

Pebble Watch 2011-2012





What is Pebble Watch?

- **Impartial, educational and fact-based resource to share information** about the proposed Pebble project with BBNC shareholders
- **Does not** integrate or interpret data
- Helps readers better understand data by providing **summaries** and **context**:
 - Why is data being collected?
 - How may data be used in permitting?
 - How do agencies use these data?



What is Pebble Watch?

Communication-based initiative and resource:

- In-person meetings/visits – As scheduled and on request
- Print newsletter – mailed to shareholders
- Website – [www. PebbleWatch.com](http://www.PebbleWatch.com)
- Science team – Scientists, science communicators and permitting specialist research and address questions



Proposed Pebble Project

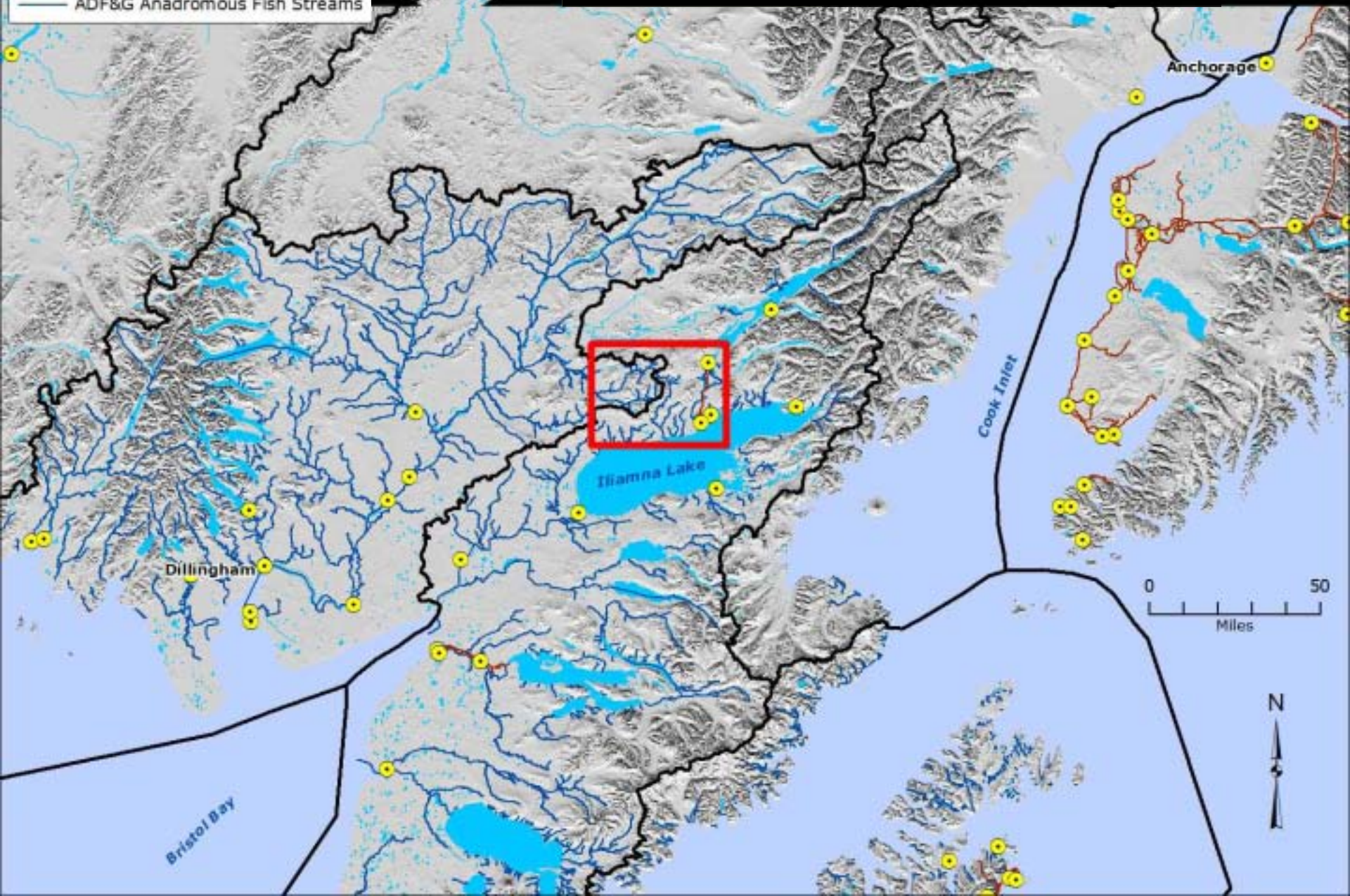
FIRST, SOME BACKGROUND...

