

PEBBLE WATCH

FACT SHEET

Key terms

Population – In general, scientists use the term population to refer to a component or subgroup of individuals within a species or subspecies that share a common geographic region during one or more periods of their life cycle. For instance, marine mammal biologists might refer to the Alaska population of harbor seals, or the discrete population of Iliamna Lake seals.

Stock – The Marine Mammal Protection Act (MMPA) defines a marine mammal stock as a group of individuals “of the same species or smaller taxon in a common spatial arrangement that interbreed when mature.” The Iliamna Lake seal is a subgroup of the Bristol Bay stock of harbor seals.

Substock – A portion of a stock. This portion may or may not be discrete.

Species – A biological ranking below genus of a population potentially capable of interbreeding.

Subspecies – A population of a particular geographic region within a species. A biological ranking below species.

Endemic – Organisms that exist only in one geographic region. Usually an area that contains endemic species is isolated in some way, so that species have difficulty spreading to other areas, or it has unusual environmental characteristics to which the endemic species is uniquely adapted.

See page 5 for a list of references used to develop this fact sheet.



(Dave Withrow / NOAA Fisheries)

Iliamna Lake Harbor Seals

When we think of harbor seals, we picture them in the shifting tides and seaweed covered rocks of saltwater coastal zones. But imagine walking along a lakeshore and finding a population of seals in the lake.

This is the case of the rare Iliamna Lake seal, which scientists consider to be a discrete population of the Bristol Bay **stock** of the eastern Pacific harbor seal **subspecies** (*Phoca vitulina richardii*). The eastern Pacific harbor seal is one of six **species** of **true seals** in Alaska.

Of the true seals, Lake Iliamna seals are unique in that they likely spend their entire life cycle isolated in the freshwater of Lake Iliamna. In fact, Iliamna Lake seals are one of only five populations of freshwater seals of the world. Two, including Iliamna Lake seals, are members of the harbor seal species. The other three are of the genus *Pusa* and occur in arctic Eurasia, including the Baikal Seal which is **endemic** to Lake Baikal.

Some freshwater seal populations resulted from land rising after ice retreated 9,000 to 11,000 years ago. However, Iliamna Lake seals were likely established 200 to 5,000 years ago by marine seals swimming up the Kvichak River, and currently comprise about 400 individuals.

QUICK READ

- There are about 400 Iliamna Lake seals.
- They are the only freshwater harbor seal population in the United States.
- Scientists believe the seals stay in Iliamna Lake for their entire lifecycle.
- Some proposed components of the Pebble mine include a ferry transport across Iliamna Lake.
- There is concern for the welfare of the seals if their habitat is used as a transportation corridor.



Iliamna Lake

Iliamna Lake, Alaska's largest freshwater lake, is situated in the Bristol Bay region. The islands on the east end of the lake are the seals' primary habitat. Credit: Jason Ching/University of Washington

Habitat and Movements

Iliamna Lake seals inhabit Alaska's largest freshwater lake, which covers an area greater than 1,000 square miles and measures up to 1,000 feet deep. During winter, the lake is typically covered in ice, but seals use cracks, leads, and **polynyas** to find air pockets and other areas of open water. They are difficult to detect, because they stay hidden, utilizing **subnivean** habitat under the snow- and ice-covered lake. In summer, the seals use island haulouts in the northeastern end of the lake.

Iliamna Lake seals prey upon lake fish such as lamprey, smelt, sculpin, whitefish, and sticklebacks, as well as taking advantage of the seasonally abundant anadromous sockeye. In

2019, scientists compared isotope ratios in teeth between Iliamna Lake seals and Bristol Bay harbor seals to determine if seals consumed prey from salt water or freshwater. Their results support the hypothesis that Iliamna Lake seals are lifelong lake residents and rely principally on resources produced in the lake.

Importance for Subsistence

Several native villages surround Lake Iliamna, including Newhalen, Iliamna, Pedro Bay, Igiugig and Kokhanok. These communities have relied on Iliamna Lake seals as a subsistence resource for generations. Annually the harvest is about 24 seals, and the meat, blubber and hide are prized.

Hunters and elders report that the seals in the lake are larger and fatter than nearby marine harbor seals. The coats of lake seals are considered to be softer than those in salt water. This observation is consistent with those reported for the freshwater harbor seal population in eastern Canada.

The Iliamna Lake Monster Mystery

People have reported seeing glimpses of a large sea creature in Lake Iliamna since the late 1940s. Village residents consistently tell of huge aquatic creatures in the lake. The *Anchorage Daily News* once offered a reward for proof of the "monster's" existence. In 2019 researchers Bruce Wright and Charlotte Levy used a two-pronged approach to further research the mystery: they employed deep water video cameras and collected water samples to be analyzed for DNA. Some say it's a large sleeper shark. Others bet on a sturgeon. For now, it remains a mystery.

KEY TERMS

Polynya – a stretch of open water surrounded by ice, especially in Arctic seas

Subnivean – Spaces below snow above frozen lakes

What kind of seal is that?

Want to quickly impress your friends on your next sealife cruise or visit to the aquarium? Look closely at a seal's ears and flippers.

True Seals lack external ear flaps and are classified in the family Phocidae. Their flippers point backward and don't rotate, making movement in water graceful and movements on land cumbersome.

