

K3.1 INTRODUCTION TO AFFECTED ENVIRONMENT

Information about traditional ecological knowledge (TEK) and the approach taken by the US Army Corps of Engineers (USACE) to collect TEK is outlined in Section 3.1, Introduction to Affected Environment. The TEK information collected is presented below.

K3.1.1 Scoping Comments

Scoping comments were pulled from the Scoping Report (Appendix A). Comments received that pertain to the topics listed in Section 3.1, Introduction to Affected Environment, are listed below.

- Fish:
 - The area that makes up the headwaters is full of underwater streams where small fry/fingerlings swim as they emerge. They sometimes swim into lakes and ponds of the region and often get too big to get out; referred to as “landlocked salmon.”
 - Many species of fish are used for subsistence harvest, not just salmon.
 - The people in Seldovia have a long tradition of subsistence fishing for herring in Kamishak Bay. The herring also support other animals that we subsist on.
 - The placement of the tailings impoundment facility on the North Fork of the Koktuli River is prime king salmon habitat.
- Wildlife:
 - Exploration activities at the site have caused caribou to avoid the area.
 - Helicopter traffic during exploration disrupted subsistence activities. Particularly, helicopter traffic impacts spring waterfowl hunting (geese), displaces caribou, and impacts the Koktuli River.
- Birds:
 - Kamishak Bay is home to a large seabird nesting colony.
 - Bald eagles nest and feed along the coast and along all of the major salmon spawning rivers in the Bristol Bay and Cook Inlet regions. A relatively high number of golden eagles are also found here.
- Marine Mammals:
 - Incorporate TEK on freshwater seals in Iliamna Lake and be aware that there is a Freshwater Seal Commission.
 - The proposed ferry could strike seals in Iliamna Lake, which would congregate in the open water created by the ice-breaking ferry.
- Vegetation:
 - Over 80 edible and medicinal plants grow and are harvested in the project area including several species of berries, wild peas, wild onions, ferns, cow parsnip, rosehips, and many others.
- Subsistence Activity:
 - Be sure to include Kodiak Island in your analysis because it has important subsistence areas that could be impacted by the project.
 - The road corridor would go through winter moose hunting area in the Talarik Creek watershed.
 - The Nushagak, Mulchatna, and Koktuli watersheds are the hunting and fishing areas for people of New Stuyahok.

- The Amakdedori area has been historically used for early subsistence activities, including salmon harvest.
- The mountain behind Nondalton is traditional subsistence area.
- The Frying Pan Lake area is important to Nondalton people and shared with other neighboring people.
- The people in Seldovia have a long tradition of subsistence fishing for herring in Kamishak Bay. The herring also support other animals that we subsist on.
- The residents along Iliamna Lake rely on access to small islands for the harvest of bird eggs in the spring.
- A chart on the Bristol Bay seasonal subsistence gathering cycle was submitted.
- Culturally Important Areas:
 - The Amakdedori port area has been used as a site for a cultural camp, subsistence use areas, and school field trips.
 - There are ancestral burial grounds at/near the proposed Amakdedori port, along the road route on the south side of Iliamna Lake, and on the road route to the south ferry dock.
 - This region of Alaska contains several recorded rock art (i.e., petroglyph) sites. No doubt more sites like this remain to be discovered. Many of the rock art panels are on shorelines and only visible during low tide; therefore, it is easy for archaeological surveys to miss these important cultural resources.
- Navigation:
 - While lower Cook Inlet and Kamishak Bay do not have ice or currents to the same extent as the upper Cook Inlet, lower Cook Inlet is not nearly as protected as the waters of upper Cook Inlet, and Kamishak Bay experiences challenging winter sea conditions.
 - No depths are recorded on navigation charts for Iliamna Lake. Some rocks on the chart do not exist; others are not where the charts show them to be. Some are not on the charts at all. There are places where the depth goes from 400 feet to 30 feet.
 - Wind has pushed ice on the north shore of Iliamna Lake in piles as high as 50 feet and could damage the proposed ferry terminal.
 - The east winds on Iliamna Lake are strong and generate large waves that would make the proposed ferry unreliable and dangerous; winds can reach 100 miles per hour.
 - A disabled ferry could be blown by the wind onto the shoreline such as at Eagle Bluffs.

Scoping comments that referenced a geographic location via the online comment form web mapping feature are below.

