

Protecting Pacific Herring:

Updates in conservation and management of B.C.'s foundational fish



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Acknowledgement

I would like to begin by acknowledging that I am currently on the traditional, ancestral, and unceded territory of the Coast Salish People.

Learn about where you live at Native-Land.ca.



Outline

- 01** Pacific Wild Herring Campaign
- 02** History and methods in the herring fishery
- 03** Indigenous and cultural importance
- 04** Current conservation status
- 05** Recent management changes
- 06** Pacific Wild Recommendations
- 07** Emerging research on herring
- 08** Take Action

Pacific Wild

WHAT WE DO

Pacific Wild is a leading voice for Wildlife Conservation in the Great Bear Rainforest and beyond.

MISSION

Using our powerful, trustworthy, visual storytelling (film, photography, books), evidence-based reporting, wildlife monitoring, legal action and community-led initiatives, Pacific Wild leverages its many partnerships to influence public opinion, policy, and legislative change to protect ecosystems and sustain biodiversity throughout the Pacific Northwest.

CAMPAIGNS

Wildlife Conservation and Habitat Protection

Sustainable Fisheries and Marine Conservation

Informed and Emboldened Coalition for Conservation

PROTECT PACIFIC HERRING

Herring is a cornerstone of marine biodiversity on the B.C. coast, however, a wasteful commercial sac roe fishery is threatening herring stocks and the sustainable First Nations spawn-on-kelp fishery that dates back thousands of years.

Campaign Goals

- Pacific herring populations rebound to healthy levels.
- DFO should impose a moratorium on the commercial herring fishery in the Strait of Georgia.
- Widespread support for Indigenous and local community stewardship projects that enhance Pacific Herring populations.

Campaign Projects

- Responding to management decisions
- Research: Fighting Fish paper and annotated bibliography
- Herring in the Classroom educational series
- Producing videos and social media content for public education and awareness.

The Fighting Fish

*An historical review of our relationship
with Pacific herring in British Columbia*

**“The herring is the
most baffling fish we
have. For every mystery
in the herring’s life
we solve, two new
mysteries appear.”**

— DR. ERIK POULSEN

*Secretary of the International Commission for the
Northwest Atlantic Fisheries, Summer, 1943*

“Prior to the closure of the reduction fishery, the fisheries on Canada’s west coast herring resource were managed on the principle of maximum sustainable yield (i.e. to take as great a tonnage of fish as possible on a continuing basis). As the stocks recovered from their decline in the mid-1960s, this approach was replaced by the “Best Use” principle. The new approach was concerned with maximizing the value to the Canadian economy (by processing the annual catch into quality products which demand a high price on world markets), diversifying the markets for the products (to provide more stability to the industry), and promoting jobs for Canadians (by increasing the amount of processing done in Canada).”¹⁵

Pacific Herring Facts

Pacific Herring are an important fish for British Columbia. They play a major role in our ecosystem and First Nations culture.

Name: Pacific Herring
Description: Small, oily fish
Length: 15-25 cm
Weight: 70-200 g
Colour: Silver-grey
Life Span: 8-10 years



Ecology

Pacific herring are **forage fish**. This means that they eat the smallest organisms called plankton, while feeding large predators such as seals, humpback whales and Chinook salmon. Further up the food chain, Orca whales feed on these

Commercial Fishing

In the commercial fishery, herring are primarily caught using two types of nets called **gillnets and seine nets**. These nets catch herring and bycatch. **Bycatch** are fish or animal caught unintentionally. In the herring fishery, bycatch can even include

Herring Quiz

Name

Date

Draw a line from the question in column A to the correct answer in column B.

Column A	Column B
A. Gillnet	1. This is a type of net used for fishing herring.
B. Spawn-On-Kelp	2. This is the sustainable fishing method used by many First Nations in B.C.
C. Plankton	3. This type of whale consumes herring.
D. Fish Meal	4. Herring are known to communicate using this method.
E. Killer Whale	5. This area is the last region open for commercial fishing in B.C.
F. Bubbles	6. Herring eat this organism.

Pacific Herring

Why are they important?

Characteristics

- Pacific herring are a small, bony, oily fish with a strong smell.
- 20.32 cm to 25.4 cm in length
- silvery sides and dark greenish-blue backs.
- The tail of herring is comprised of a deep fork.
- The age of herring can be determined by certain growth rings located on the loosely attached scales of the fish.
- On average, herring live for 8-10 years and can spawn multiple times in their life cycle.

Ecosystem Importance

- Pacific herring is a forage fish widely considered to be a keystone or foundation species.
- This small silver fish plays a major role in the lives of nearly every coastal species on land or underwater in British Columbia.
- Herring are an important link between tiny plankton and larger animals, from humans to whales, wolves, fish, and birds.
- Herring are integral for the survival of humpback whales, Chinook salmon, Southern Resident Killer Whales, wolves, bears and countless other species along the coast.

BY NORMAN CREIGHTON

PACIFICWILD



History of the Herring Fishery

Why? Where?

