

PACIFICWILD

# ***Top Ten Arguments*** *against the Strait of Georgia commercial seine and gill net herring fishery*



#BIGlittleFISH

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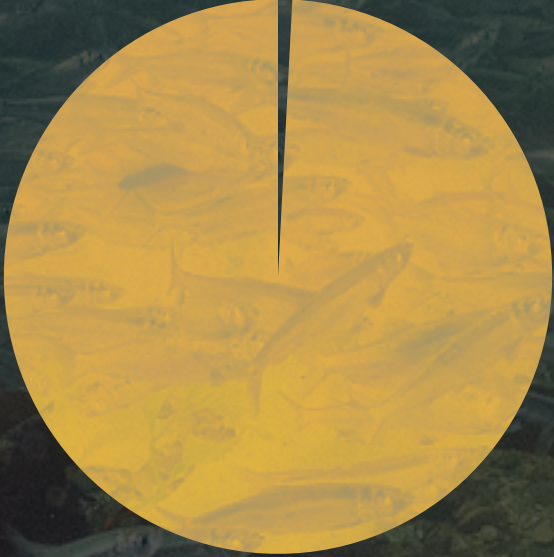
## ***For thousands of years, herring were abundant on the B.C. coast.***

First Nations fished Pacific herring sustainably for thousands of years before industrial fishing. Archaeological records from up to 10,700 years ago show that herring were more abundant and widespread than they are today. In 171 archaeological sites stretching from Puget Sound into southeastern Alaska, herring bones made up almost half of all fish bones, on average, and were found at 99% of sites. In some parts of the B.C. coast, like southwestern Vancouver Island and the Gulf Islands, herring were likely a more important food source than Pacific salmon.

**Source:** McKechnie et al. 2014. Archaeological data provide alternative hypotheses on Pacific herring (*Clupea pallasii*) distribution, abundance, and variability. PNAS.

**Source:** Shore, 2014. DFO assessment of herring fishery based on broken ecosystem, study finds. Vancouver Sun.

**Source:** Gill. 2018. Ofroe, rights, and reconciliation. Hakai Magazine.



***Herring bones were found at 99% of archaeological sites between Puget Sound and southeastern Alaska.***

## Herring feed the coast.

Herring play a key role in the coastal ecosystem, transferring energy from plankton (tiny plants and animals) to bigger animals, from salmon to seabirds to whales.

Herring are an important food for fish like Chinook and coho salmon, lingcod, Pacific halibut, and Pacific hake. Marine mammals also rely on herring, including humpback whales, dolphins, porpoises, sea lions, and seals. Millions of seabirds, like cormorants and murrelets, feed on spawning adults and eggs. Surf scoters time their migration to summer nesting grounds to coincide with the herring spawning event. Bears and wolves migrate down to the tideline during and after the spawn to eat herring eggs. Even plants that grow on beaches near herring spawning sites contain nutrients that come from herring.

As herring become smaller and less common over time, there is less food to go around. A complete collapse of herring populations would cause ecosystem-wide changes.

**Source:** Fisheries and Oceans Canada data.

**Source:** Fox et al. 2018. Pacific herring spawn events influence nearshore subtidal and intertidal species. Raincoast Conservation Foundation.

**Source:** Surma et al. 2018. Herring supports Northeast Pacific predators and fisheries: Insights from ecosystem modelling and management strategy evaluation. PLOS One.



**Herring play a key role in the coastal ecosystem, transferring energy from plankton to bigger animals, from salmon to seabirds to whales.**

## 130 million herring could feed a lot of animals.

Herring catches are measured in tons, but since herring are small, each ton contains thousands of fish. The expected quota for the 2019 Strait of Georgia roe fishery is 21,493 tons. That's about 130 million herring.

