

## Safety Will Always Come First in Lake Ferry Operations



**Pebble's proposed transportation plan and route for moving mineral concentrate to the port at Amakdedori includes the use of a year-round ice-breaking ferry to cross Iliamna Lake.**

Sealed containers will be transported from the mine site to a port on the north shore of the lake, where the containers will be safely loaded onto the ice-breaking ferry.

From there, the ferry will transit the lake to a ferry port on the south shore of the lake. **We estimate one round trip of the ferry across the lake per day.**

As people learn more about this plan, we have been hearing concerns about the potential for open water

in the winter creating a safety hazard for the communities around the lake.

**Safety for all employees and community members, along with best-practice environmental stewardship, are our top priorities.**

Due to the unique transportation needs of the Iliamna Lake region, we're committed to working with local communities.

We're interested in your input and comments. Safety will require a community effort and a lot of communication.

**With community input, we intend to establish a lake safety plan that addresses and mitigates winter lake travel route concerns.**

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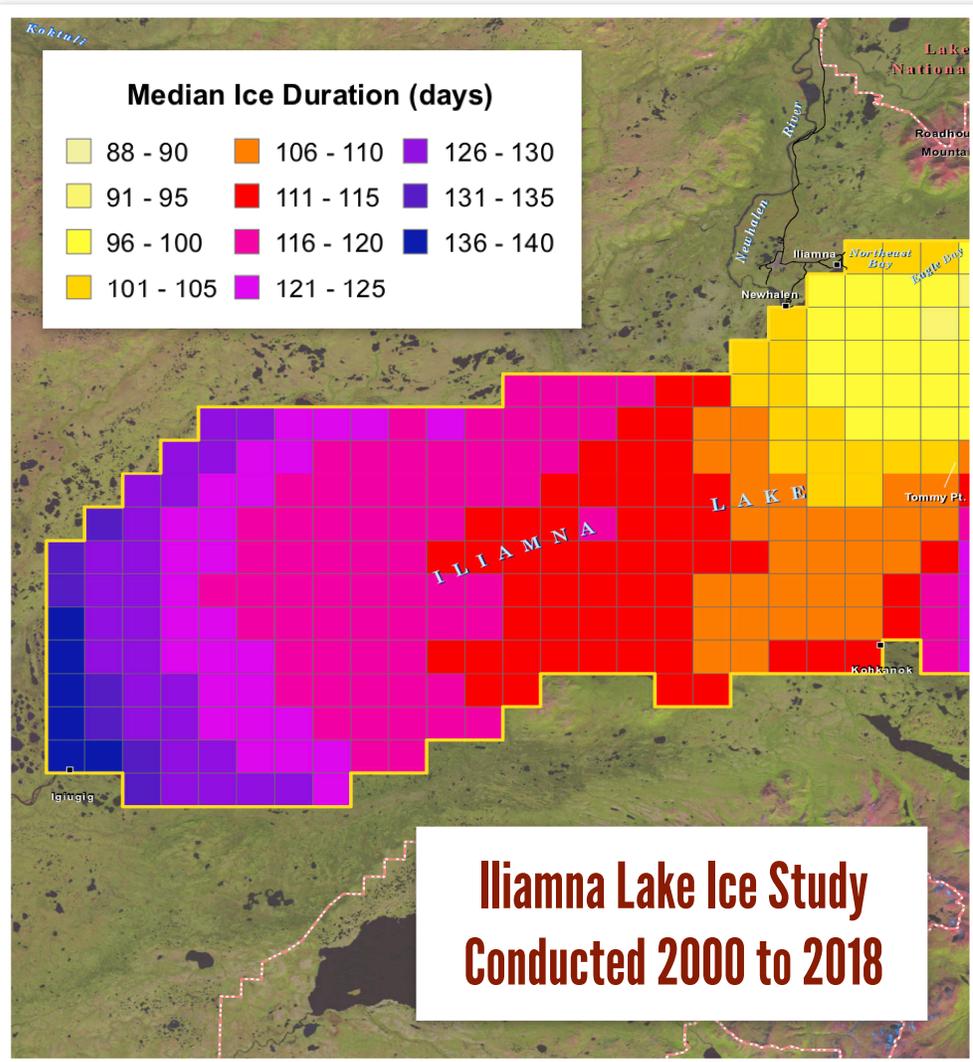
**Pebble is ready to work with community residents to craft an appropriate lake safety plan.**

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Ideas being considered include **groomed ice trails with high-visibility markers to create a winter "highway"** and establishing roads around the ports to help route traffic.

Stay engaged in the conversation and visit [PebblePartnership.com](http://PebblePartnership.com) for updates and more details.

*Have a question? Please email [info@PebblePartnership.com](mailto:info@PebblePartnership.com)*



## LAKE FERRY FAQ

### What about the seals?

#### ANSWER

Research shows that seals do not frequent the ferry route – but we will closely monitor for behavioral changes. In the event that seals use the open water to haul out during winter, we will immediately adjust operations.

Working with wildlife is common in Alaska. **Accommodating wildlife behavior is built into the Pebble plan** – just like other responsible development projects around Alaska.

# Safety Features and Redundant Systems Found on the Lake Ferry

The design of the custom ice-breaking ferry will incorporate extensive safety capacities and overlapping systems designed to quickly mitigate potential incidents.

