

# The State of Strait of Georgia Herring and Why There Should Be No Herring Fishery in 2020

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## Summary:

Fisheries and Oceans Canada (DFO) has again recommended a 20% harvest rate in the 2019-20 herring fishery in the Strait of Georgia (SOG). Because of the uncertainties in biomass projections, the 60% decline in SOG biomass in the past 4 years, the importance of herring to the overall SoG marine ecosystem, the serious lack of scientific knowledge on the different stocks that make up the overall SoG herring biomass, the fact that the SoG herring are the last of the supposedly healthy stocks on the BC coast, and the requirements of the new Fisheries Act, UNDRIP, and DFO's principles of Sustainable Fisheries Framework, Precautionary Approach, Ecosystem Based Management and risk aversion, we urge DFO to place a moratorium on or seriously reduce the commercial herring fisheries in the SOG for the 2019-20 fishery.

**1. SCIENCE: Given the uncertainties in the biomass projections, as shown below, the observed overall stock decline and DFO's own science and "precautionary approach", a sustained ongoing commercial fishery should not be allowed in the SOG in 2020 based on the following:**

- a. **Stock decline:** The spawning biomass of the Strait of Georgia (SOG) stock has declined from 129,000 metric tonnes in 2016, to 85,700 tonnes in 2019, and is predicted to fall to 54,242 tonnes in 2020 - a 60% decline in 4 years. (*DFO Science Response: Pacific Herring Status in 2019 and Forecast for 2020*)
- b. **Overharvesting even more likely this year:** "there is a moderate to high potential to over-harvest in this fishery, which may pose a risk to the stocks ... **the overall risk that the fishery poses to the stocks was changed to high**" (*DFO's 2019/20 IFMP p. 206*) According to the Fisheries Act: "6.1 (1) *In the management of fisheries, the Minister shall implement measures to maintain major fish stocks at or above the level necessary to promote the sustainability of the stock, taking into account the biology of the fish and the environmental conditions affecting the stock.*" **If there is a HIGH risk of overfishing as cited in the IFMP, then what measures might the Minister be implementing to satisfy this statute?**
- c. **Incorrect projections:** The SOG spawning biomass in 2019 was forecast to be 135,497 tons. DFO stated "Stock biomass is high and

growth is positive." (*Final 2018-19 Pacific Herring IFMP*, p. 64)

However they were wrong: the *Draft 2019-20 Pacific Herring IFMP*, p. 155, states "The estimated spawning biomass in the SOG decreased in 2019 from 2018. Estimated median spawning biomass in 2019 was 64,281 t and the forecasted median spawning biomass in 2020 is 54,242 t, with a range from 27,200 t to 110,000 t." **This again shows the uncertainty of their model's biomass predictions, which may be consistent with a flaw in the model.** Until DFO can produce models that accurately reflect the dynamics of herring stocks, their response to environmental and anthropogenic factors, and the effects of declining coast-wide herring abundance on other important species, herring should not be fished commercially in B.C.

- d. **Reason for uncertainties:** "Research indicates that the interplay of food supply and predation impacts on herring survival and production is complex and **not readily predictable** (*Schweigert et al. 2010*)." (*DFO's 2019/20 IFMP p. 24*)
- e. **DFO's own science advice:** Since 1986, over-harvest has occurred "frequently" on the Central Coast (*Status of Pacific Herring in 2018*: page 10; Figure 11), and in the Strait of Georgia, harvest exceeded the intended 20% harvest rate in four of the last ten years (page 11; Figure 11). DFO's Management Strategy Evaluation found that "**Reduction in harvest rate from 20% to 10% was the most effective means** of mitigating stock assessment errors by reducing the absolute size of the catch". (*DFO Stock Status Update with Application of Management Procedures for Pacific Herring (Clupea Pallasii) in British Columbia: status in 2019 and forecast for 2020*, p. 11, Oct 28, 2019) yet, the IFMP assigns a 20% harvest rate for the Strait of Georgia in 2020. To improve effectiveness--and public trust--in the herring management system, DFO managers must, at a minimum, implement the lessons of their internal evaluations.
- f. **More cause for alarm:** DFO's July, 2019 *Pacific Herring Preliminary Data Summary for Strait of Georgia*, p. 4 states:
  - Compared to recent years, most test fishery samples had **smaller fish and more juveniles.**
  - The overall length of spawn observed during the flight program was **less than recent years.**

- **Lack of spawn deposition in some common locations** like Qualicum Beach to Columbia Beach.