Legend

-  Towns
-  Basin
-  ADF&G Anadromous Fish Streams



Project Location





Review: What is NEPA?

National Environmental Policy Act (NEPA):

- Is triggered by major federal actions (in this case: submittal of **Section 404 Permit** application to the **US Army Corps of Engineers®** (USACE)).
- Requires an Environmental Assessment (EA) and/or (most likely) **Environmental Impact Statement** (EIS).
- Will be the major driver behind Pebble permitting.



Pebble Project Status Update

Study Reports:

20 Study Reports will be incorporated into the final EIS.

- The EIS will be based on the information in these study reports.

PLP has so far released 14 Study Reports.

- No new reports released since 2009
- Highly anticipated fisheries and wetlands reports/data have not yet been released.



Pebble Project Status Update

As of March 2011:

- No permit applications or project plan filed.
- PLP has publicly named 2011 for permitting.
- EPA oversight of Clean Water Act wastewater permitting & enforcement for mines turned over to the State in November 2010 (as anticipated).
- 404c-related EPA announcement begins long process.
- BBNC continues to keep Board Members and shareholders informed through Pebble Watch.



Communicating Study Reports

Pebble Watch:

- Team summarizes the reports into “bite size” pieces.
- Each *Pebble Watch* newsletter focuses on a report or logical grouping of reports.
- Newsletters do not integrate the data; the EIS will do that.

Goals : Give shareholders easier access to the reports and data, help them understand what these say, and how they will be used.



Study Reports in *Pebble Watch*

Publication plan, 2011:

F Groundwater & Surface Water
Quality – Q1, 2011 (In Progress for
Jan.)

C Surficial Geology*

B Surface Water Hydrology*

D Groundwater Hydrology* – Q1,
2011

N Terrestrial and Wildlife Habitat –
Q2, 2011

H Aquatic Macroinvertebrates and
Periphyton*

I Marine Nearshore Habitat*

J Marine Nearshore Fish and Benthic
Invertebrates* – Q3, 2011

L Iliamna Lake Studies – Q3, 2011

K Noise* – Q4, 2011

M Visual Resources* – Q4, 2011

(*multiple topics in one issue)



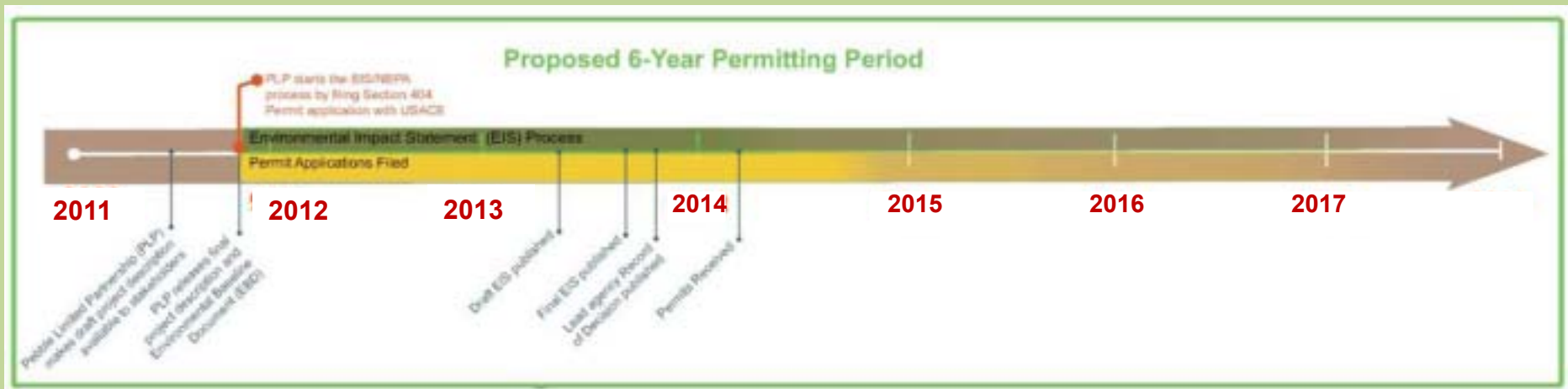
Pebble Watch activities

- Three newsletters published (Meteorology, Trace Elements, special 8-page issue on Surface Water & Groundwater Quality)
- Next issue: hydrology
- Website online since December 2010, updated twice weekly
- Community visits
- Complements BBNC Responsible Development ad campaign & video