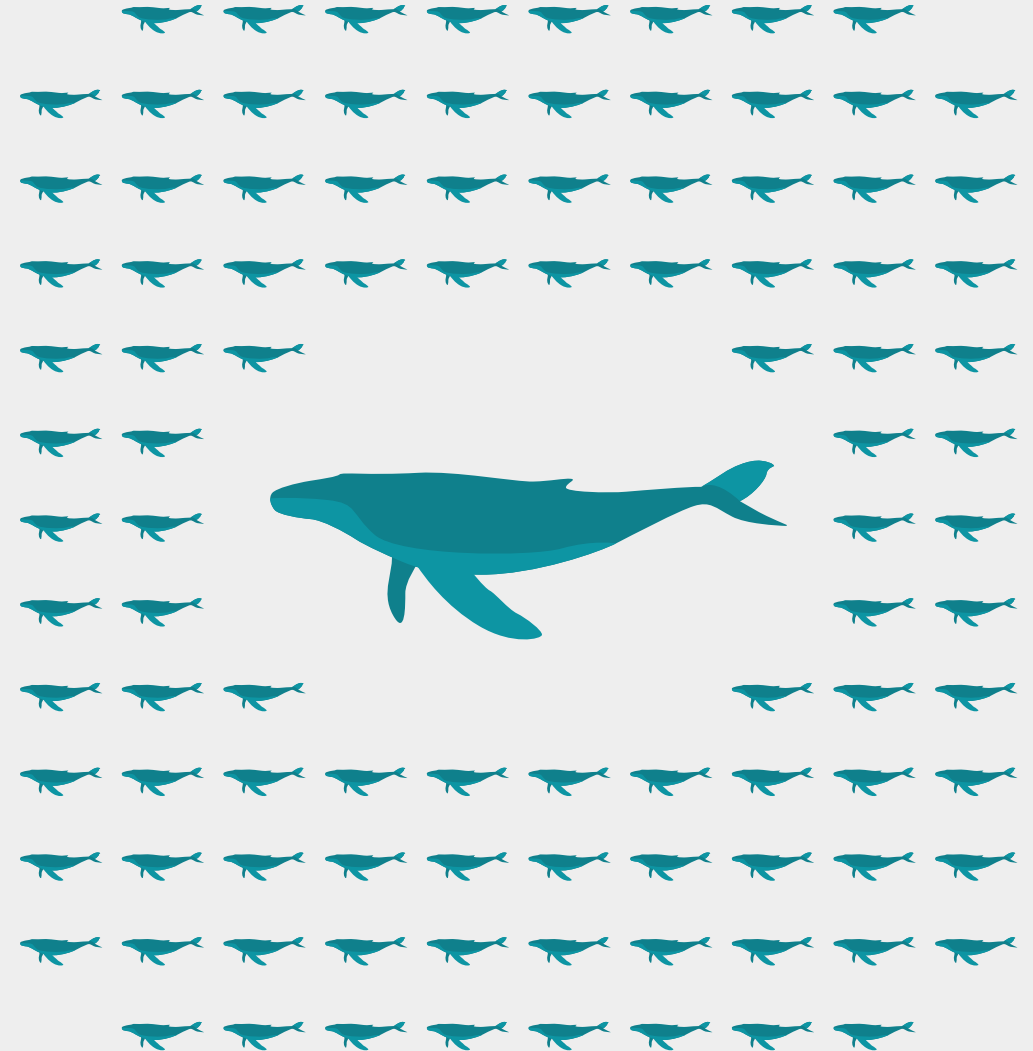
130 million herring could feed 100 humpback whales all summer, or between 400,000 and 900,000 10-lb Chinook salmon for a year.

The Salish Sea needs these fish. 130 million herring is too many.

**Source:** Fisheries and Oceans Canada. 2018. Draft Integrated Fisheries Management Plan: Pacific Herring.

**Source:** The Herring School. 2014. Whales.

**Source:** Madenjian et al. 2004. Evaluation of a chinook salmon (*Oncorhynchus tshawytscha*) bioenergetics model. Canadian Journal of Fisheries and Aquatic Science.



**130 million herring could feed 100 humpback whales all summer.**



## One herring can spawn up to 9 times in a lifetime.

Each spring, schools of herring flood into the bays and inlets of the Salish Sea to spawn. Each female herring lays thousands of sticky eggs on kelp and eelgrass growing in shallow water. Male herring release milt into the water, which fertilizes the eggs and turns the waters along the coast milky white. Unlike Pacific salmon, herring don't die after spawning. Adult herring can live up to fifteen-years-old and return to the same place to spawn, year after year.

Young herring spend a few years in the Salish Sea, where they are food for Pacific cod, lingcod, and rockfish species. When they become mature at three- or four-years-old, young herring join the migration to spawning areas. The roe fishery catches herring right before spawning, interrupting the production of billions of fertilized eggs, year after year.

**Source:** Ware. 1985. Life History Characteristics, Reproductive Value, and Resilience of Pacific Herring (*Clupea harengus pallasii*). *Canadian Journal of Fisheries and Aquatic Sciences*.