- Culturally Important Areas

Applicable Comment

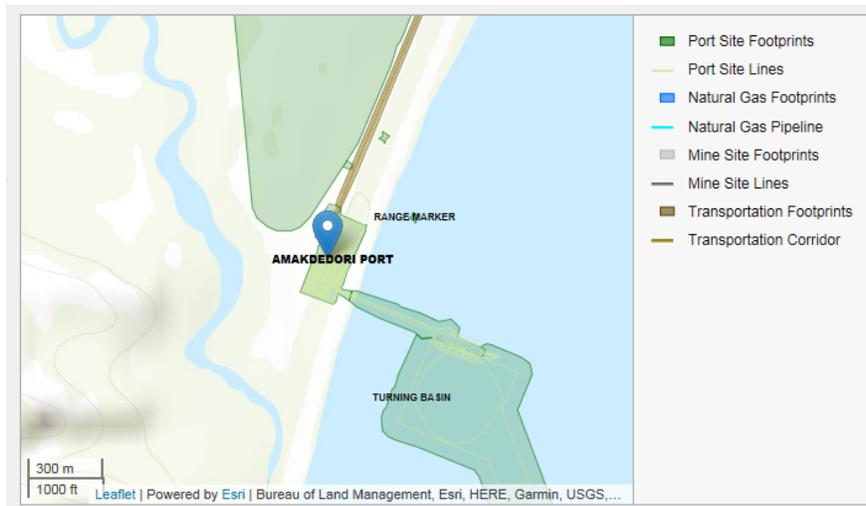
The proposed dredge storage and port site on this map is overlaid on the Amakdedori Native Village. This is also the site of cultural learning camps, subsistence use areas, and school field trips.

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Survey work needs to include consultation with local tribal governments to apply religious and culturally appropriate research methods. Any alternatives will need to address meaningful mitigation to the loss of access to historical cultural resource sites and to living cultural resource sites.

Loss of access and location changes to the traditional learning camps and school field trips to the Amakdedori Native Village will need to be made in consultation with the Kokhanok school and parents. Alternative locations for these teachings would need to include other cultural sites of the Kachemak Tradition.

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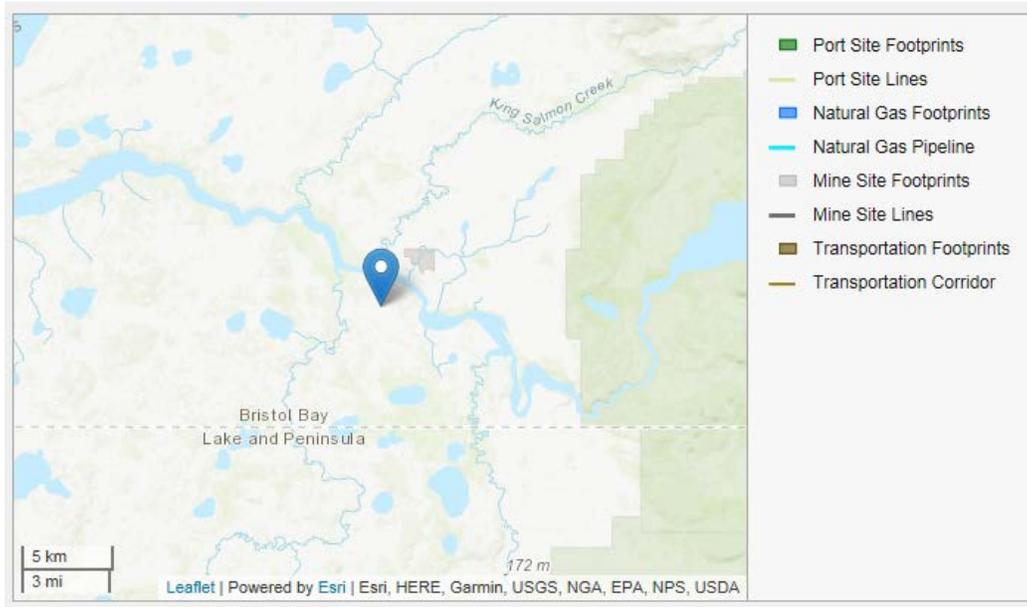


- Subsistence Activity

Applicable Comment

It worries me that the mine could impact animals, fish and berries that my friends and I gather for subsistence. A lot of us depend on the land and water for food. It offsets the high cost of living and shipping food into the area. We rely on moose, caribou, bear, many berries etc.