Pebble Watch Timeline (update)



Permitting



Pebble Watch Activities



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Up Close



Place Name: Cetyaraq

Native Name: Estuyaraq

Native Language: Yup'ik

English Name: New Shuyahok

Language: Yup'ik

Type: Village

Meaning: Place to go downriver

Source: Place names Up-River
Tape 30, 1996; Jacobson,
Steven A. 1984 1114; Alaska
Department of Community &
Economic Development;
Vanstone, James W, Volume 50
Number 3, 1968:220; Orth,
Donald J. 1971:1923

EPA Web resource explains Section 404(c)



WEDNESDAY, 23 DECEMBER 2010 09:00

When BBNC asked EPA to use its authority under Section 404(c) of the Clean Water Act in relation to the proposed Pebble Mine, you may have wondered what that meant, or where to find out more about Section 404(c). What is it? What role, if any, might the public play in this process?

The PebbleWatch (PW) team has found a section of EPA's website with much more information on Section 404(c), including details of how it's been employed in the past.

[Read more...](#)

Permitting Matrix provides guide to Pebble permits



WEDNESDAY, 23 DECEMBER 2010 08:00

The Pebble Watch Permitting Matrix document, available as a PDF, offers an important resource for shareholders seeking information about the permits that are likely to be involved in any proposed Pebble project. Our PDF resource, now available for download, lists both major and minor permits by category (for example, air, water, and fill material are some of the categories). It also provides an all-in-one reference to which agency is involved in the listed permit, what that permit covers, and the comment period duration for that permit. Most also provide links to relevant agency websites, as available. This resource was created by the Pebble Watch science team.

If you need assistance searching the Pebble Watch Permitting Matrix, or would

Pebble Watch Calendar

December 2010

Sun Mon Tue Wed Thu Fri Sat

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October 2010

- 00 BBNC Annual Meeting
- 06 Pebble Watch Newsletter: Meteorology
- November 2010
- 17 Resource Development Council Conference
- December 2010
- 07 BBNC Committee Meetings
- 08 BBNC Board Meeting
- 09 BBNC Village Leadership Workshop

Download 'good practice guide' for mining & indigenous peoples



TUESDAY, 18 JANUARY 2011 16:26

While at the Keystone Center forum, Pebble Watch heard of a resource we think would be helpful to shareholders. The International Council on Mining and Metals (ICMM) offers a 'toolkit' (in PDF form) to help mining companies and indigenous peoples navigate issues surrounding engagement and participation, impact management, agreements, benefits sharing and dealing with grievances.

Anglo American, a Pebble developer, is one of the 18 mining and metal companies belonging to ICMM. According to the ICMM website, organization members all agree to subscribe to the principles of sustainable development and respect for the environment.

Here is a link to "Good Practice Guide: Indigenous Peoples and Mining."

Find more information about ICMM [here](#).

Magazine article explores local impact of mine



THURSDAY, 13 JANUARY 2011 00:00

A December 2010 *National Geographic* magazine article explores possible environmental and economic effects the Pebble mine may have on the surrounding area and residents. "[Alaska's Choice: Salmon or Gold](#)," focuses on topics that may be impacted by mine development, including salmon runs, industrial growth, job creation, utility prices, air quality and other issues now on the minds of Bristol Bay residents and mine developers. Communities mentioned include Iliamna, Dillingham and Naknek.

First Independent Review presented at meeting



FRIDAY, 07 JANUARY 2011 10:01

Pebble Watch members were in attendance at the much-anticipated December 3



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Up Close



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*Source: Place names Up-River
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Economic Development;
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Donald J. 1971:923*

[Sign Up](#)

EPA to review Pebble mine project



MONDAY, 14 FEBRUARY 2011 15:35

Last week, the U.S. Environmental Protection Agency (EPA) announced plans to conduct a scientific assessment of the Bristol Bay watershed in order to better understand how future significant development projects may affect the water quality and salmon populations. EPA stated its assessment was initiated after Native Tribes and others, including Bristol Bay Native Corporation (BBNC), petitioned EPA in 2010 to use its authority under the Clean Water Act, Section 404(c). BBNC asked EPA to "carefully tailor a prohibition of the discharge of dredged or fill material from the proposed Pebble mine," to prevent "an unacceptable risk of irreparable harm to water, fishery and wildlife resources."

EPA's assessment will focus primarily on the Nushagak and Kvichak watersheds. It will examine the effects of hard-rock mining projects, as well as consider the effects of large-scale development in general.