**Source:** Surma et al. 2018. Herring supports Northeast Pacific predators and fisheries: Insights from ecosystem modelling and management strategy evaluation. *PLOS One*.



*Each female herring lays thousands of sticky eggs on kelp and eelgrass growing in shallow water.*



*Male herring release milt into the water, which fertilizes the eggs and turns the waters milky white.*



## Young herring rely on older herring for knowledge.

Like salmon, herring return to the same spawning areas year after year. But unlike salmon, many generations of herring spawn together. Older fish hold important hereditary knowledge, like where to spawn, and they pass this knowledge down to younger fish.

Because the herring fishery catches the largest fish, which are the oldest, it removes important knowledge from the population. Some experts say this loss of knowledge explains why herring no longer spawn in many old spawning locations—they have forgotten where to go.

**Source:** MacCall et al. 2018. A heuristic model of socially learned migration behaviour exhibits distinctive spatial and reproductive dynamics. *ICES Journal of Marine Science*.

**Source:** Rogers et al. 2018. Collapse, tipping points, and spatial demographic structure arising from the adopted migrant life history. *American Naturalist*.



## Herring are worth more in the water.

Herring contribute more to British Columbia's economy by feeding other species than by being caught and processed. Many of the fish species that eat herring support lucrative commercial and sport fisheries. In 2016, B.C. commercial fisheries for salmon, halibut, and hake were worth \$62.9 million, \$64 million, and \$18.3 million in landed value, respectively. In the same year, the landed value of the commercial herring fishery was just \$15.6 million.

In 2016, the B.C. sport fishing industry employed 9,000 people, who earned \$236.5 million in income. The estimated number of people employed by the herring fishery was fewer than 500.

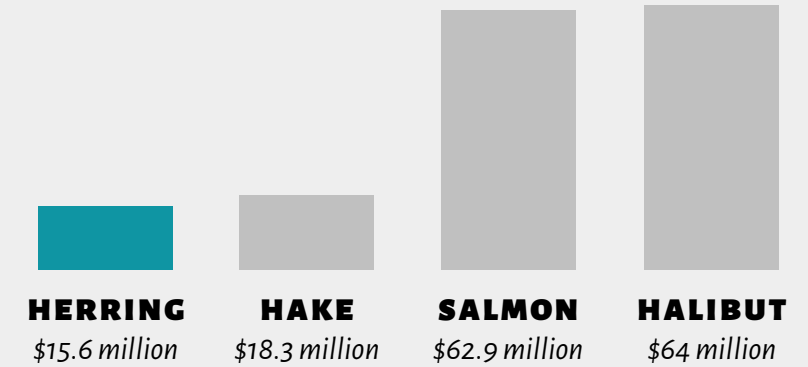
The whale populations that rely on herring, like humpbacks and orcas, draw hundreds of thousands of tourists to B.C. Whale watching generates approximately \$250 million per year in economic impact.

Herring are most valuable to British Columbia as the foundation of the coastal ecosystem. Better management of herring populations is an investment in the B.C. economy.

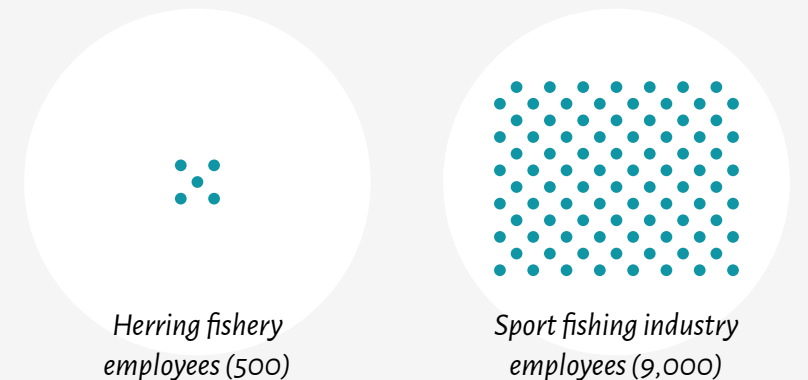
**Source:** Fisheries and Oceans Canada. 2016. Value of commercial landings by province.