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- Subsistence Activity

Applicable Comment	
<p>My husband and I have a set net site on Raspberry Island. We are especially concerned about transport plans across Lake Clark and Cook Inlet. We learned during the Exxon Valdez oil spill that the spills in one place can impact fisheries and habitats along a wide swath. Although the spill was in Prince William Sound we found oil on our beaches in the Kodiak District and our fisheries was shut down.</p>	

K3.1.2 Draft Environmental Impact Statement Comments

Comments on the Draft Environmental Impact Statement (EIS) were pulled from the Comment Analysis Report (Appendix D). Comments received that pertain to the topics listed in Section 3.1, Introduction to Affected Environment, are listed below.

- Subsistence Activity:
 - Additional concerns exist regarding potential impacts to the hundreds of allotments owned by Alaska Natives, which dot the landscape in the watersheds most likely affected by the proposed mining activities. These holdings were selected primarily for their importance as subsistence harvesting locations and traditional family holdings, with many of them found along streams, rivers, lakes, or other sources of freshwater; each allotment is located in watersheds also containing high-quality, diverse aquatic habitats with complex ecosystems that are important for subsistence resources.
 - The area between the Newhalen River and Upper Talarik drainage is used for subsistence activities, including hunting and harvesting.
- Navigation:
 - Hurricanes near Bristol Bay have flooded camps and trails, and have caused the relocation of cabins and buildings in the area.
 - Cook Inlet, near the proposed Amakdedori port, is known for high winds and difficult navigation for large vessels.
 - Ice on Iliamna Lake has been observed to be up to 2 feet thick.

- 80 knot winds have been observed near Kamishak Bay.
- Salt water spray has been observed to accumulate to over a foot thick in 15 degree temperature, which could lead to sinking potential for ferries.
- Transportation:
 - The tundra is not able to support the heavily traveled trails and roads needed for this project.
 - Open water created by the all-season ice-breaking ferry will prevent locals from traveling across lakes to other villages for visiting relatives and attending gatherings.
 - Locations between Pile Bay and Williamsport are known for their high risk of landslides, heavy avalanches, and summer rock slides.
 - Thawing permafrost has caused deep melting ruts in the tundra from walking and driving. This has caused trails and roads to flood and sink.
- Culturally Important Sites:
 - There are numerous sacred historical sites and allotments in close range of the mine site and proposed transportation corridor.
 - 40 sites have been documented in the proposed mine area; 190 sites will be impacted in all areas of operation.
- Wildlife:
 - Caribou roam and have been hunted where the project infrastructure is planned.
 - Wildlife use frozen lakes for travel. The use of an all-season ice-breaking ferry across Iliamna Lake will affect wildlife crossing in all directions.
 - A population of rare freshwater seals live in Lake Iliamna.
- Birds:
 - The project area is home to over 19 species of shorebirds, with 14 breeding in the area and 33 waterbird species.
- Fish
 - The northern fork of the Kaktuli can produce 25 percent of the king salmon used for subsistence food.
 - Increased rain and big storms over the years have caused massive flooding in marshy areas where salmon spawn.
- Geohazards:
 - 5,000 earthquakes have been detected since fall 2018, including those in new locations not previously experiencing such activity. Water funneling down volcano tubes that connect seemingly disconnected lakes and streams have been observed.
 - There have been increased slips deep in the tundra as it thaws out rapidly from climate change and as rain events increase.

K3.1.3 Existing Documents

K3.1.3.1 Environmental Protection Agency Watershed Study

Appendix D in Volume 2 of the Environmental Protection Agency (EPA) *Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska* is a study of TEK and cultural

characterization in the Nushagak and Kvichak watersheds, conducted by Boraas and Knott (2013). The study was based on interviews in the region. Information from this study that would be considered TEK and pertains to the topics presented in Section 3.1 is listed below.