EPA has stated it will accept and consider public input during development of the watershed assessment. A public comment period usually lasts between 30 and 60 days; a public hearing is usually held during the comment period.

Check back for updates regarding timelines for public hearings and comment periods.

Read the [press release](#) from EPA.

Read an editorial about EPA's decision in *The New York Times*: [The Risk to Bristol Bay](#).

Read an article about EPA's assessment in the *Anchorage Daily News*: [EPA: Agency simply monitoring, not halting Alaska development](#).



Pebble Watch Activities



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October 2010

today

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Sun	Mon	Tue	Wed	Thu	Fri	Sat
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			12a Pebble Watch Newsletter: Meteorology			
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About Pebble Watch

Pebble Watch is an impartial, educational and fact-based initiative of the BBNC Land Department to disseminate information regarding the proposed Pebble Mine project to BBNC shareholders and interested parties. Pebble Watch does not attempt to integrate or interpret data; this would occur during an Environmental Impact Statement process. Instead, we seek to help BBNC shareholders better understand data by providing summaries as well as context, such as how the data may be used in the permitting process and how it relates to regulatory benchmarks.

Produced by
the BBNC Land Department

Questions? Call
(800)426-3602



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FAQ

About Pebble

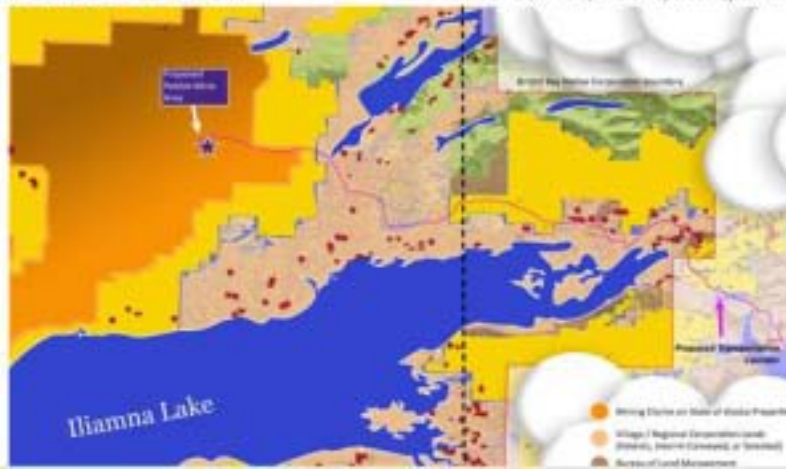
Note: Pebble Watch is an impartial, educational and fact-based initiative of the Bristol Bay Native Corporation Land Department to disseminate information regarding the proposed Pebble Mine project to BBNC shareholders and interested parties. Pebble Watch does not attempt to interpret data; this would occur during an Environmental Impact Statement process. Instead, we seek to help BBNC shareholders better understand data by providing summaries as well as context, such as how data may be used in the permitting process and how it relates to regulatory benchmarks.

Some frequently asked questions about the Pebble Mine project and the Pebble Watch effort are addressed below.



