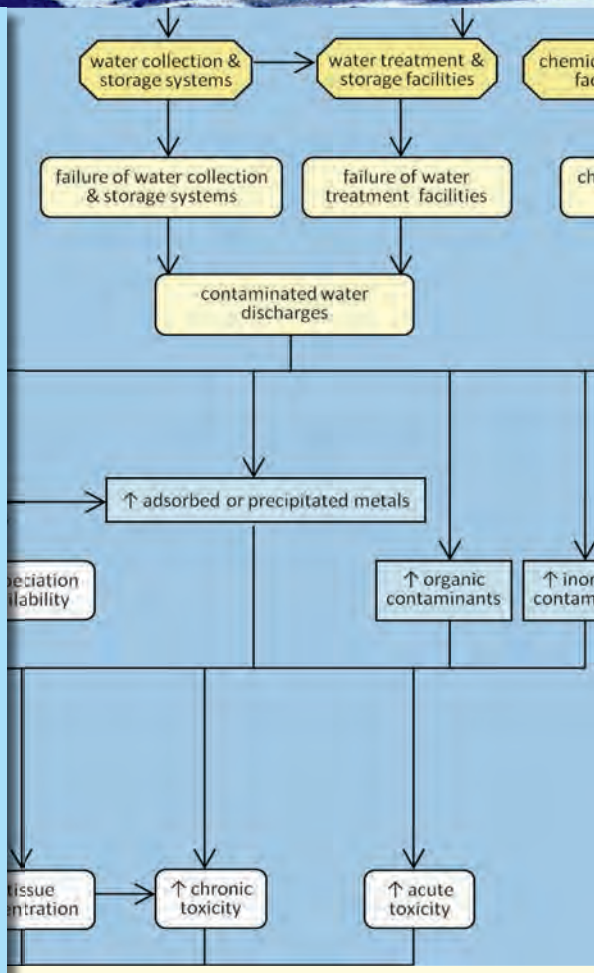
Wetlands, ponds and lakes provide important habitat, spawning and rearing grounds for salmon and other fish. The mine scenarios studied would require excavation or filling-in of up to 11.2 square miles of wetlands and 1.1 square miles of ponds and lakes. Additional losses would occur in the area near the roadbed of the transportation corridor and in the riparian floodplain.

Risks to wildlife

A reduction in salmon would likely directly affect wildlife that uses it as a food source, including brown bear, wolves, and bald eagles and other birds. Indirect effects on birds, moose and caribou through loss of aquatic invertebrates and marine-derived nutrients to vegetation are also likely. However, the interactions between salmon and wildlife are complex and are difficult to quantify.

Cumulative Risks: multiple mines

EPA's report makes it clear that the Pebble deposit in Bristol Bay is not the only mineral resource in the area: Several nearby mining claims could be developed more easily if mining and transportation infrastructure at the Pebble site were in place. Planning documents and patterns of mineral exploration suggest that a scenario for a "mining district" could be realized within 50 to 100 years. Chapter 13 discusses six mines specifically, and predicts their potential impact on fish, wildlife and Alaska Native populations.



Conceptual models are used in EPA risk assessments to link cause and effect.

What is a risk assessment?

The Bristol Bay Watershed Assessment was conducted based on a scientific process that EPA routinely uses to determine whether adverse ecological effects would occur under certain stressors.

To answer the question of how large-scale copper porphyry mining would affect Bristol Bay salmon, the ecological risk assessment conducted by EPA consisted of: 1) analyzing existing characteristics of Bristol Bay and its resources, 2) analyzing existing copper mining methods, 3) developing realistic mine scenarios, and 4) developing the risk analysis and characterization.

Uncertainties, a part of any risk assessment, are detailed throughout the document.

BACK MATTER:
Not to be overlooked

Fused glass mosaic by Patricia Walsh, Dillingham.

The appendices of the Assessment contain a wealth of background information, such as summaries of published research. Dig deeper there for detailed information on the following topics.

Appendix A: Fishery Resources

A review of the biology, ecology and management of the fish in Bristol Bay, with an emphasis on those of great cultural and economic importance - sockeye salmon, Chinook salmon and rainbow trout.

Appendix B: Non-Salmon Freshwater Fishes

What other types of fish, besides salmon, are harvested in Bristol Bay? Which species, found less frequently, still play important roles in the ecology of the watershed?

Appendix C: Wildlife Resources

What kinds of wildlife are present in the Bristol Bay region? How are they dependent on marine-derived nutrients and/or salmon?