**Source:** Alan McGillivray, President, Pacific Whale Watch Association.

**Source:** BC Ministry of Agriculture, Corporate Statistics and Research data.



**Herring make up only 4.4% of the total value of the commercial fishery in B.C. (2016)**



**The sport fishing industry employs 18x more workers than the herring fishery.**



## Herring fishers make too little for their catch.

Herring fishers are making a fraction of what they made three decades ago—for the same quantity of fish. For example, in 1990, the average value per ton was \$2,880, over three times more than the average of \$840 per ton that fishers earned in 2017. As catch values decline, each boat must fish multiple licenses to make enough money to offset the costs of fishing.

In recent years, gillnetters and seiners in the Strait of Georgia have even chosen to catch below their quota, because the market was flooded with small herring and the value was low.

Independent fishers aren't getting rich off herring. A large amount of income from the fishery goes to corporations like Canfisco, which owns 30% of seine and 12% of gillnet licenses for herring roe, as well as 30% of facilities that process the catch.

**Source:** BC Ministry of Agriculture, Corporate Statistics and Research data.

**Source:** Morley. 2016. Testimony to the Standing Committee on Fisheries and Oceans, Canadian Parliament.



**Herring fishers are making a fraction of what they made three decades ago—for the same quantity of fish.**



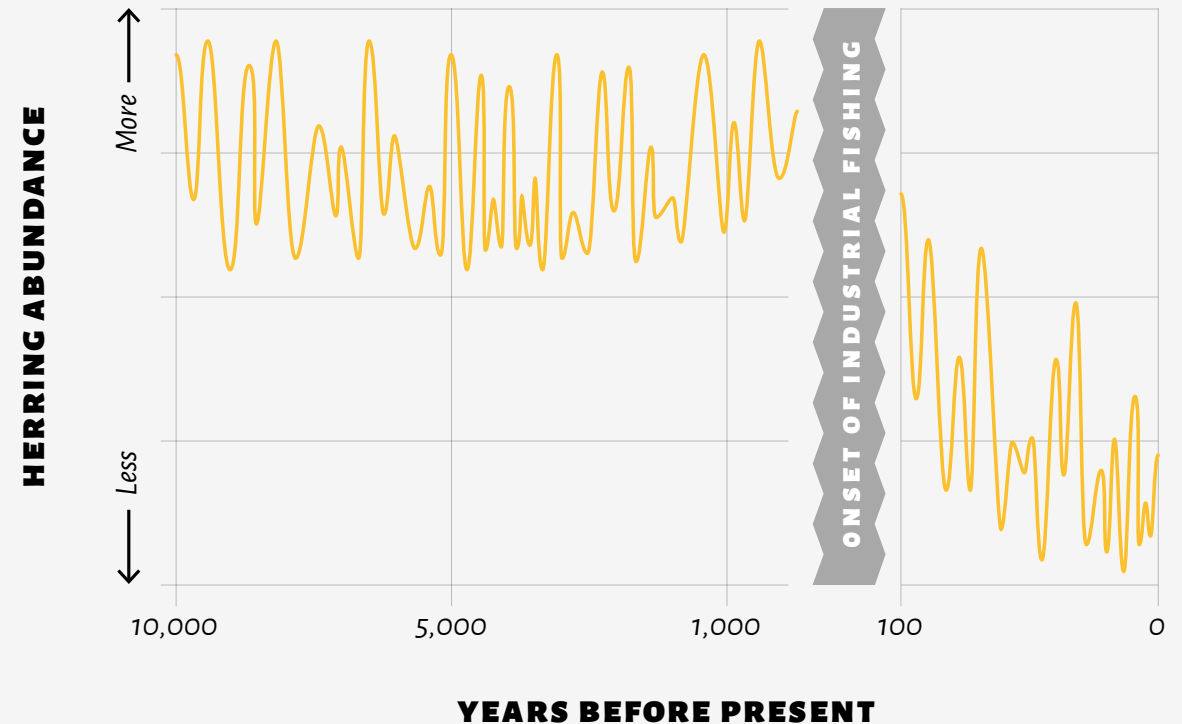
## DFO is using the wrong population baseline.

The current management system for herring is based on an incomplete picture of B.C. herring populations. DFO compares current population estimates to data from 1951, even though herring populations were already depleted by industrial fishing.

The B.C. commercial herring fishery began in 1876 and caught huge quantities of herring in the first half of the 20th century. By 1910, government officials noted that herring were less common in areas where they had been abundant. In 1962, the B.C. catch peaked at 237,600 tons, more than the entire population of herring in the Strait of Georgia today (estimated at 122,921 tons). In 1967, populations collapsed coastwide. Using 1951 data as a population baseline is misleading. It conceals the declines caused by the early fishery and limits the scope of recovery for B.C. herring populations.

