

Caring about Herring: Sustaining Key Forage Fish

Pacific herring are a key fish for the ecosystems and cultures along the B.C. coast. However, herring populations have been declining and they face pressures from climate change, species competition, fishing, and habitat destruction. In order to support population recovery and resilience, considering ecosystem and climate change interactions, reducing pressures, and building partnerships are recommended.

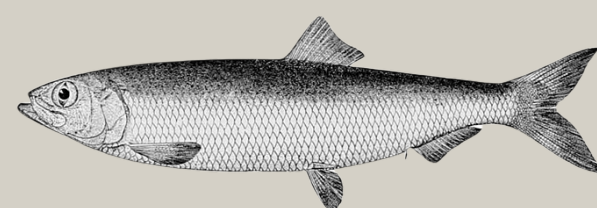
Pacific herring are an important marine species for B.C. They are a key species for **First Nations** and have contributed millions of dollars to B.C. **fisheries**. They are **especially important ecologically** and many species rely on them for food. However, many Pacific herring populations along the B.C. coast have been **declining** and are well below their estimated historical levels. The exact cause for these declines are unclear and populations where fisheries have closed have not rebounded as anticipated. Factors affecting their populations may include competition with other species, reduced prey availability, habitat degradation, and human exploitation. Additionally, warmer water temperatures from **climate change** seems to have a negative impact on the ability for Pacific herring to thrive and reproduce.

Recent attention has been drawn to Pacific herring due to their significance as a source of food and potential protection for declining Chinook Salmon, a key prey species for the endangered Southern Resident Killer Whale. Currently, Pacific herring quotas are calculated without ecosystem considerations. The resiliency of Pacific herring populations is key to ecosystem health and is especially important in the face of climate change, which is occurring rapidly within Canada.

Herring Who?

Herring are small fish that eat phytoplankton and zooplankton. Herring take 3 years to become reproductively mature and can reproduce for multiple years in a row, laying their eggs on kelp or other marine vegetation. These eggs are what are of most value on the markets as they are sold for roe and are harvested either by collected them from kelp or by fishing the herring and extracting the eggs.

A huge number of animals rely on Pacific herring. They are considered a central part of the food web and can even be considered a central part of a wasp-waist food system, where only a couple animals link the food chain levels between smaller and larger animals such as zooplankton and salmon.



Pacific herring

Recommendations

- **Reduce commercial fisheries** intake until appropriate ecosystem data is available to make a fully informed decision
 - *Potential short-term implications:* decreased fisheries' catches, reduced human pressure on Pacific herring stocks and dependent species, increased successful Pacific herring spawning
 - *Potential long-term implications:* increased sustainability and stability of fisheries, increased resilience for Pacific herring and other dependent stocks
- Apply an **ecosystem-based approach** and ecosystem understanding to Pacific herring fisheries management
 - *Potential implications:* increased understanding of the links between Pacific herring and other species, increased sustainability of Pacific herring fisheries and increased resilience of ecosystem overall
- Include **best available climate data** and impacts of climate change on Pacific herring in stock assessments and quota setting
 - *Potential implications:* longer-term resilience and viability of Pacific herring stocks and fishery
- Support more **sustainable roe harvesting methods** by increasing allowed amounts of spawn-on-kelp harvesting and decreasing amounts of roe fishing
 - *Potential implications:* herring are able to spawn multiple years, leading to older, larger herring with more eggs and more roe harvest
- Continue to build and expand **partnerships with First Nations**
 - *Potential implications:* increased understandings of Pacific herring history, furthered efforts of reconciliation and Indigenous food sovereignty
- Identify key spawning sites and create **protected areas** for population recovery
 - *Potential implications:* decreased habitat loss pressures and increase in herring spawn

Overall goal: ensure that Pacific herring are carefully managed to allow for maximum resilience so they can support the food web they are a part of and thrive in the face of climate change.

References

- "British Columbia Seafood Industry: Year in Review 2016." 2016. *Government of British Columbia*, https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/statistics/industry-and-sector-profiles/year-in-review/bcseafood_yearinreview_2016.pdf
- Duffy, E., Å Beauchamp, D., Sweeting, R., Å Beamish, R. & Brennan, J. 2011. Ontogenetic Diet Shifts of Juvenile Chinook Salmon in Nearshore and Offshore Habitats of Puget Sound. *Transactions of the American Fisheries Society*, 139, 803-823, <https://doi.org/10.1577/T08-244.1>
- McKechnie, I. Lepofsky, D., Moss, M.L., Butler, V.L., Orchard, T.J., Coupland, G., Foster, F., Caldwell, M., & Lertzman, K. 2014. Archaeological perspectives on herring variability. *Proceedings of the National Academy of Sciences*, 111(9), doi: 10.1073/pnas.1316072111
- Meissner, D. 2019. B.C. herring roe fishery ends for another season amid ongoing controversy. *CBC News*, <https://www.cbc.ca/news/canada/british-columbia/bc-herring-fishery-ends-for-another-season-controversy-over-catch-continues-1.5084581>
- "Protecting Southern Resident Killer Whales." 2018. *Fisheries and Oceans Canada*, <http://dfo-mpo.gc.ca/campaign-campagne/protectingwhales-protegerbaleines/srkw-eng.html>
- "Pacific herring 2017 to 2018 Integrated Fisheries Management Plan summary." 2018. *Government of Canada*, <http://www.pac.dfo-mpo.gc.ca/fm-gp/mplans/herring-hareng-ifmp-pgip-sm-eng.html>
- Schweigert, J. F., Boldt, J. L., Flostrand, L., and Cleary, J. S. 2010. A review of factors limiting recovery of Pacific herring stocks in Canada. *ICES Journal of Marine Science*, 67, 1903-1913.
- Surma, S., Pitcher, T.J., Kumar, R., Varkey, D., Pakhomov, E.A., & Lam, M.E. 2018. Herring supports Northeast Pacific predators and fisheries: Insights from ecosystem modelling and management strategy evaluation. *PLOS One*, 13(7), 1-24, <https://doi.org/10.1371/journal.pone.0196307>
- The Salish Sea Pacific Herring Assessment and Management Strategy Team. 2018. Assessment and Management of Pacific Herring in the Salish Sea: Conserving and Recovering a Culturally Significant and Ecologically Critical Component of the Food Web. *The SeaDoc Society*, Orcas Island, WA
- "What is a Pacific Herring?" n.d. *Capital Regional District*, <https://www.crd.bc.ca/education/our-environment/wildlife-plants/marine-species/pacific-herring>

Potential contacts:

Amber Neuman

Lead Roe, Food and Bait Herring Resource Manager

amber.Neuman@dfo-mpo.gc.ca

Brenda Spence

A/Regional Pelagics Coordinator

brenda.Spence@dfo-mpo.gc.ca

Jonathan Wilkinson

Minister of Fisheries and Oceans Canada

min@dfo-mpo.gc.ca

Mike Carlson

Regional Director, Conservation and Protection Area

mike.Carlson@dfo-mpo.gc.ca

Steven Groves

North Coast Section Head (Herring) and Lead Spawn-on-Kelp Resource Manager

steven.Groves@dfo-mpo.gc.ca

Victoria Postlethwaite

Regional Herring Officer and Lead Special Use Herring Resource Manager

victoria.Postlethwaite@dfo-mpo.gc.ca