

# PEBBLE WATCH *explores*



## Overview of the external peer review report on the U.S. EPA's draft Bristol Bay watershed assessment

### About Pebble Watch

Pebble Watch is an impartial, educational and fact-based resource for sharing information about the proposed Pebble project. It is a program of the Bristol Bay Native Corporation Land Department.

Visit Pebble Watch online or "Like" us on Facebook for regular announcements.

The Pebble Watch team consists of scientists and science communicators who can research and answer your questions about issues related to potential Pebble mine development—from science reports to permitting.

Call (800) 426-3602 or write [staff@pebblewatch.com](mailto:staff@pebblewatch.com).

*All information contained in this overview represents an unofficial summary of the peer review report. This summary was not prepared by EPA and is not intended to be comprehensive. Please access the full 193-page report for details.*



In May, the U.S. Environmental Protection Agency (EPA) published its draft Bristol Bay watershed assessment, which was followed by public meetings and a 60-day comment period. In August, EPA convened a 12-member peer review panel to provide an independent review of the document.

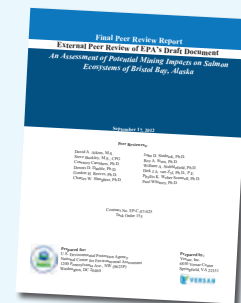
Peer reviewers were asked to comment on the draft assessment, guided by 14 questions developed with input from the public. The reviewers held three days of meetings in Anchorage, where they heard testimony from about 100 people.

This month the EPA released the official peer review report, which commended the EPA on the assessment and offered a number of recommendations for improving the document.

This guide provides highlights of some of those recommendations.

The EPA said it will address the concerns raised in the report and will also convene a group of experts to review the revised assessment. The final Bristol Bay assessment will reflect this further expert review and be accompanied by a point-by-point response to the peer reviewer and public comments.

For in-depth reading, including Pebble Watch's guide to the draft assessment and links to the entire peer review report, visit [www.pebblewatch.com/resources](http://www.pebblewatch.com/resources).



### Peer review report includes:

193 pages

Summary of key recommendations

Detailed comments from 12 peer reviewers

Biographies of peer reviewers

Summary of technical, scientifically substantive public comments

**The final watershed assessment is anticipated in early 2013.**

# HIGHLIGHTS OF KEY RECOMMENDATIONS

The peer review team's report provides a summary of recommendations in the areas of: document scope, technical content, editorial suggestions and research needs.

Recommendations from peer reviewers do not reflect a consensus or group perspective, but are individual comments compiled into one document.

This overview includes highlights from the document scope, technical content and research needs portions of the report.

For detailed comments from each reviewer, access the full report online at [www.pebblewatch.com](http://www.pebblewatch.com).

## Document scope

**Peer reviewers suggested some changes impacting the scope of issues addressed by the assessment – and how these should be implemented.**

- Clarify the purpose of the document to be consistent with ecological risk assessment processes.
- Include a statement about the role of risk managers and others – such as regulators, mine owners and engineers – in helping with risk assessment.
- Review effects beyond fish-mediated ones. Explain why the scope for human and wildlife impacts was limited to fish-mediated effects, and why those effects were limited to Alaska Native cultures.
- Be consistent in the levels of detail provided for the various scenarios and stressors.

## Technical Content

Suggestions for technical content changes were offered for each of the science specialties the assessment addressed.

### MINE SCENARIO

- Document should be a screening-level assessment of all potential stressors, rather than focusing on catastrophic events.
- Reexamine the use of historical data and case studies when looking at the risk of failures; the examples used may not compare to a new mine in the Bristol Bay watershed.
- Expand on the use of “best” management practices rather than “good” practices, but don't assume that technology alone will always mitigate risks.
- Adopt a broader range of mine scenarios, including smaller mines and an underground mine.
- “In perpetuity” should be emphasized, using existing monitoring practices (such as at the Equity Silver Mine in British Columbia). Discuss the conditions needed after closure.
- Give technical details on how exploratory effects were managed, including roads, airstrips and fuel dumps, and what mitigation has been undertaken on these sites. Assess the impacts in the Cumulative Risks section.

### WILDLIFE

- Where appropriate, include other levels of ecology into the stressors assessment. Levels might include individual (such as a bald eagle nest), population, community, ecosystem and landscape.
- Discuss fishes other than salmonids, rainbow trout and Dolly Varden. Also, primary and secondary production, including nutrient flux, was not addressed.

### RISKS TO SALMONID FISH

- Give context to the potential mining impacts of the entire Bristol Bay watershed (How much salmon habitat would be lost due to mining). Also, reflect on the relationship between habitat and salmon production, detailing how much habitat is critical, and how much of that is necessary to support salmon and other fish.
- Include a section on the impacts of global climate change, with references to a monitoring program that would allow scientists to distinguish between climate and mining effects.
- Recognize that the transportation corridor and its necessary development will have impacts that will vary in duration and intensity, and that those impacts will expand over time with further development. Included these in the Cumulative Risks section.
- Incorporate current research findings regarding stream crossings and culvert-design practices.
- Recognize that risk and impact are not equivalent. Risk may be low, but impact could be huge.
- Recognize and justify behavioral endpoints, such as those potentially affecting survival and long-term success of fish populations.