**Source:** *The Herring School*. 2015. *Timeline: Herring through Time*.

**Source:** McKechnie et al. 2014. Archaeological data provide alternative hypotheses on Pacific herring (*Clupea pallasii*) distribution, abundance, and variability. *PNAS*.



**Archaeology studies show herring were more abundant in the past.**

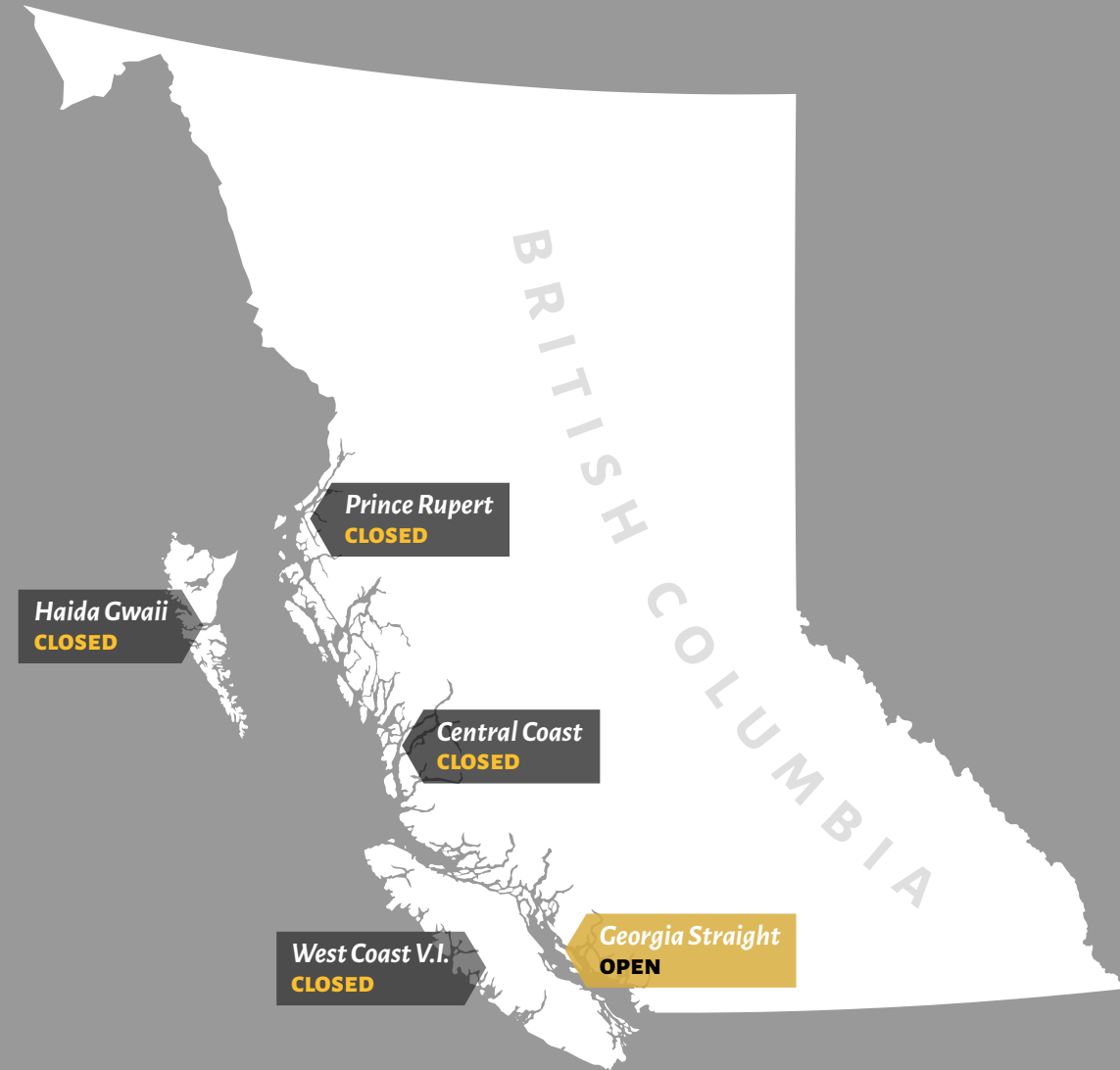
(McKechnie et al. 2014)

## 4 out of 5 herring populations have crashed.

The Strait of Georgia is home to the last large herring population in B.C. Since 2000, herring fisheries off Haida Gwaii, the Central Coast, and the West Coast of Vancouver Island have been closed many times under DFO management, because the populations were too small. Despite years of little fishing, these populations have not recovered. This year, the Prince Rupert herring fishery will also be closed.

