PEBBLE WATCH *explores*

A series of fact sheets on topics related to potential Pebble mine development.

About Pebble Watch

The Pebble Watch team consists of scientists and science communicators who can research and answer your questions about potential Pebble mine development—from science reports to permitting. Write staff@pebblewatch.com.

Take note of Section 404(c)

Section 404(c) of the Clean Water Act gives the Environmental Protection Agency (EPA) the authority to limit or prohibit disposal sites for dredged or fill material—including wetlands—"if the discharge will have unacceptable adverse effects on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas."

The EPA's Bristol Bay Watershed Assessment of the Nushagak and Kvichak watersheds is not officially part of the 404(c) process. However, its purpose is to gather information to help the agency decide whether a 404(c) action is warranted.

If available science suggests unique factors of Bristol Bay's wetlands are vital to supporting the region's one-of-a-kind fisheries and wildlife, EPA may initiate a 404(c) action. If this should happen, the decision would include additional opportunities for public comment.

Wetlands

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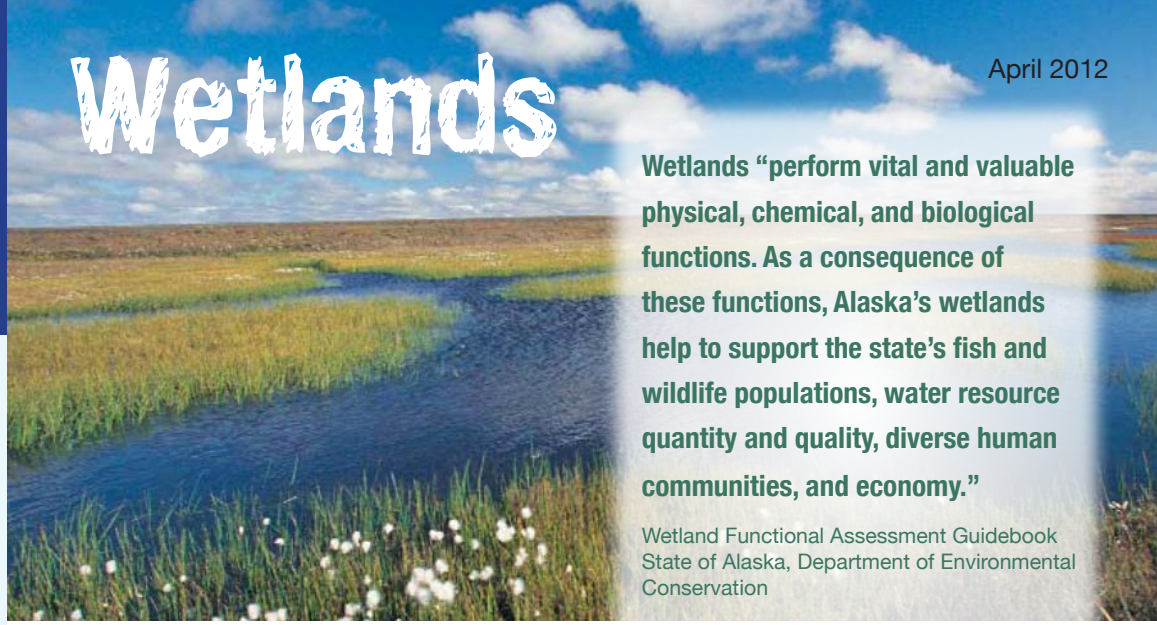

Wetlands "perform vital and valuable physical, chemical, and biological functions. As a consequence of these functions, Alaska's wetlands help to support the state's fish and wildlife populations, water resource quantity and quality, diverse human communities, and economy."

Wetland Functional Assessment Guidebook
State of Alaska, Department of Environmental Conservation

What are wetlands?

One cannot avoid wetlands in Alaska. Our state is covered with marshes, bogs, sloughs, river flood plains, and shallow ponds. You may have appreciated wetlands for the vast amount of berries that grow in these environments, or the valuable hunting and fishing. Or, you may have been frustrated by how difficult it is to keep your socks dry when slogging through them. Either way, wetlands are an important landscape in Alaska – covering about 43 percent of the state.

Wetlands are complex ecosystems that develop in areas mostly inundated by or saturated with water. Whether that ecosystem is a marsh, a swamp or another type of wetland is determined by three factors: the types of plants living there, the unique combination of soil properties, and the source and flow of water (also known as "hydrology").

How do wetlands relate to the development of Pebble mine?