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AMONG the crews bringing a blacked-out convoy warily toward Halifax in the summer of 1943 were those loneliest among our allies—Norwegians who had escaped to England and now were fighting the battle of the convoys without a port of their own to come home to. On a moonless night near the Canadian coast they saw a nostalgic sight—all around the ships the sea glowed with a deathly radiance. On a dozen ships Norwegians on the rails, read the message of the periscope, and called softly to each other: "Herring."

When they reached Halifax some of the Norwegians asked to be directed to the docks where the deep-water Canadian herring trawlers moored. Then, they left, they would find men of their own kind. Well they remembered the good fellowship

sounder registered a heavy concentration of fish down below. On and on steamed the vessel and the sounder sent back the same clear message: "Herring, herring, herring." The school continued for eighteen miles. When it finally thinned out, the skipper ordered turnabout, to double-check this remarkable concentration of fish.

On the return trip the sounder encountered nothing between the keel and the ocean bottom but thin salt water. Incredulous, the captain set a zigzag course at top speed, sweeping the miles of sea that minutes before had been thick with herring. Not a single "blip." Millions of fish had vanished without trace.

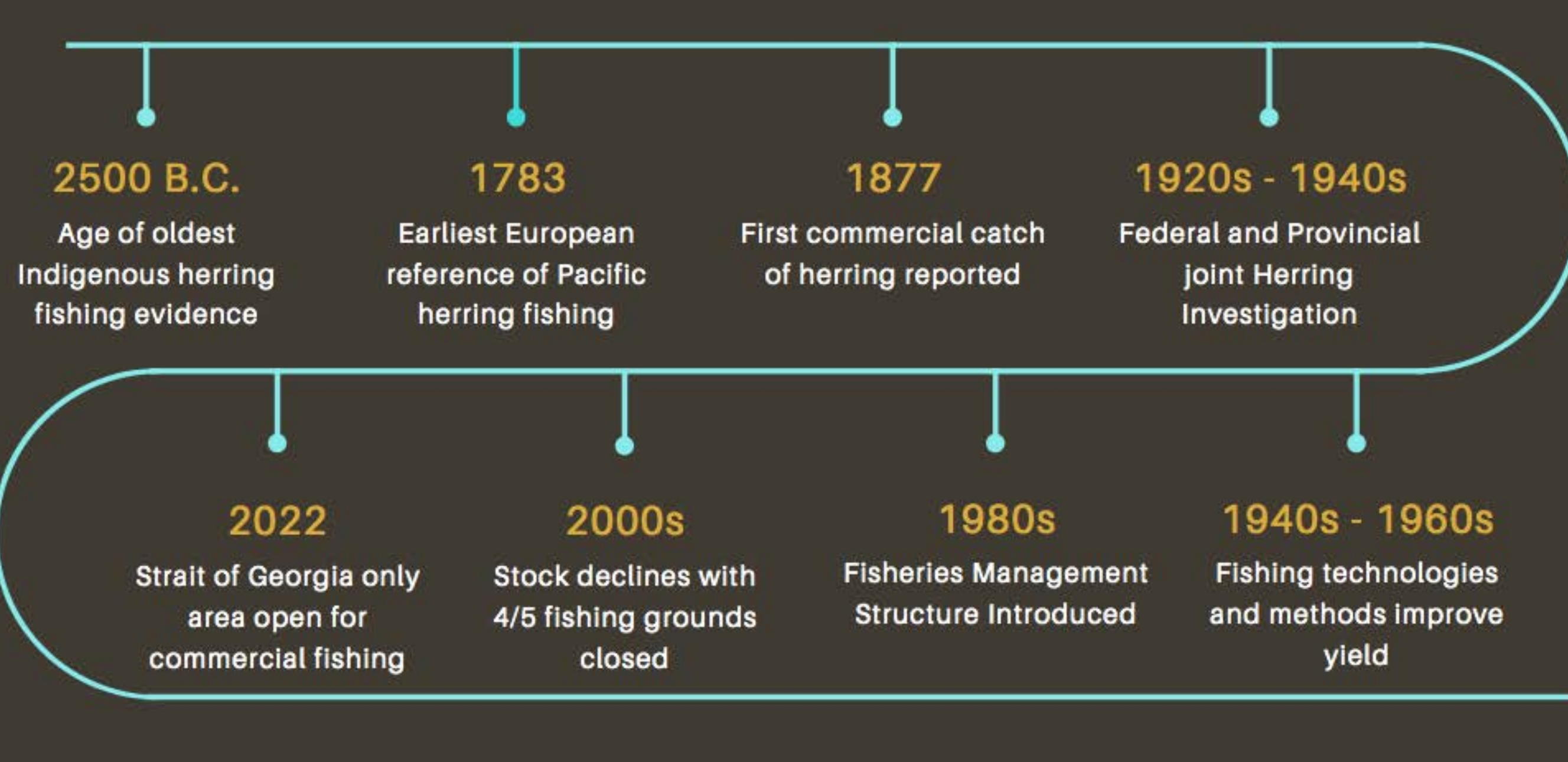
Dr. Erik Paulsen, secretary of the International Commission for the Northwest Atlantic Fisheries, declares, "The herring is the most baffling fish

Lawrence manning the boats of a new Canadian company, Mercury Fisheries Ltd. This trail-blazing venture is headed by Paul Stockhamer, of Great Yarmouth, who controls several British fishing companies. The Nova Scotia Government has loaned him \$367,700 to help buy five North Sea herring drifters.