PEBBLE WATCH

Land Ownership in the Proposed Project Area



Pebble Watch Calendar

December 2010

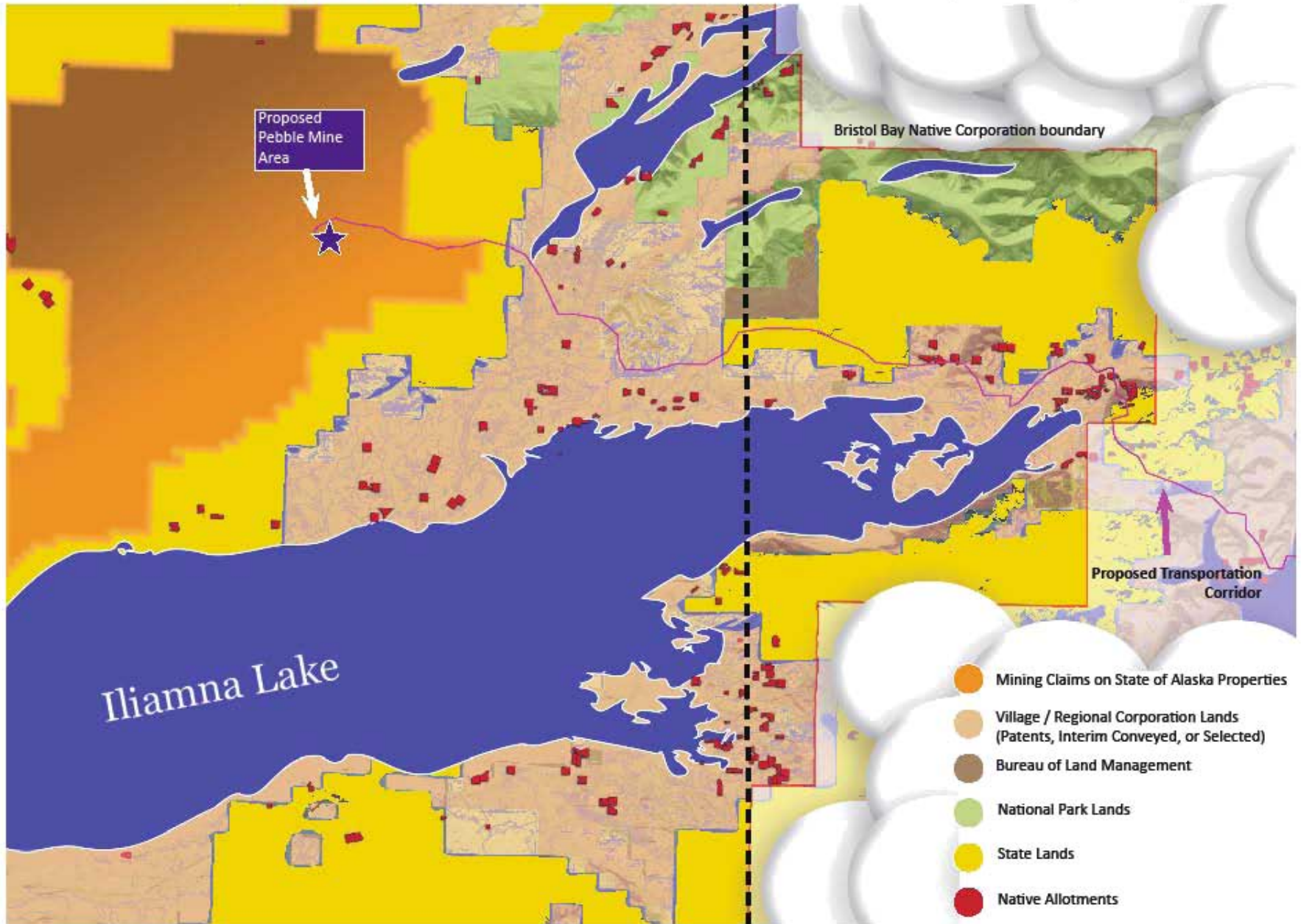
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Land West of the dashed line is owned by Iliamna Natives Limited.

Land East of the dashed line is owned by Pedro Bay Native Corporation.



Pebble Watch Activities



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Newsletters

Pebble Watch Newsletter August 2010

This first issue of Pebble Watch focuses on "Report Series E: Trace Elements (Sediments & Soils)," an overview of soil and sediment sampling, 2004-2007 at the proposed sites of the Pebble mine, port and transportation corridor. Inside, our team summarizes the results for copper and arsenic, and shows how the data may begin to answer questions community members first asked Pebble developers in 2005.



(PDF 1.92Mb)

Pebble Watch Newsletter October 2010

This issue of Pebble Watch focuses on the Pebble Partnership's data release "Report Series A: Meteorology," an overview of meteorological data collected between 2005 and 2007 in areas near the Pebble deposit and proposed port sites. Inside, we summarize the report, explain how the data will be significant for permitting, and provide a focused look at wind data collected by the two meteorological stations closest to the deposit site. Our science team also supplies some answers to questions community members first asked Pebble developers in 2005.



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Workshop



PEBBLEWATCH



February 2011 | BBNC

Inside: Water Quality

This issue of Pebble Watch focuses on the Pebble Partnership's data release "Report Series F: Surface Water & Groundwater Quality," an overview of surface water and groundwater quality data collected between 2004 and 2007 in the Pebble Project deposit area, Klanna Lake and along the transportation corridor. Here, we present a summary of the report, explain how the data relates to permitting, highlight some water quality issues related to mining, and supply answers to questions community members first asked Pebble developers in 2005.

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Bristol Bay
Native Corporation

Water Quality and the Pebble Mine Project

Among the reports that project developers have released is "Report Series F: Surface Water & Groundwater Quality." This portion of the Pebble Partnership Pre-Permitting Environmental & Social Economic Data Series describes the water quality collection program developers started in 2004 with the primary goal of obtaining data to characterize surface water and groundwater resources. Secondary objectives included contributing to information known about wetlands and fish habitat, supporting "the engineering design of facilities," meeting requirements of the permitting process, and establishing the foundation for a long-term monitoring program. The report contains data collected between 2004 and 2007 and provides photographs, water quality for surface water, seeps and groundwater collection near the deposit area, as well as for water quality analyses from sites in Klanna Lake and the transportation corridor. This full report, along with accompanying maps and data, is available online at www.pebblepartnership.com/environmental/data-releases.