With approximately 45 percent of the Pebble project area covered by wetlands, impacts are inevitable. The project would likely require the dredging of wetlands for a mine site, and filling of wetlands for roads and other infrastructure. Wetlands may be at the crux of the permitting process for the mine, because Section 404 of the Clean Water Act specifically regulates the dredging and filling of wetlands. A Section 404 permit from the U.S. Army Corps of Engineers would be required to build the mine and related infrastructure.

Other regulations affecting wetlands

Clean Water Act Section 301 – prohibits the discharge of any pollutants into wetlands without a permit.

Clean Water Act Section 402 – requires the EPA to ensure that standards for water quality and effluent (wastewater) limitations are maintained.

Alaska Fish Way Act – requires permits from the Alaska Department of Natural Resources for activities that affect waters important for anadromous fish (those fish that spend most of their lives at sea and move to freshwater to spawn).

National Environmental Policy Act – requires extensive evaluation of impacts to the natural environment, including wetlands.

Crowberry (Empetrum nigrum) is one of the dominant wetland shrubs found in the mapped Pebble deposit area. Like other wetland plants, it is adapted to growing in waterlogged soils with poor nutrient availability and little oxygen.

Questions to consider

- What percentage of the wetlands will be altered? Is this percentage biologically significant with regard to fish and wildlife habitat?
- How will the filling affect the wetlands' ability to perform wetland ecosystem functions?
- What is the impact threshold for wetlands in the project area? (How severe does the impact need to be before mitigation is required?)

Additional resources

- **Pebble Partnership Environmental Baseline Document Chapters 14 and 39 on Wetlands**
  www.pebbleresearch.com
- **EPA Fact Sheets on Wetlands and Wetland Regulations**
  water.epa.gov/type/wetlands/outreach/facts_contents.cfm
- **EPA Bristol Bay Watershed Assessment**
  www.epa.gov/region10/bristolbay/
- **U.S. Army Corps of Engineers Regulatory Division**
  www.poa.usace.army.mil/reg/
- **Alaska Wetlands and Wildlife Vol. 5 of The Alaska Wildlife Curriculum Teacher's Guide**
  Alaska Department of Fish and Game, (907) 267-2216

Assessing the importance of wetlands

Wetlands are key habitat for many types of wildlife, and they also provide *essential ecosystem functions*, such as: water storage and flood control, water quality maintenance, groundwater recharge/discharge, erosion control, carbon storage, aquatic habitat, and recreation and aesthetics.

Throughout the research and permitting phases of a project, developers and regulators take several steps to determine how important each wetland is to the ecosystem.

TYPICAL PROCESS	STATUS FOR PEBBLE PROJECT
1 Determination For the purposes of protecting wetlands, the U.S. Army Corps of Engineers has developed an official wetland definition that includes specific factors related to the soil, plants, and water of the area.	In the Pebble Partnership's Environmental Baseline Document, scientists identified wetlands (as defined by regulation) in both areas they studied: *Mine area* - 33% (9,825 acres) *Transportation corridor area* - 12% (2,425 acres)
2 Classification Classification provides essential information in evaluating which wetland ecosystem functions are present and how well they are performed. For example, a "slope wetland" is associated with the ecosystem function of groundwater discharge to a land surface.	Pebble scientists used two different systems to classify each wetland: • Enhanced National Wetlands Inventory system (ENWI), and • HGM, a hydrogeomorphic system. They found that "slope wetlands" dominate both study areas.
3 Function analysis The process for analyzing wetland functions is extremely complicated, and follows specific guidelines outlined by the U.S. Army Corps of Engineers.	Function analysis, ranking, and mitigation take place during the permitting process. The wetlands function analysis has not yet been completed, and is not included in the Environmental Baseline Document. However, it will be critical for determining the relative importance of each wetland, and impacts that could result from altering the wetlands. Watch for function analysis and ranking during the Environmental Impact Statement phase of permitting. The Corps of Engineers will be responsible for determining the amount and type of compensatory mitigation required by the project. (Methods include restoration, establishment, enhancement and preservation of wetlands.)
4 Ranking Typically, the function analyses allow for wetlands to be ranked as *high functioning, moderate functioning*, or *low functioning*. This ranking is used when determining how wetland loss will be compensated during the permitting process.	
5 Mitigation During mitigation, steps are taken first to avoid or minimize adverse impacts to wetlands. Unavoidable impacts require *compensatory mitigation* to make up for any loss.	