"None of the Nova Scotia fishing companies consulted wanted to tackle it," says John Bagelow, Nova Scotia's Deputy Minister of Trade and Industry. "It's a completely new field. The techniques are highly specialized. These Great Yarmouth men have centuries of experience behind them, both in fishing and processing. But more important, they have the market connections. Most of the fish will go to Europe."

So far, Canadian fishermen have adopted a hard-see attitude toward offshore herring, on grounds that it is an expensive business and so depends on many unknown factors. For now, is there any chance that Canadians will ever herring enough to provide a palatable net in addition to the export demand? There's a sign that arrival in Canada of large numbers of immigrants since World War II has stimulated demand for herring products. In such districts as Blue-Bathurst area of Toronto ordinary grocery stores now carry imported herring packed in oil and other gourmet varieties. But Canadianing interests maintain that "someone will have to herring what fish sticks are doing for the fish varieties" before a substantial national net for unearched herring develops.

There is no doubt that there are vast quantities of herring in Canadian waters. And one of the boxes of the herring mystery is that Canada only reaps a huge harvest of the fish—but only during the hectic six weeks each year when the fish are in its countless. Continued on page 38



By counting the rings on a herring scale you can tell the age of a fish. This one was six.

Elderly herring (below) was twelve. Scales are sold separately to make pearl essence.

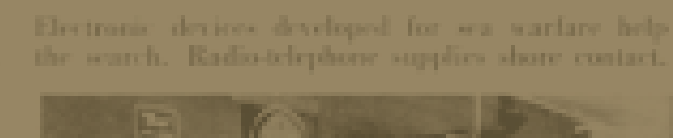


Dr. A. B. Leim (r) with his Herring Squad. From left: Dr. L. Laurier, Dr. L. R. Day, S. Noel Tibbo.

SCIENCE AND BRAINS COMBINE TO TRACK DOWN THE ELUSIVE ATLANTIC HERRING

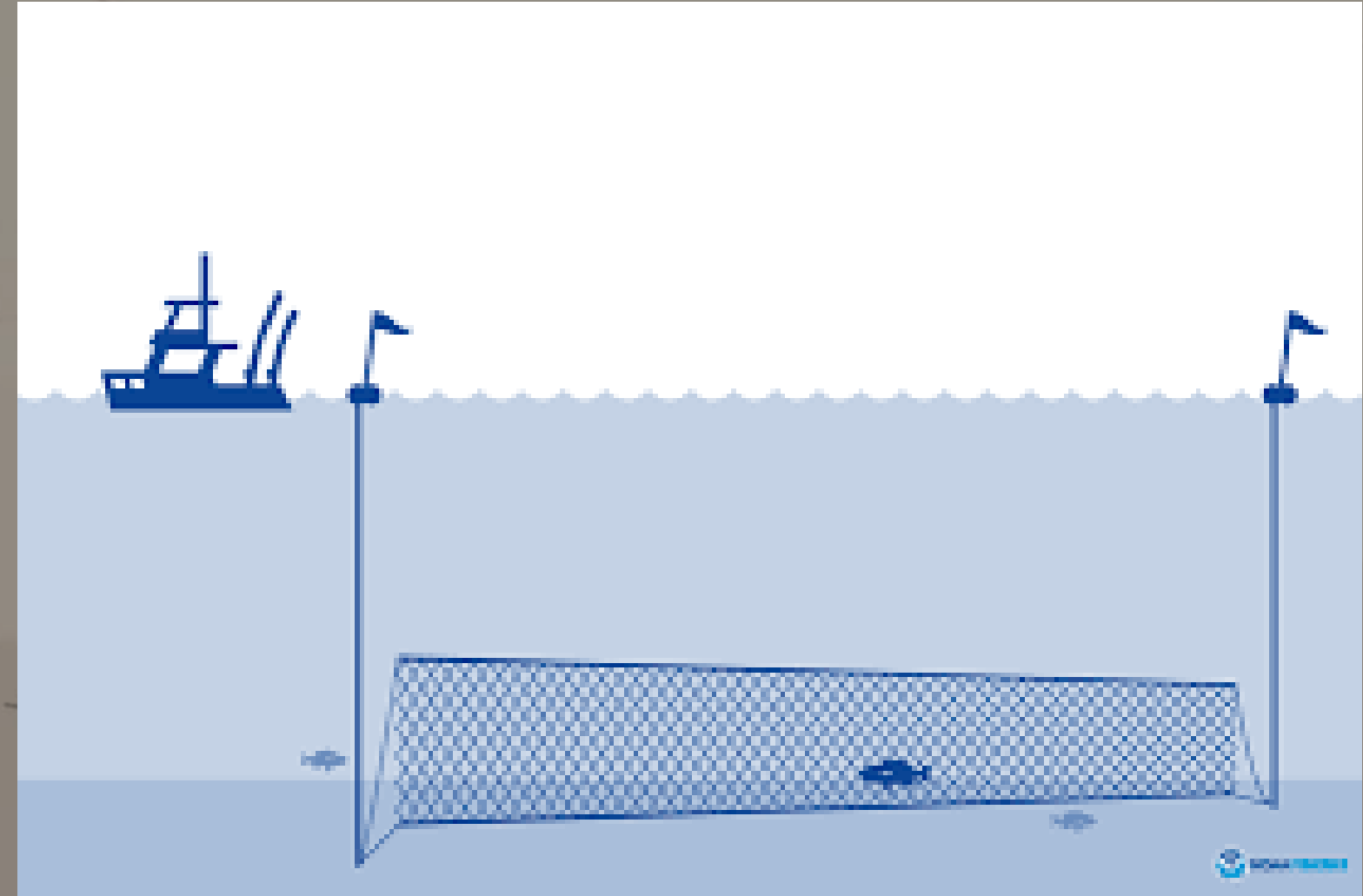
The Atlantic Biological Station at St. Andrews, N.B., is home port for the Harengus. Her crew totals nine.