For example, the vessel is designed with **two fully independent engine rooms, each with two generators.**

The vessel has also been designed with **multiple watertight compartments** and would remain afloat, stable, and operational in the event of flooding of any one of those compartments.

To address the potential for fire, the ferry will be equipped with

**fire detection and fighting systems.** Machinery spaces, thruster rooms, and engine rooms are protected by a CO<sup>2</sup> system.

The proposed vessel will also be equipped with a **state-of-the-art navigation systems**, including real time water depth monitoring and voyage planning.

These types of vessels have decades of documented safe operations worldwide. Pebble is committed to maintaining the highest safety standards.

*Have a question? Please email [info@PebblePartnership.com](mailto:info@PebblePartnership.com)*



# Frequent Questions About the Lake Ferry and Salmon

Pebble plans to use a ferry to cross Iliamna Lake when transporting materials for the mine, port, and facilities. Some are concerned that the ferry may harm salmon.

We recognize the importance of salmon to the region's residents, and we are taking deliberate steps to approach this natural resource development project responsibly.

## **Will the noise generated by the ferry impact salmon?**

No. Science shows that fish avoid noise, including vibrations, swimming out of the path.

## **Will the speed of the ferry have a negative impact on salmon?**

No. The Pebble ferry moves slowly vs. fish that swim quickly. Scientific literature confirms noise and vibrations from the ferry will drive fish to swim away from the area long before the ferry arrives.

## **Will fish be drawn into the Pebble ferry propellers?**

No. The unique design of the Pebble ferry propellers minimize harm to aquatic life.

## **How does the propeller design minimize harm to aquatic life?**

The Pebble ferry is designed with two symmetrical ice breaking bows that will slowly clear a winter transportation path with propellers strategically placed and recessed in the hull away from the bows.

## **Will the Pebble ferry impact salmon spawning habitat?**

No. Extensive environmental research confirms that salmon spawn in other areas of Iliamna Lake, away from where the ferry terminals are located. Studies show that the shorelines at proposed ferry terminal sites are not significant spawning habitat.

## **Will the ferry impact salmon fry?**

The number of salmon fry in the area is practically unmeasurable. Additionally, fry and yearlings have enough motility to easily avoid the ferry. The noise or breaking ice would drive fish out of the path long before potential impact.

## **Will the facilities associated with the Pebble ferry occupy a large area of Iliamna Lake?**

No. Iliamna Lake is vast. By comparison, the shoreline area occupied by the two ferry terminals at either end of the transportation corridor is very small.

## **Will constant ferry traffic impact salmon numbers?**

No. The Pebble ferry will only make one round trip during the day, operating at a slow speed.

## **What about fish that can be seen underneath the ice in winter?**

It is unlikely that these fish are salmon, which tend to swim 30 feet or more below the surface during the day.

## **How will the Pebble ferry traffic impact salmon feeding behavior?**

The fish will retreat from ferry noise and vibrations, swimming away and out of range, including during day-time feeding. At night, fish retreat to deep water to avoid predators. In winter, they tend to stay deep for

long stretches—days if not weeks at a time, as there is very little food at the surface to warrant the risk.

## **Will the Pebble ferry route impact general fish food sources?**

No. Salmon in Iliamna Lake exhibit what is called a "diel vertical migration" (DVM), meaning the best scientific data indicates they stay in deep water during daylight hours, then rise to surface waters at night to feed. Their zooplankton prey does the same.

During winter months, zooplankton is sparse due to decreased sunlight. The cold water also slows fish metabolism. Overwintering fry and yearlings are driven more by predator avoidance than foraging, thus they are more likely to spend long stretches sheltering in deep, 30-ft water, rather than foraging near the surface for limited food.

## **If there is a catastrophic failure, what is the anticipated impact to fish along the Pebble ferry route?**

A catastrophic failure is unlikely as there are several preventative safety measures in place including, for example, dual power sources that can be operated separately.

Scientific literature shows that failure impact would be insignificant to the overall population.

**Interested in learning more?**  
[Visit PebblePartnership.com/ferry/](https://PebblePartnership.com/ferry/)



3201 C Street, Suite 505  
Anchorage, Alaska 99503

ANCHORAGE (907) 339-2600  
TOLL-FREE (877) 450-2600

[PebblePartnership.com](http://PebblePartnership.com)



## Examples of Safe Ferry Operation

There is a long history of documented, responsible use of ice-breaking vessels supplying materials and hauling concentrate to remote mines in the Canadian Arctic.

### **Williston Transporter on Williston Lake BC**

This ice-breaking, log-carrying ferry operates year round. It went in to service in 1995 and provides transportation for the forestry and mining industries on the lake.

### **Voisey’s Bay Mine in Northern Labrador**

The Umiak 1 carrier moves 1,100 nautical miles to Quebec City in 12 trips annually – through ice up to five feet thick.

### **Nunavik Nickel Mine in Northern Quebec**

A similar ice-breaking bulk carrier is used to haul concentrate, fuel, and supplies to and from the Nunavik Nickel Mine.

### **Polaris and Nanisivik Mines in the High Arctic**

The MV Arctic, currently supporting the Raglan and Voisey’s Bay mines, entered service in 1978 in the High Arctic.