Appendix D: Traditional and Ecological Knowledge and Indigenous Cultures

The unique status and vulnerabilities of the indigenous Dena'ina and Yup'ik cultures of Bristol Bay. Includes results and quotes from a survey of 53 Elders and culture bearers.

Appendix E: Bristol Bay Wild Salmon Ecosystem: Economic Activity and Values

A summary of the major economic components of the Bristol Bay fishery, including subsistence use, sport fishing, commercial fishing and other recreation and preservation values.

Appendix F: Biological Characterization: Bristol Bay Marine Estuarine Processes, Fish and Marine Mammal Assemblages

Bristol Bay provides Essential Fish Habitat (EFH) to salmon and other marine species. A healthy habitat both supports and results from interactions between abundant salmon and natural processes.

Appendix G: Environmental Impact of Potential Road and Pipeline Development on Water Quality and Freshwater Fishery

What effects would a road and pipelines have on streams, rivers, lakes and wetlands in the Bristol Bay watershed? How does the existing geology and the lack of development in the area contribute to its abundant fishery?

Appendix H: Porphyry Copper Deposit Descriptions with Emphasis on Potential Future Development

Technical description of copper deposits in the Bristol Bay watershed, noting that the size of the Pebble deposit places it in the top 5 percent of porphyry copper deposits globally.

Appendix I: Conventional Water Quality Mitigation Practices for Mine Design, Construction, Operation, and Closure

What are the conventional practices used to avoid or minimize adverse impact of large-scale hard rock mining?

Appendix J: Compensatory Mitigation and Large-Scale Hardrock Mining

Is there sufficient compensation to offset the negative effects large-scale mining would have on wetlands, streams and fish? This appendix considers the efficacy of several potential mitigation strategies.

Photo credits: Cover/p. 3: U.S. EPA, Back page: U.S. Fish and Wildlife Service, All other: Bristol Bay Native Corporation and Bristol Bay Resource Solutions, LLC

ABOUT THE ASSESSMENT

What it is

- An environmental risk assessment of large-scale mining in Bristol Bay, Alaska.
- A scientific document that can inform regulatory action and permitting decisions.
- Assessment of probable direct impacts of large-scale mining to salmon populations.
- Assessment of consequent effects of salmon loss on wildlife and Alaska Native populations.
- Synthesis of available research, using credible sources.

What it isn't

- Not a regulatory action.
- Not a cost-benefit analysis of mining vs. commercial fishing, an environmental impact assessment or assessment of a particular mine.
- Not a risk assessment of Cook Inlet deep water port or electrical generating plant, although such development necessary for a large-scale mine would also have potential impacts on the salmon fishery.
- Not a risk assessment of direct impact of mining on Alaska Natives or wildlife.
- Not original scientific research.

Public input

EPA visited Bristol Bay on multiple occasions to gather information and feedback from residents. Additionally, it provided public input periods after releasing the first and second drafts of the Assessment. All together, more than 1 million comments were submitted to the EPA, landing the draft versions of the Bristol Bay Watershed Assessment in the "Top 10" of most-commented on EPA documents ever. The public was also invited to nominate peer review panelists, comment on the charge questions panelists would consider, and attend and comment at public meetings. EPA plans to publish more than 5,000 relevant public comments and the agency's responses in a report that is still in progress.

Note: *For ease of reading, we refer to EPA's study as the "Bristol Bay Watershed Assessment" or "Assessment" throughout this publication. Its official title is "An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska." Information contained in this document represents an unofficial summary of the EPA's final report. This overview was not prepared by the EPA and is not intended to be comprehensive. Access the full report at* **www2.epa.gov/bristolbay**.

Bristol Bay Watershed Assessment Peer Review

For any scientific document, a peer review is a critical part of the process. EPA states that peer review "is a process for enhancing a scientific or technical work product so that the decision or position taken by the Agency, based on that product, has a sound, credible basis."

Selection of panelists – EPA obtained public input to build a pool of 68 possible panelists. Twelve independent scientists, all doctorate-level scientists from universities and agencies around the nation, were selected for the peer review panel. Factors for selection included areas of expertise and a lack of conflicts of interest.

The process – For both draft versions, panelists provided overall impressions and specific responses to 14 "charge questions" asked by EPA. Additionally, the group met in August 2012 to hear public concerns and held both open and closed deliberations.

Comments – The panelists' comments were extensive and ranged from very general to highly specific. EPA addressed each one, and in most cases made substantive changes. Reviewer comments and EPA's responses to them are presented in a 400-page "Response to Peer Review Comments." Reviewer comments in this document reflect that they were generally satisfied with EPA's changes.