Electronics devices developed for sea warfare help the search. Radio-telephone supplies shore contact.

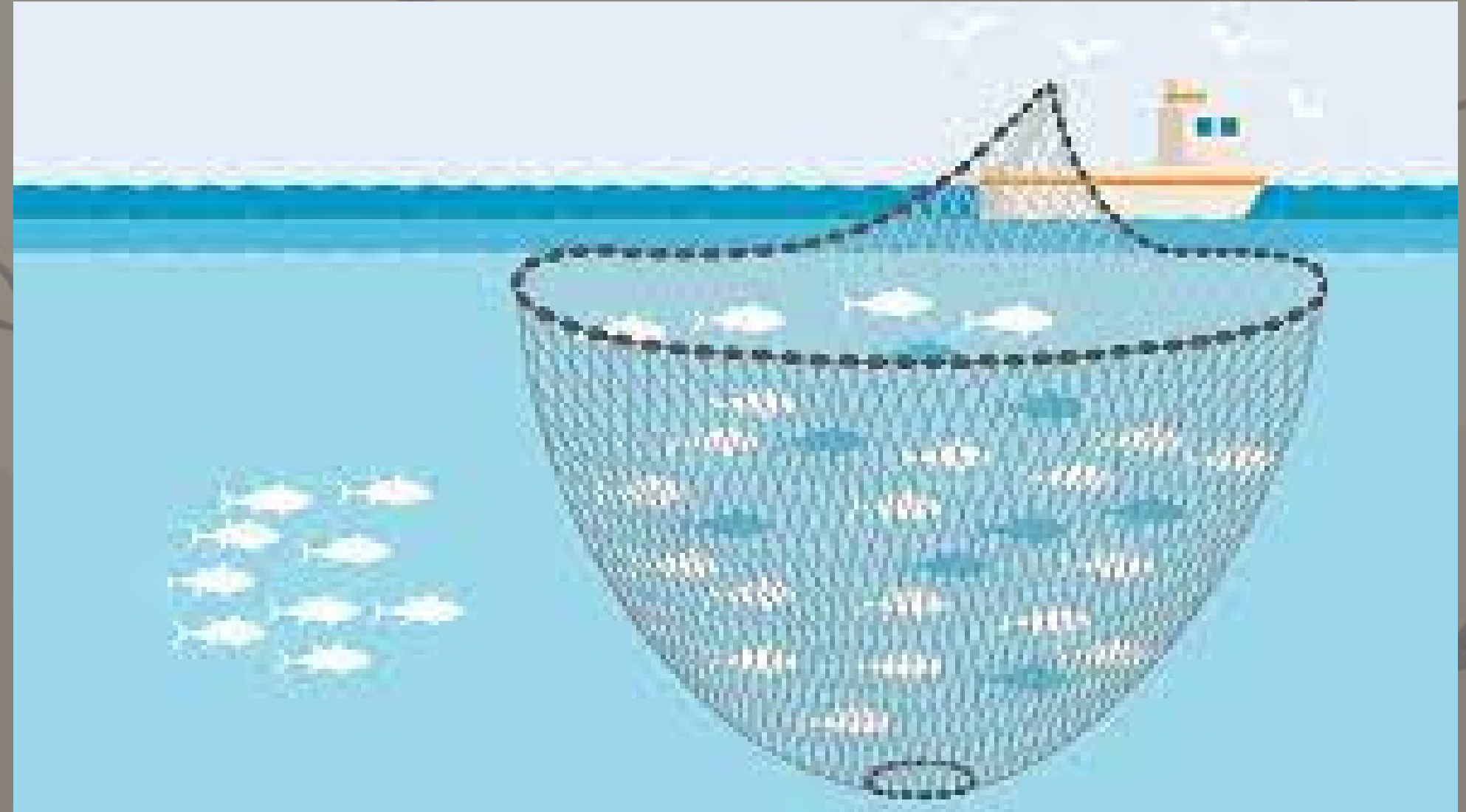


Harvesting Methods





Commercial fishing method using vertical panels of netting to catch fish as they swim into the net.