Report Summary

The report explains the water quality study's objectives in detail, tells how field and laboratory scientists analyzed water samples to assess water chemistry, and provides details about the program study area and sampling locations. The report also names eight companies involved in the sampling between 2004 and 2007, including a BBNC subsidiary.

Surface Water Study

The 41 sites where surface water was collected here streams and rivers include locations on the North Fork Klutuk River, South Fork Klutuk River, Upper Toluk Creek, Kuskokwam Creek, and their tributaries. Collection sites were selected based on their proximity to the mineral deposit, proposed tailings disposal area or other proposed mine facilities, and were located both upstream and downstream of the deposit. Surface water samples were also collected from 19 ponds and water body instream, 125 springs or seeps near the deposit area, nine Klanna Lake sites, and 24 river crossing sites along the proposed transportation corridor. The locations of which were determined "in consultation with" those chosen for fish studies.

The sites were categorized between the spring of 2004 and the end of 2007. From 2004 to 2006, samples were collected



This surface water study area is in the proposed mine area. Photo: BBNC Land Dept.

WATER QUALITY AND AQUATIC LIFE

Water quality affects the health of the aquatic environment and is evaluated using a complex set of parameters. Metals, chemicals and other constituents that occur naturally, as well as those introduced by activities from industry or construction, can have an impact on salmon, trout, and other fish. Other important factors include changes in temperature, dissolved oxygen levels, water flow and depth, sedimentation and alkalinity. Following are examples of how water quality parameters relate to healthy aquatic life.

Copper

Dissolving naturally in the environment, copper is essential to the growth and metabolism of fish, but it can also cause harm at levels only slightly above those required for growth and reproduction.

According to a 2007 report by the U.S. Department of Commerce and NOAA, "The growing body of scientific literature indicates that dissolved copper is a potent neurotoxicant that directly damages the sensory capabilities of salmonids at low concentrations."

Copper concentrations can impact enzyme activity, blood chemistry, metabolism, sense of smell, and ability to fight disease or sense the vibrations of predators in salmon. Some have correlated copper can interfere with fish sensory systems, and by extension important behaviors that underlie predator avoidance, juvenile growth, and migratory success.

Whether exposure is toxic to a specific salmon in a particular location depends on many life cycle factors, including the size, age, and reproductive condition of the fish, as well as the interplay of other water quality factors.

Dissolved oxygen

Necessary to all forms of life, oxygen enters water either from the surrounding air through diffusion and ventilation from plants, as a waste product of photosynthesis. Because oxygen dissolves into colder water more readily, dissolved oxygen (DO) levels are typically higher in the winter.

In general, dissolved oxygen levels below 3 mg/L put stress on aquatic life, levels below 2 to 2 mg/L for a few hours can lead to fish kills. Optimal levels for salmon vary by age, size, reproductive condition, and species. Insufficient oxygen levels can reduce the swimming ability of salmon during upstream migration, disrupt growth and (Boyle, S.A., 2011; Baileys, C.A., Hansen, T., Baileys, K.J. Gross, and N.L. Scholz, 2007. An overview of sensory effects on juvenile salmonids exposed to dissolved copper: developing a benchmark concentration approach to evaluate individual watershed-level health. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-FWC-443, 40 p.).



Salmon in their summer spawning grounds. Photo: Bruce

food conversion efficiency, and impact food sources. In spawning areas, the amount of oxygen available to fish also depends on factors like water velocity and the permeability of gills.

Alkalinity

Alkalinity can be a critical factor in determining water quality because it can affect the toxicity of other constituents.

Alkalinity measures the concentration of substances dissolved in water, which have the ability to neutralize acid. Water with higher alkalinity has a greater capacity to resist changes in pH; scientists refer to this capability as buffering capacity. Low capacity to resist acidity, or a lower buffering capacity, can increase the toxicity of copper, aluminum and other trace minerals in water.

According to the State of Alaska's aquatic life criteria, water should contain at least 20 parts per million (ppm) alkalinity. Many study area samples generally met or exceeded these criteria most of the time, but concentrations ranged widely at individual sites, from 11 to 32 ppm in the North Fork of the Koktuli River; 7 to 20 ppm in the South Fork of the Koktuli River; and from 16 to 56 ppm in Upper Taluk Creek.