EPA reports that it is already taking steps to incorporate key input from the peer reviewers, including:

- Clarifying the assessment's overall purpose and objective
- Clarifying the development and use of a realistic mining scenario
- Expanding the use of the conceptual models throughout the assessment to better illustrate how mining activities could potentially affect Bristol Bay's fishery resources
- Enhancing the review of modern mining practices to consider additional strategies for mitigation of potential adverse impacts of mining.



*EPA's Region 10 Administrator Dennis McClerran is interviewed by KSKA-FM's Daysha Eaton during peer review meetings in Anchorage, August 2012.*

## **WATER BALANCE/HYDROLOGY**

- Better characterize the water resources and assess the potential effects of mine development on these resources by: generating conceptual models; developing a quantitative water balance and identifying water gains and losses; identifying the seasonality of the hydrologic processes; incorporating these processes into a landscape characterization; evaluating how climate change would influence these processes; and using this characterization to demonstrate how the hydrology may change with the mine scenarios and infrastructure development.
- Demonstrate how the groundwater, surface water and hyporheic zone (area where the groundwater and surface water mix) is interconnected, and the importance to fish habitat. Address how that interconnectedness changes over time (such as with seasons, varying weather and climate change).
- Give information on all rivers and streams that could be influenced by a mine, its facilities and the transportation corridor.
- Emphasize the importance of characterizing the leaching potential of acid-generating and non-acid generating waste rock and tailings. Also, recognize that collection and treatment of runoff and leachate is critical to maintain baseline water chemistry.

## **GEOCHEMISTRY/METALS**

- Reference the most current geochemistry data on acid-generating and non-acid generating, and metal leaching to describe potential effects of seepage and changes to water.
- Explain how contaminants were selected as causes for concern. Include information on other metals and their toxicity to assess the impacts on leachates. Pebble Limited Partnership's baseline document could be useful.

## **HUMAN CULTURES**

- Use case histories (such as those that looked at the Exxon Valdez oil spill and development on the North Slope) to provide insight and anticipate mining impacts on Alaska Natives.
- Clarify why the scope was limited to fish-mediated effects.

## **MITIGATION MEASURES**

- Incorporate critical mitigation information from the Appendices into the main report's mine scenarios.
- Emphasize mitigation measures in the main report.

## **UNCERTAINTIES & LIMITATIONS**

- Clarify uncertainty versus certainty in *Chapter 8: Integrated Risk Characterization*. Discuss data limitation in the context of uncertainties.
- State how much uncertainty is acceptable.

## KEY RECOMMENDATIONS

(continued)

### Research needs

Peer reviewers identified areas where they thought the assessment could benefit from further research. The EPA has not stated whether it will conduct research for its final assessment. Here are some of the reviewer recommendations for questions to be addressed by research:

- How will contaminants like metals and acid mine drainage affect the plants and wildlife of the Nushagak and Kvichak river watersheds?
- What nutrients and organic carbons are in the aquatic environment? Can an inventory be developed to show how many there are and where they are found along the stretch from the headwaters all the way to Bristol Bay? What is the importance of nutrients from marine sources compared to nutrients from the watershed and the land? How many nutrients come from the atmosphere (deposited by wind or precipitation)?
- Where are the subsistence areas, and can these be characterized by collecting local environmental and ecological knowledge?
- What impact might mining have on other wildlife?
- What is the comprehensive hydrologic regime of the proposed mining area, and the broader watershed system as characterized by baseline monitoring, spatial distribution and quantitative flow of surface and ground waters?
- What is the cumulative impact of commercial fisheries on the Bristol Bay watershed, especially in an ecosystem context, as related to marine-derived nutrient and energy flow?



U.S. Fish and Wildlife

## WHO ARE THE REVIEWERS?

EPA contracted an independent firm, Versar, to find scientists and engineers who could complete a thorough review of the report. Public suggestions for panel members were taken into consideration during this process. Panel members included:

- ✦ Mr. David Atkins, Watershed Environmental, LLC—Expertise in mining and hydrology.
- ✦ Mr. Steve Buckley, WHPacific—Expertise in mining and seismology.
- ✦ Dr. Courtney Carothers, University of Alaska Fairbanks—Expertise in indigenous Alaskan cultures.
- ✦ Dr. Dennis Dauble, Washington State University—Expertise in fisheries biology and wildlife ecology.
- ✦ Dr. Gordon Reeves, USDA Pacific NW Research Station—Expertise in fisheries biology and aquatic biology.
- ✦ Dr. Charles Slaughter, University of Idaho—Expertise in hydrology.
- ✦ Dr. John Stednick, Colorado State University—Expertise in hydrology and biogeochemistry.
- ✦ Dr. Roy Stein, Ohio State University—Expertise in fisheries and aquatic biology.
- ✦ Dr. William Stubblefield, Oregon State University—Expertise in aquatic biology and ecotoxicology.
- ✦ Dr. Dirk van Zyl, University of British Columbia—Expertise in mining.
- ✦ Dr. Phyllis Weber Scannell—Expertise in aquatic ecology and ecotoxicology.
- ✦ Dr. Paul Whitney—Expertise in wildlife ecology and ecotoxicology.

For full biographies of the peer review panelists, see the complete Peer Review report.

Find it online at [www.pebblewatch.com/resources](http://www.pebblewatch.com/resources).