Commercial fishing method using a net that sits vertically in the water, scooping up entire schools of fish.



SOK, or Spawn-on-Kelp fisheries involve the placing of lines of kelp (and in some regions, hemlock boughs) in the water and eggs produced during the spawning period adhere to the kelp and are harvested. This method does not harvest the whole herring and allows for the fish to continue spawning.

Cultural Importance

First Nations have a long history of sustainably harvesting herring roe for trade and consumption using a method that involves collecting eggs that have been deposited on kelp or hemlock branches suspended near the shore. Such a method allows the spawning herring to live on and spawn again or be eaten by predators, therefore maintaining the herring's critical ecosystem function.

- Herring and their roe are nutritionally valuable and integral to daily lives.
- Many First Nations have traditional stories and songs about the importance of Pacific Herring, reflecting the long-term connection to herring.
- In the 1970s, the Federal Government introduced Food, Social and Ceremonial fisheries category.





Current Conservation Issues

4/5 Fishing Grounds Collapsed

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.

Herring Feed the Coast

Herring are an important link between tiny plankton and larger animals and exist as the primary food source for many species including chinook salmon which, in turn, are the primary food source for endangered Southern Resident killer whales.

First Nations FSC Fisheries Struggling

First Nations fished Pacific herring sustainably for thousands of years before industrial fishing. Many First Nation along the coast have expressed that there have been insufficient herring spawns for traditional harvesting. Many Nations have elected not to fish in recent years.





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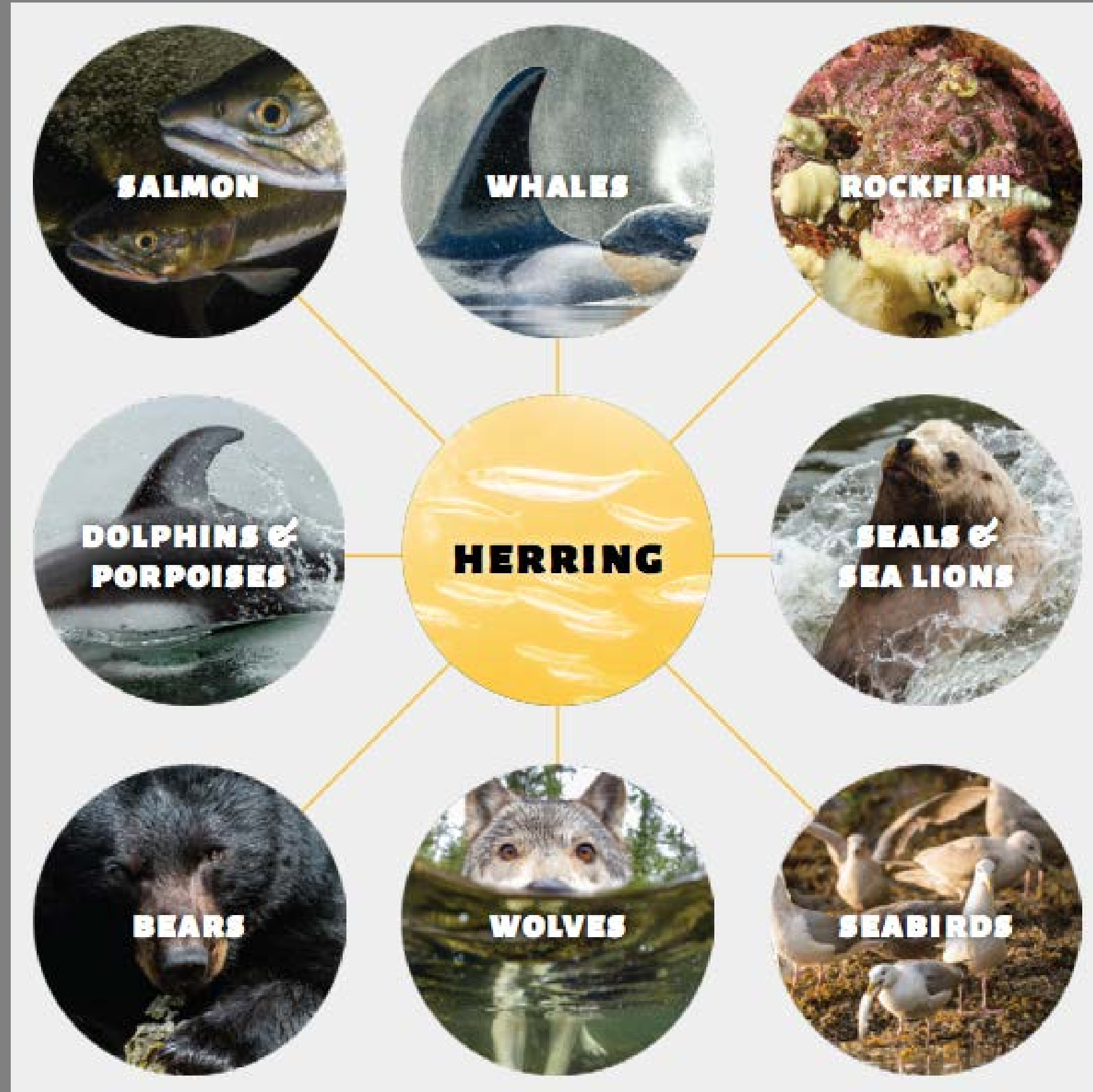
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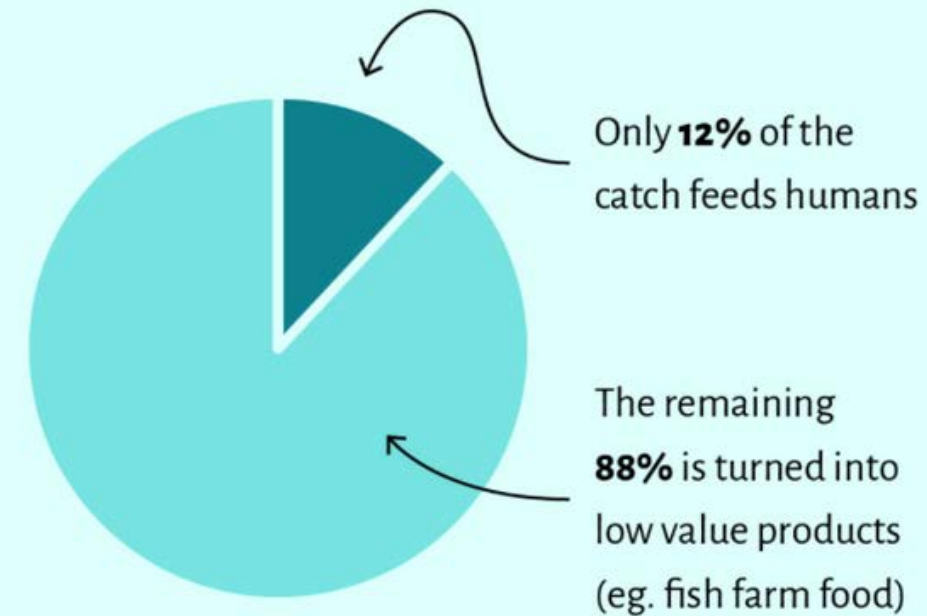
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Pacific Herring End-Use