Though most sampling sites exceeded the minimum aquatic life criteria of 20 ppm between May and October, some were below the minimum during summer months. No data were provided for winter months, when alkalinity would likely be affected by low water flow.

Temperature

Water temperature regulates metabolic functions and determines the rate of development in salmon. It plays an integral part in salmon growth, survival, feeding, migration and reproduction, and contributes to levels of DO, a factor in the health of aquatic life. As with DO levels, the ideal temperature for salmon depends on factors such

as age, size, and the reproductive condition of the fish. The optimal water temperature for salmon depends on the species and phase within its lifecycle, but typically ranges between 57 and 59 degrees Fahrenheit.

Studies have shown that water temperatures of 68 degrees Fahrenheit or higher can result in a higher mortality rate from disease for Coho fry. Similar temperatures have been lethal to Sockeye salmon migrating upstream. Long-term exposure to low temperatures can also have an impact on the health of fish, leading to losses of juvenile salmon in the winter and fall.

Studies of the Pebble region indicate that water flow from tributaries helps regulate temperature throughout the river system.

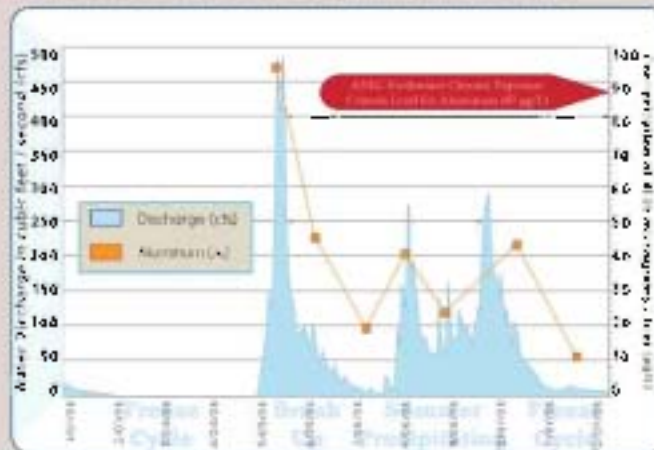


Scientists collect groundwater data in the proposed mine area. Photo: Bruce

WATER CHEMISTRY AND STREAM FLOW

This hydrograph, a graph showing changes in stream flow rate, or discharge, over time, shows 2006 Alutian and water discharge from the stream gauged on South Fork Koktuli River, near the project. This graph demonstrates how stream and channel fluctuations with changes in stream levels. Water chemistry values that fluctuate with higher stream flows are indicated with green lines.

The largest peak occurred in the large floods associated with spring breakup. Peaks from high to lower are followed by smaller peaks. The flow decreases with water flowing on duration of the gauge by 10.



2006 SOUTH FORK KOKTULI RIVER HYDROGRAPH



UNDERSTANDING THE DATA:

To help interpret the large number of site-specific data, our Pebble Watch Team calculated the average concentrations of copper (Cu) and arsenic (As) found in 250 soil samples taken from 133 locations found in the proposed mine area. We also highlighted the highest concentrations collected for each.

State and federal agencies use scientific studies and risk analysis to determine "safe" concentrations of such constituents for humans, animals, plants, and other life, and they have developed numerous benchmarks for comparison. In the graphic (Figure 2), using the data for copper and arsenic as

examples, we show how the amounts sampled compared to two such benchmarks: the Alaska Department of Environmental Conservation (ADEC) maximum allowable soil concentration for migration to groundwater level considered safe for human ingestion and the Environmental Protection Agency (EPA) Ecological Soil Screening Levels.

Shareholders with questions about these and other data may request Pebble Watch assistance by contacting the BBNC Land Department.



Gary Marttila from Nondalton collects stream sediment samples.

PERMITTING:

Data summarized here may be used in applying for the following permits:



Under the Clean Water Act, Section 402:

- Section 404 Permit (for construction impacting waters of the United States, including wetlands; issued by US Army Corps of Engineers)
- Section 401 Certificate of Reasonable Assurance (a subset of the 404 permit application; issued by ADEC, overseen by EPA)
- National Pollutant Discharge Elimination System (NPDES) construction-related water discharge permit (issued by ADEC, overseen by EPA)
- Storm Water Pollution Prevention Plan (EPA)



Fish Habitat Permit (issued by ADFG, under Alaska Statute 16.05.071)

- Fish Passage Permit (issued by ADFG under Alaska Statute 16.05.041).