Sources

EPA reports using more than 700 resources to develop the Assessment, a listing of which appears in Chapter 15. They include peer-reviewed published research, state and federal agency reports, input from EPA staff, other experts and tribal Elders. In response to criticisms, resources that had been questioned in early drafts were removed; however, EPA says their absence did not impact the agency's final conclusions.

Bristol Bay
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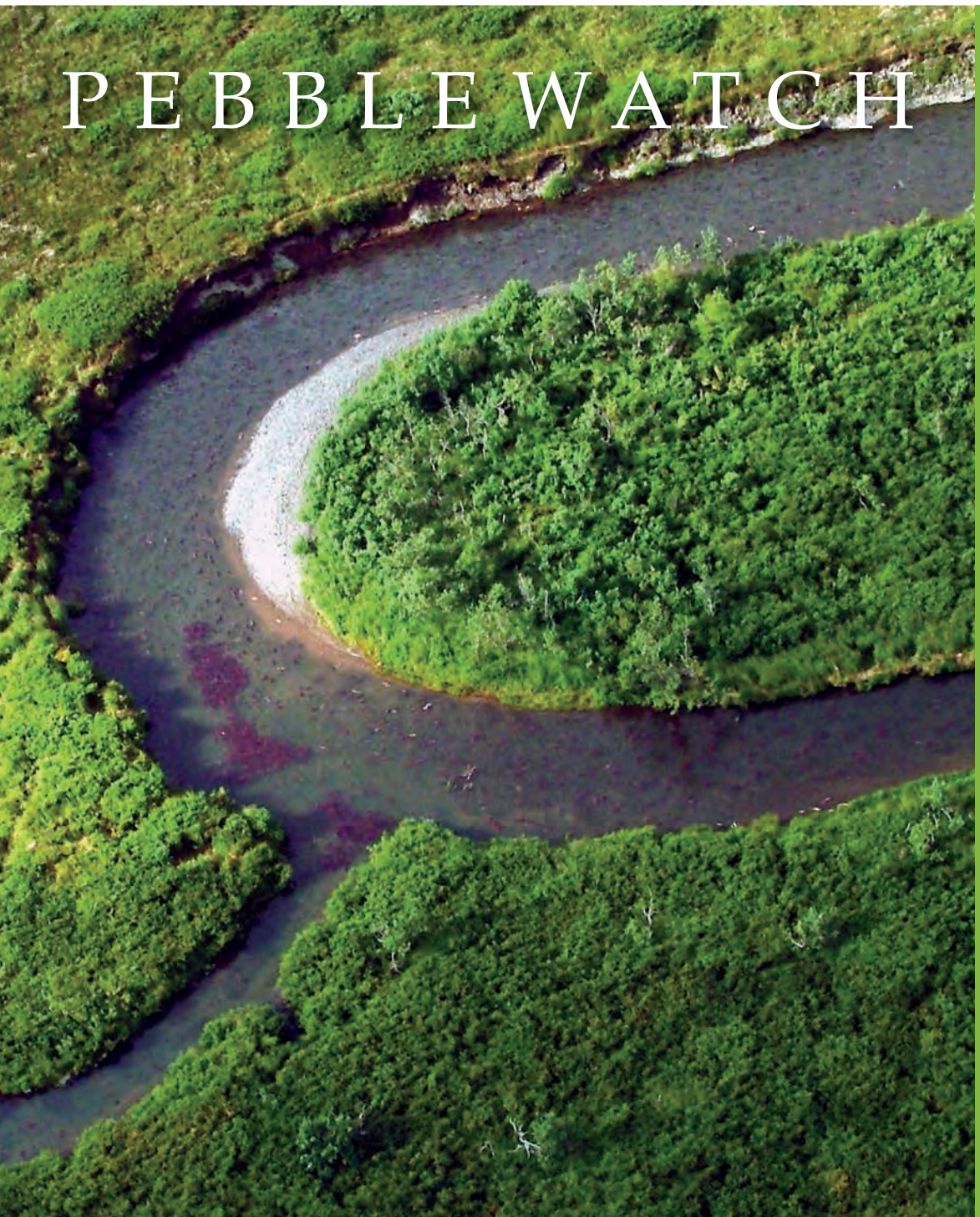
PEBBLE WATCH



Special issue:

The U.S. Environmental Protection Agency is considering restrictions for mining the Pebble deposit in Bristol Bay.

- What can the public expect from that process?
- What is the science behind the decision?
- What does the EPA's final Bristol Bay Watershed Assessment say about mining in the region?

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