Where do commercially fished Pacific herring end up?



Harvested Roe

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. Roe is also harvested in SOK fisheries (both commercial and First Nations)

Fishmeal and Fish Oil

Waste product from the roe fishery is ground up and used in fishmeal (served to fish in fish farms) and put into pet food as a protein. Fish oil for supplements is also produced.

In 2019, more than 18,000 tonnes of herring were **reduced to fishmeal and fish oil which predominantly went to feed farmed salmon.**



That's the weight equivalent of 600 humpback whales!

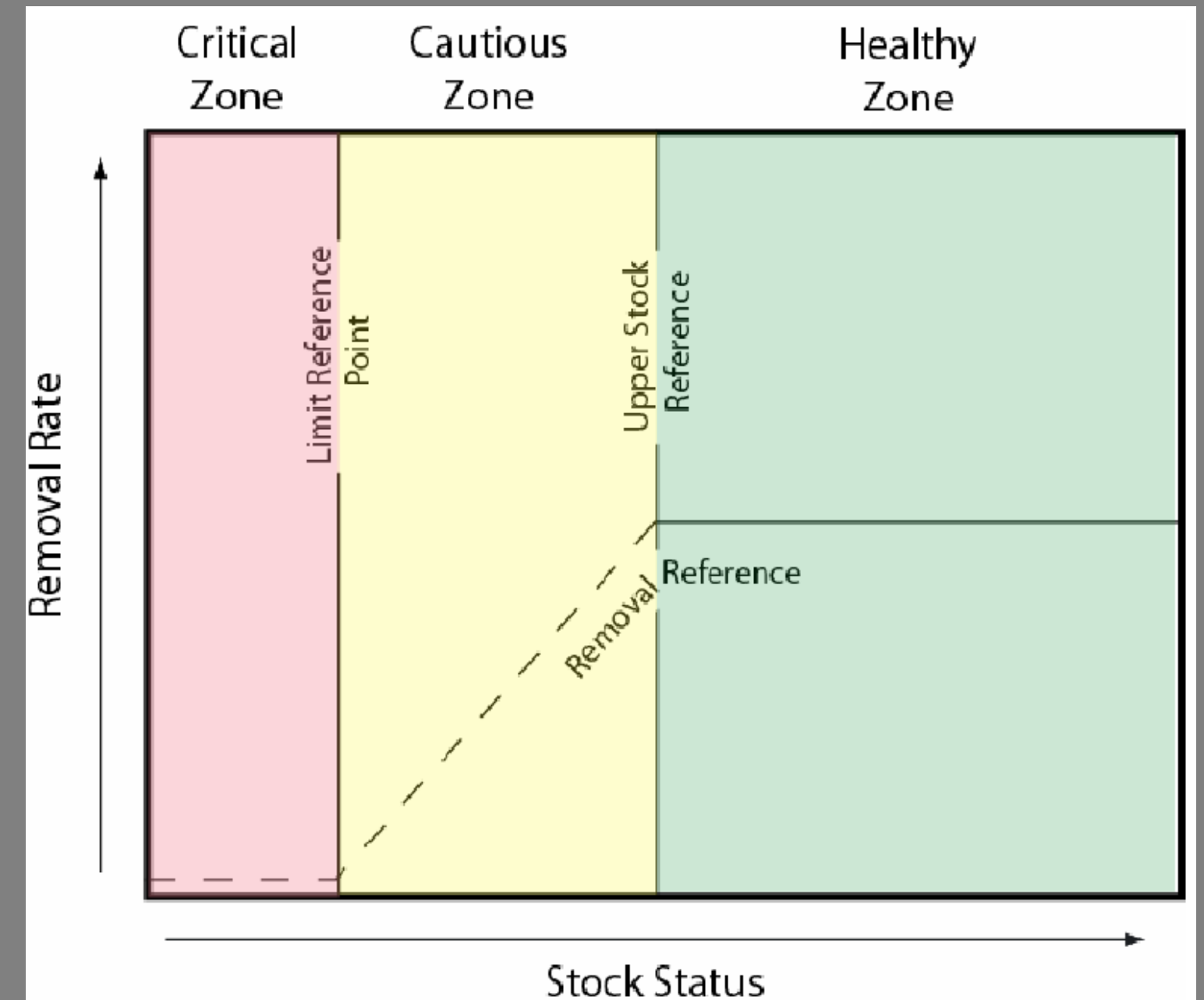
Current Management Regime

- Stock Assessments
 - Total Allowable Catches and Precautionary Principle
- Quotas allocated
 - Industrial and small-scale vessels, commercial
 - Bought and sold like stock
- Licenses can be purchased by large corporations
- Fisheries Officers and Monitoring
 - DFO and Coastguard
 - EM, Observers, Dockside

Current Management Regime

Precautionary Approach

- Identifies three stock status zones – healthy, cautious, and critical – according to upper stock reference points and limit reference points
- Sets the removal rate at which fish may be harvested within each stock status zone
- Adjusts the removal rate according to fish stock status variations
- Precautionary Approach is still designed to catch the largest amount of fish possible.





2022 Management Changes

Commercial Fishing Openings

DFO has proposed to open a singular commercial herring fishing ground - the Strait of Georgia. The other 4 fishing grounds are closed to commercial fishing in the 2022 management year.

Reduction of Quota by 50%

The 2021/2022 IFMP outlined a Pacific herring quota reduction by 50% - from a 20% harvest rate to 10% harvest rate for a maximum total allowable catch of 7,850 tons in the Strait of Georgia.

Haida Gwaii Rebuilding Plan

Haida Gwaii has seen extreme declines in Pacific herring stocks since the early 2000s. These declines have resulted in the closure of the fishery for decades. The new management plan outlines development of a rebuilding plan for Haida Gwaii herring. This is a long time coming and it is time that DFO upholds its commitments to working with the Haida Nation to protect their herring.

Pacific Wild Recommendations



1. Move towards Ecosystem-Based Management

- EBM allows for a holistic analysis of the herring fishery in relation to the ecosystem, rather than simply at a species level.
- The new Sustainable Fisheries Framework is outlined in the IFMP and includes policies for adopting EBM approaches.

2. Identify migratory and resident herring populations in the management plan

- The spatial distribution of herring stocks is not recognized in the Pacific herring management plan.
- The difference between migratory and resident herring is under-researched.
- There is current and upcoming research that DFO can take note of in order to consider resident and migratory herring in management plan.

3. Outline a more detailed plan to integrate Traditional Ecological Knowledge (TEK) into management

- The 2021/2022 herring IFMP mentions the need to integrate Traditional Ecological Knowledge (TEK) and Indigenous Knowledge (IK) into DFO management plans.
- Consulting with First Nations is a necessary step in Fisheries Reconciliation and ensuring access to fishing rights.

4. Prioritize Spawn-on-Kelp (SOK) fisheries over other harvesting methods

- Spawn-on-Kelp (SOK) commercial operations are not allowed to open this season.
- SOK fisheries are a sustainable method of harvesting and should not be suffering while gillnetters and seiners continue to profit.
- Additionally, SOK fisheries are not yielding sufficient herring eggs in the population collapse.