Photo: Bristol Environmental & Engineering Services Corporation

Graphic: BBNC Pebble Watch

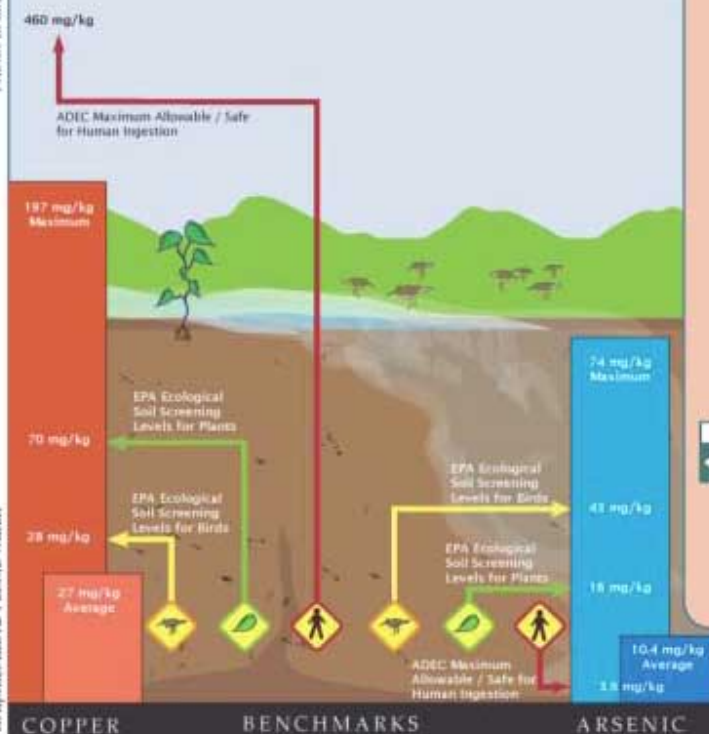


FIGURE 2: COPPER AND ARSENIC CONCENTRATIONS FOUND IN PROPOSED MINE AREA IN MILLIGRAMS/KILOGRAM (MG/KG)



Contact Information

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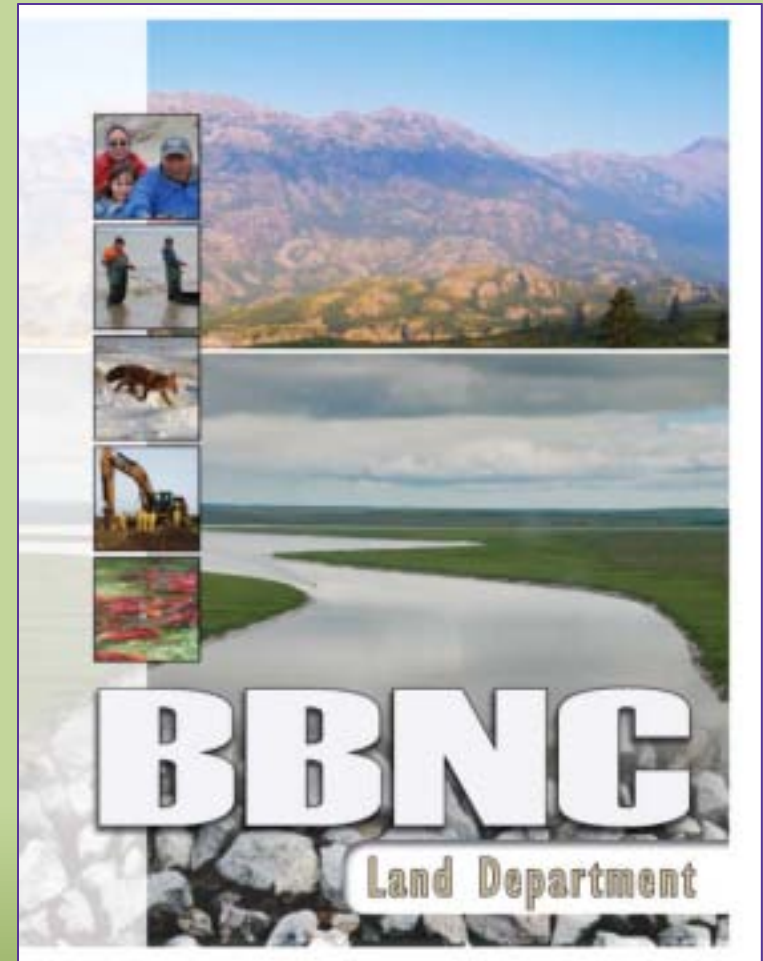
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Website Information

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(Our Land)