The factors that affect herring populations are complex. Ocean conditions, food availability, predators, and fishing can all contribute to low herring numbers. But DFO management has not modeled herring populations accurately. The 2018 DFO review found that management models overpredicted herring in the Strait of Georgia six times in the last 13 years, causing overfishing. We cannot risk our last herring population for a fishery that uses unreliable models which have led to collapse in four of five populations.

**Source:** Fisheries and Oceans Canada. 2018. Pre-Approved Draft: Status of Pacific Herring (*Clupea pallasi*) in 2018 and Forecast for 2019.



**The Strait of Georgia is the only remaining herring fishery open in B.C.**



## Only 12% of the catch feeds humans—in Japan.

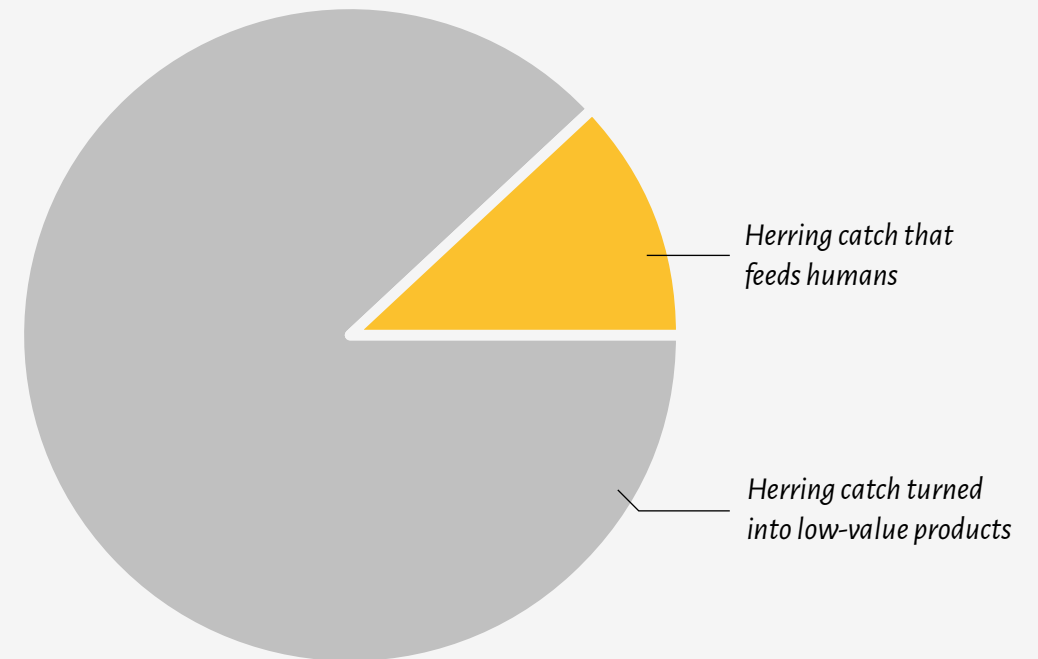
In the roe fishery, adult herring are captured just before spawning, and the eggs (roe) are removed from the female fish. The roe, which is only 12% of the catch on average, is sold in Japan as kazunoko, a luxury food. Because the popularity of kazunoko is declining in Japan, B.C. herring fishers now make less money for their catch.

The carcasses from the male and female herring are ground up and turned into low-value products. In 2019, over 18,000 tons of herring carcasses could be reduced into fishmeal and fish oil, most of which would go be fed to farmed salmon in BC.

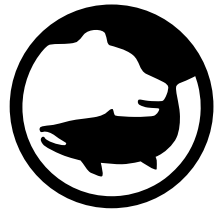
**Source:** Alaska Commercial Fisheries Entry Commission. 2005. *Changes in Roe Herring Markets: A Review of Available Evidence*.

**Source:** Victoria Postlethwaite, DFO Regional Herring Officer.

**Source:** Cashion, T. 2019. *The Economic Value of Pacific Herring in the Strait of Georgia*.  
<https://timcashion.github.io/PacificHerring/>



**Only 12% of the catch feeds humans—in Japan.**



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