Emerging Research on Herring

Phenological diversity of a prey species supports life-stage specific foraging opportunity for a mobile consumer

[Joshua Chamberlin](#) ✉, [Eleni Petrou](#), [Will Duguid](#), [Russel Barsh](#), [Francis Juanes](#),
[Jessica Qualley](#), [Lorenz Hauser](#) [Author Notes](#)

ICES Journal of Marine Science, Volume 78, Issue 9, November 2021, Pages 3089–3100,
<https://doi.org/10.1093/icesjms/fsab176>

Published: 22 September 2021 **Article history** ▼

Declines in Chinook salmon productivity may be result of poor food availability.

Adult Chinook salmon feed predominantly on herring in March - April, while juveniles fed on herring in the late fall.

This suggests that there is importance for both the migratory and residential stocks in Chinook salmon feeding and survival.

Emerging Research on Herring

Trade-offs and uncertainties in Northeast Pacific herring fisheries: ecosystem modelling and management strategy evaluation [Get access >](#)

Szymon Surma ✉, Tony J Pitcher, Evgeny A Pakhomov

ICES Journal of Marine Science, Volume 78, Issue 6, September 2021, Pages 2280–2297,
<https://doi.org/10.1093/icesjms/fsab125>

Published: 19 July 2021 **Article history** ▼


Surma, Pitcher & Pakhomov evaluated herring fisheries management strategy performance in contrast with ecological and socioeconomic objectives.

There is evidence of a trade-off between stable herring catches and high biomasses of herring and several predators.

This study suggests trade-offs among management objectives should be considered in pursuing ecosystem-based fisheries management for forage fish.

Emerging Research on Herring

Functional genetic diversity in an exploited marine species and its relevance to fisheries management

Eleni L. Petrou , Angela P. Fuentes-Pardo, Luke A. Rogers, Melissa Orobko, Carolyn Tarpey, Isadora Jiménez-Hidalgo, Madonna L. Moss, Dongya Yang, Tony J. Pitcher, Todd Sandell, Dayv Lowry, Daniel E. Ruzzante and Lorenz Hauser

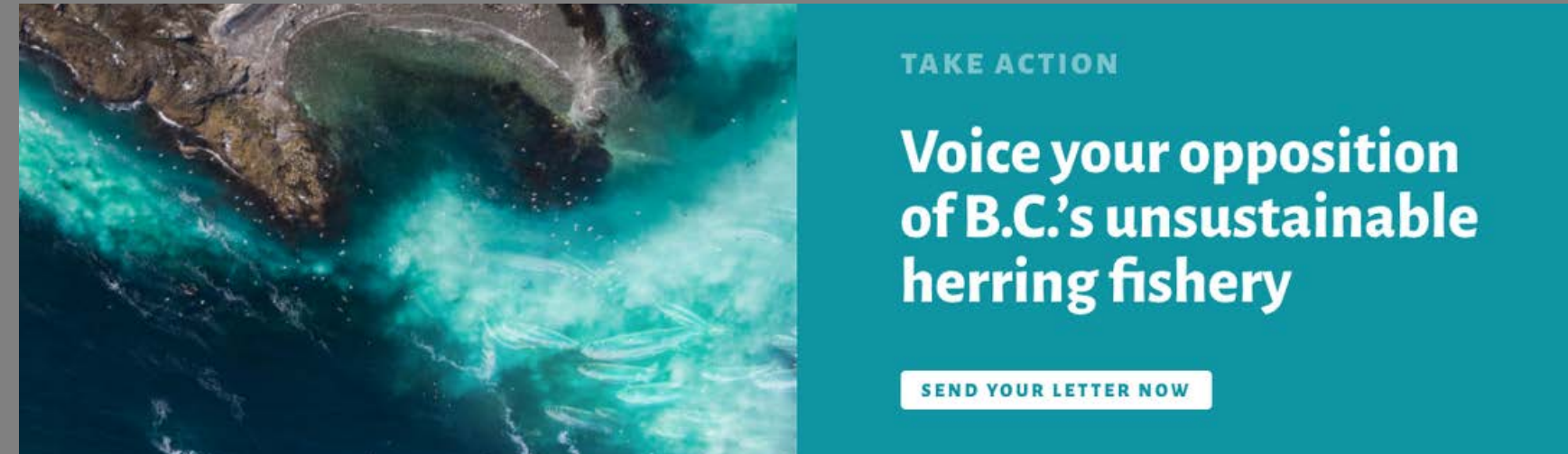
Published: 24 February 2021 | <https://doi.org/10.1098/rspb.2020.2398>

This study explores the timing of reproduction and how it influences ecological processes.

In Pacific herring, it was determined that gene flow is geographically limited and that there is seasonal and spatial variation in spawning. This is further evidence of resident versus migratory herring.

Results supported that it is necessary to conserve genetic diversity (and spatially distinct populations) in Pacific herring.

Take Action



- Consume content - social media, research, The Fighting Fish, etc.
- Get familiar with your local organizations: Pacific Wild, Conservancy Hornby Island, SeaLegacy, etc.
- Choose wild salmon - farmed salmon rely on the fishmeal produced from the herring fishery waste product.
- Switch pet foods - if accessible, choose a pet food that doesn't contain herring.
- Sign the form letter on our website - Urge Joyce Murray to close the last remaining herring fishery so that herring can rebound to healthy levels.