Eared Seals have external ear flaps and are classified in the family Otariidae. Flippers can rotate forward, allowing them to walk on all fours. (*Think of sea lions, which are considered eared seals.*)

Population Surveys

Iliamna Lake seals were first documented by Russian explorers in 1819. In modern times, information from Local Traditional Knowledge (LTK) and aerial surveys (private, local, state and federal) are used to describe distribution and abundance of these unique seals.

Following a period of growth in the 1980s, the lake's seal population has stabilized to about 400 individuals. The production rate (seals produced annually) estimate was about 5% per year, similar to the harvest rate.

In a recent study, scientists determined that, in the absence of a catastrophic event, there is a 1% to 3% risk of quasi-extinction (defined as a population of less than 50 animals in the next 100 years) of Iliamna Lake seals.

The authors emphasize that results should be applied cautiously due to the limitations of their risk model.



Could the Pebble project impact Iliamna Lake seals?

The Pebble project, currently in permitting, includes three alternatives that envision a ferry crossing of Iliamna Lake, as well as a natural gas pipeline built under the lake. Pebble Limited Partnership (PLP) prefers an alternative that bisects the lake from north to south. PLP contends that developing a ferry system across Iliamna Lake would not present a threat to seals, but concerns from the public, environmental organizations, native communities and scientists abound.

The Center for Biological Diversity has petitioned NOAA Fisheries to list Iliamna Lake seals under the Endangered Species Act, stating that "Mine operations would include year-round use of an icebreaker ferry, which would destroy lake ice relied upon by seals during the winter and run immediately adjacent to critical haul-out, pupping and fishing areas." (read more on page 4).

Additionally, Native communities are concerned that disturbance of seals due to increased traffic would impact their way of life. This concern led local citizens to conduct their own aerial surveys and to participate with scientists to better understand the biology of Iliamna Lake seals.

Scientific studies point towards impacts. Endemics species are more susceptible to cumulative effects of disturbance and climate change. In other regions of Alaska, NOAA Fisheries scientists found the risk of flushing harbor seals in glacial fjords increased when cruise ships approached within 500-m. They argue that their findings indicate the need to develop regulations to maintain a 500-m separation between ships and seals in all Alaska glacial fjords.

Another NOAA Fisheries study found high potential for broad-scale disturbance by a single vessel, and underscores the need to develop conservation measures to reduce seal-ship overlap in an Alaska glacial fjord.

Current Status and Jurisdictions related to Pebble

The Marine Mammal Protection Act gives the authority to conserve and manage seals and other marine mammals to the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration, often referred to as NOAA Fisheries. The Alaska Department of Fish and Game also maintains a strong presence in marine mammal conservation due to the great importance of these species to Alaska.

Endangered Species?

A species, subspecies or a Distinct Population Segment (DPS) can be considered for protection under the US Endangered Species Act of 1973 (ESA). In 2012 the Center for Biological Diversity petitioned NOAA Fisheries to list the Iliamna Lake seal under the ESA.

Iliamna Lake seals are not scientifically recognized by NOAA Fisheries as a species or a subspecies, so must qualify as a DPS to be considered for listing (much like the Cook Inlet Beluga Whale).

The primary attributes of a DPS are a population's *discreteness* and *significance*. In 2016, NOAA Fisheries ruled that while the seals are a discrete population, they are not ecologically significant to the subspecies of harbor seals in

the eastern North Pacific, and thus were not listed under the ESA.

NOAA Fisheries acknowledged that Iliamna Lake is a unique ecological setting for seals, but concluded loss of seals at that site would not create a gap in the taxon's range.

In February 2020 the Center for Biological Diversity again petitioned to list the seal under the ESA. As of May 2020, NOAA Fisheries is determining if the current petition warrants another review.

New study points to susceptibilities

In a 2019 scientific study, researchers used stable isotopes to determine that Iliamna Lake seal food sources are acquired exclusively from the lake. This indicates a lack of migratory connectivity to the Bristol Bay harbor seal population, and thus provides support to the argument that this population is endemic to Iliamna Lake. Researchers note that Iliamna Lake seals have a unique foraging ecology that makes them more susceptible to declines in marine food availability. The researchers argue that while marine seals can take advantage of salmon stocks from many river basins, Iliamna Lake seals

Scientific Classification:

Iliamna Lake harbor seal

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Carnivora
Family	Phocidae
Genus	<i>Phoca</i>
Species	<i>Phoca vitulina</i>
Subspecies	<i>Phoca vitulina richardii</i>
Stock	Bristol Bay
Discrete Population	Lake Iliamna seals

are reliant on salmon from a single basin (e.g. Iliamna Lake), constraining their access to food if local salmon are depleted.

How could an ESA listing impact the Pebble project?

The U.S. Army Corps of Engineers is analyzing the Pebble project to determine the Least Environmentally Damaging Practicable Alternative (LEDPA).

If Iliamna Lake seals were to be listed as endangered or threatened under the ESA, the lake and its resident fishes could be considered critical habitat. This would decrease the likelihood that a ferry crossing would be permitted.

Distinct Population Segments (DPS)

Under the Endangered Species Act, a DPS of a vertebrate population is *discrete* from other populations of the species and *significant* in relation to the entire species.

Discrete – A discrete population is one

that is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological or behavioral factors.

Significant – A population is significant if it is important to the overall welfare of the entire species.

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. Questions? Write info@pebblewatch.com.

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