- Fish:
 - That is spring water [at Kijik]. It does not freeze. That is why you can go over there and get a sockeye salmon in March; it might have a green head, and it is red, but it is still a sockeye salmon. You can go over there on New Year's Day and get a fresh sockeye salmon.
 - But, I think, when they are spawning, that is where they hit the spring waters, where it does not freeze. It is always open, even in the dead of the winter. It is always open; you got to be careful there. Especially up in Lake Clark, around Kijik. It is, man, 30 below zero, and still open water.
 - They are sensitive, very sensitive. If you put something bad in the water the fish will sense it. They will probably not go up the river, they will go somewhere else. If they spawn here and they notice something different they will move to another spot. The fish are very sensitive.
 - For quite a few years there when we were building up the king salmon run we did not even fish in June. It was just to build up those runs. It is kind of ironic that the kings we built up are on the Koktuli River where that mine is going to go. It is almost a whole decade that we sacrificed to build up that run. We built it up and now it might go away.
 - You do not see Bristol Bay having troubles because our ecosystem is whole and not damaged. We are very appreciative of what we have. In relationship to the mine the place I work up here is the Bristol Bay Economic Development Corporation and... one of the companies we bought is Ocean Beauty Seafoods which is one of the largest salmon producers in Alaska. We put up 161 million pounds of commercially caught goods in a year. So I talk to the people and if there is a mine that goes in like pebble and we have copper coming out and affecting our fish, are you interested in buying our fish? These are customers we sell 300-400 thousand pound lots to. No, we are not interested... We do not want ourselves and our kids to eat contaminated foods.
 - They [Salmon] would not go there [where water is contaminated]. They are also very sensitive to temperature. They have a really keen sensory acuity, not only them, but all the critters, all the birds. ...They are so sensitive in every aspect of that word.
- Wildlife:
 - You cannot even get meat like you used to; you cannot even go out hunting for moose or caribou. Nothing is here anymore; everything is disappearing. I know, you know [name] could verify too. There used to be so much caribou, we would see them all over the road, all over the lake, everything.
 - Since the Pebble Mine started their exploration, I speak for everyone around here that we have not had the big caribou herds that come through here anymore.
 - The drill wells are making all the noise. We were over there, my wife and I were over there last spring, and when we went over there to check out the Pebble, there [we] saw three other helicopters right in the same area, and that is lots of traffic. We have not had caribou meat around here ever since. Have not had caribou meat caught here in probably the last 6 years.

- Vegetation:
 - What they used to say, was the first time, when they first moved down to fish camps, then this wild celery, I do not know if you know what that is, but we eat those. They go up on the mountainside and pick lots of that, and then they peel it, they peel the peelings off and we eat the inside part.
- Subsistence Activity Areas:
 - In Easter they went up to Koliganek the next village up. He said people up there caught white fish and pikes. He said the water is good upriver, it is not like down here. I think it is the water that is coming down from up Mulchatna. He thinks it's from them working on that pebble up there [Pebble Mine].
- Culturally Important Areas:
 - There are 10,000 cache pits [at the Kijik archaeological site on Lake Clark] and they are still counting; over 200 houses, which are huge. So it was pretty big.
- Weather and Climate:
 - There is open water all over. They got drilling rigs that are sitting on open water. You cannot walk up there with knee boots you got to have hip boots there is so much water this year. The ground is saturated.

K3.1.3.2 Other Reports

Several other reports were used in developing individual sections. The information is established in these reports; therefore, the data are not listed individually here. These reports include:

- The Environmental Baseline Document Chapter 23, Subsistence, which includes detailed results of a study done by Stephen R. Braund & Associates (SRB&A) in coordination with the Alaska Department of Fish and Game (ADF&G) (SRB&A 2011b). Two major elements of this study were to survey residents and then follow up with interviews. The data (e.g., tables, charts, and maps) used to determine the environmental baseline for Section 3.9, Subsistence, of this EIS reflect the findings of this study. In this way, TEK regarding areas of subsistence use and harvest data are incorporated, which is reflected in pertinent EIS chapters.
- Technical papers developed by the ADF&G in conjunction with universities, tribal organizations, and federal agencies integrate TEK and subsistence use patterns with scientific studies to create a rich body of knowledge for wildlife. The information in these reports was used in the wildlife and subsistence sections. In this way, TEK regarding wildlife and subsistence in the project area are incorporated, which is reflected in pertinent chapters of the EIS.

K3.1.4 Cooperating Agencies

Cooperating agencies review and comment on draft sections of the EIS during development. During that process, some information was presented that would qualify as TEK. Information received pertaining to the topics in Section 3.1, Introduction to Affected Environment, is listed below.

- Cultural Resources:
 - The village site at Amakdedori, cabins and trails, have significant personal and cultural value to a number of individuals in the borough. The old cabins, trails, and village have personal meaning to many who reside in the borough.

K3.1.5 Government-to-Government Tribal Consultation

Information was also collected during government-to-government consultation meetings between USACE and tribes. Comments received that pertain to the topics in Section 3.1, Introduction to Affected Environment, are listed below.

- Wildlife:
 - Participants stated that bears move widely across the region from Amakdedori to the mine site and beyond.
 - The road would cross caribou migration paths. Caribou are coming back to the area; the lichen crop is robust.
 - There have been changes in caribou and moose migration patterns due to disturbances associated with Pebble mine exploratory activities conducted over the last decade.
 - Beluga whales are changing their diets because their typical food is not available for them anymore.
- Weather and Climate:
 - The mine site is in a bowl, with the right wind conditions, noise could be heard from the mine.
- Subsistence Use Areas:
 - Razor clams on the east side of Cook Inlet are declining; a lot of people dig razor clams on the west side, at Amakdedori. Aquatic resources like clams, crab, herring, and shrimp have declined on the east side of Cook Inlet.

K3.1.6 National Historic Properties Act Section 106 Consultation

Information was collected during consultation meetings between USACE and consulting parties for the National Historic Properties Act, Section 106. Comments received that pertain to the topics in Section 3.1, Introduction to Affected Environment, are listed below.

- Fish:
 - They used to see millions of fish, when they were kids, but the management with the ADF&G has changed and there are not as many fish now. They used to go down to Naknek and fish, but they cannot anymore. The fish are decreasing because of the way they managed the sport and commercial fisheries, and because of climate change. Last year the water was too warm and the fish were dying before they could spawn.
 - There are a lot of creeks near Pile Bay that have abundant salmon.
 - In the past year the salmon went up in the beach when the tide is high trying to keep cool. Some people were catching those fish on the beach. But around Iliamna Lake the fish were in the middle of the lake where the glacier water cools. At Pedro Bay the water was 17 degrees warmer than usual. They were diving without drysuits.
 - They are concerned about the initial construction in the Frying Pan drainage—as soon as they take the topsoil off it is pretty marshy. There are a lot of artesian wells in that area, and there are trout that travel underground between ponds (ghostfish).
 - Pike fish are now in Pete Andrews creek, they are invasive and eating the salmon.
 - There is a concern about the contamination of Frying Pan Lake from discharge. They are also concerned potential contamination to the Upper and Lower Talarik

- Creeks. There are fish in those creeks now (steelhead, golden-colored lake trout that take on the color of their environment). The water goes from this area through the Chulitna River to Lake Clark.
- There is also the smell of dynamite near the Newhalen River falls. When you put a funny smell in the water, the fish will not go back.
 - **Wildlife:**
 - There used to be caribou, but they ate all their lichen and moved on. They also got some diseases. Lots of people from Anchorage came and hunted, mostly with guides. We believe they were killing the breeding males of the herd. They were also migrating around guiding activities. There are so many factors that determine it; the loss of caribou is not related to the exploration activity.
 - The caribou herd population crashed before Pebble exploration. There was some minor exploration, but by then many of the caribou left. They ate all their food supply and their hooves got wet and diseased. There was a large die-off, they went out on Iliamna Lake and wandered around in circles and died on the lake, hundreds of them. There were just too many of them. But they are coming back, slowly. The lichen is growing because it is warm. They do not think the caribou that are coming back are part of the Mulchatna herd, maybe some other herd. They call them mountain or timber caribou. They are bigger.
 - There were a lot of caribou in the area until Pebble started doing exploration. It was loud and there were vibrations. Also, the sport hunters that came from the lower 48 and Anchorage. It was easy to come into this area. There was poor management. They would only take the antlers and leave the meat. There was also a hoof and mouth disease.
 - There are half a dozen different pathways that the McNeil River bears travel through to this area. Those bears are already habituated to humans because of the tours that go to the refuge. Bears are curious. The bears also like airport lights; they chew them up.
 - Some of the birds do not migrate away anymore, or are not going as far away as they used to. Sometimes when that happens, other species follow, like swans.
 - There used to be a lot of squirrels around here, now they are going farther north.
 - **Vegetation:**
 - Last year it was too warm to get cranberries.
 - It was so warm the last few years that there is grass growing in Iliamna Lake where there should not be. There were big yellow water lilies. The ADF&G was very careful about controlling invasive species, but there are so many other people coming through that invasive species are a concern.
 - The tundra is dead where the Cominco exploration happened.
 - There is an invasive species—elodea.
 - **Navigation and Transportation**
 - At Williamsport, the water depth all depends on the tides. It does not freeze as much in Iniskin Bay either. The Williamsport-Pile Bay road route gets a lot of heavy snow and the terrain is very steep.