**This is all evidence that herring are losing their way to their spawning grounds:** Recruiting year classes learn the migration pattern from older fish and a change in migration pattern is usually associated with a relatively low ratio of experienced older fish to first-time spawners (**Source:** McCall, A. D. et al. (2018) *A heuristic model of socially learned migration behaviour exhibits distinctive spatial and reproductive dynamics. ICES Journal of Marine Science. 76(2), 598–608*)

- g. **Inaccurate picture of B.C. herring populations.** DFO science uses population data from 1951 as the baseline for assessing the health of current populations. 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 (*McKechnie et al. 2014*). 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; *Herring School 2015, DFO 2018a*). In 1967, populations collapsed coastwide (*Herring School 2015*). Using 1951 data as a population baseline is misleading. It conceals the declines caused by early fisheries and limits the scope of recovery for B.C. herring populations.
- h. **Current fishery closures.** Between 1967 and 1971 the entire BC herring fishery was largely closed due to the above-mentioned uncertainties. Some stocks now remain closed for commercial fishing, including the commercial roe fisheries on the west coast of Vancouver Island, the Central Coast, and off the Haida Gwaii and Prince Rupert coasts. The conditions prior to these closures (in terms of uncertainties in spawning biomass in the context of a declining stock) are similar to the present SoG stock conditions. DFO's ability to predict future ocean productivity is limited, therefore, there is a reasonable, if not high likelihood that the projected 2020 spawning biomass is substantially inaccurate. This uncertainty in ocean productivity outlook may be acceptable when stock sizes are large, but presents unacceptable risks in a context of a low, continuously declining spawning biomass.

## **2. DFO IS IGNORING ITS OWN POLICIES** including the newly developed **SUSTAINABLE FISHERIES FRAMEWORK (SSF)** that incorporates the **Precautionary Approach** and the **Principles of Ecosystem-based Fisheries Management**, and the **POLICY ON NEW FISHERIES FOR FORAGE SPECIES**

### **a. Sustainable Fisheries Framework (SFF)**

The SFF incorporates the Precautionary Approach ("the PA is, in general, about being cautious when scientific information is uncertain, unreliable or inadequate and not using the absence of adequate scientific information as a reason to postpone or fail to take action to avoid serious harm to the resource.") and the Principles of Ecosystem-based Fisheries Management which DFO stated in 2009 was "essential for sustainable fish stocks and sustainable fisheries over the long term:

An **ecosystem approach** requires that fisheries management decisions consider the impact of the fishery not only on the target species, but also on non-target species, seafloor habitats, and **the ecosystems of which these species are a part**. This approach also requires that management decisions take into account **changes in the ecosystem** which may affect the species being fished. This includes the **effects of weather** and climate, and the **interactions of target fish stocks with predators, competitors, and prey species.**" (*Principles of Ecosystem-based Fisheries Management*: ? <http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/ecosys-back-fiche-eng.htm>)

**The 2019-20 IFMP includes only a few pages addressing ecosystem issues:**

Page 24 states "Herring plays a critical, foundational role in the ecosystem, supporting numerous economically, ecologically, and culturally significant species. These species include: seabirds, especially diving birds such as cormorants and murre; fish, including salmon, perch, and hake; and several marine mammals. The harvest rates are based on mature spawning biomass forecasts, and juvenile fish and a significant proportion of the adult population remain available to support ecosystem processes." But **DFO have done no research** on the impact of removing 20% of the steadily declining herring population every year on the wild predators that rely on the herring and that support the much more lucrative sports fishing and wildlife tourism

industry in B.C. (*Please see our science literature review for more details on the needs of these predators*).

Page 206 assumes there is no impact of the reduced biomass on the prey that rely on herring: "...the fishery has a low impact on herring as a key prey species. Even though herring are a forage fish species for many marine mammals, sea birds and other fish, **the fishery is managed using a conservative approach and therefore was identified as having a low impact on ecosystem processes.**" This is a circular argument that uses its own conclusion as its premise. How do they know it has a low impact on ecosystem processes without research on the impact on the predators themselves?

The discussion ends with this contradictory statement: "... **the overall risk that the fishery poses to the stocks was changed to high.**" (*DFO's 2019/20 IFMP p. 206*) **Again, this implies that to apply the precautionary principle there should be no herring fishery in the SoG this year.**

#### **What would true ecosystem-based fisheries management look like?**

Many, if not most, of the fish species on the BC coast that have been commercially fished are at very low population levels. Chinook and coho salmon, halibut, ling, grey and rock cod, dogfish, seabirds, whales and other mammals all rely on herring for a good part of their diet. There has been a substantial increase in the Steller and California sea lion, harbour seal and humpback whale populations in the Strait of Georgia in recent years and they consume large quantities of herring. Why have they returned in such large numbers? This may be because the last major herring run on the BC coast is in the SOG.

The Southern Resident Killer Whales (SRKW) are listed as endangered and DFO has initiated a number of measures to increase and protect the remnant Chinook populations that are resident of and migrate through the SOG and are the main food species for SRKWs. **A moratorium on herring fisheries should be included in those measures.**

"Resident forms of Chinook salmon (>300mm) rely heavily on herring throughout their entire marine life with herring contributing about 80% of their lifetime energy budget" (**Source: PSC report, Beauchamp & Duffy, 2011**).

"Marine survival of juvenile Chinook salmon is strongly correlated to the proportion of herring in their diet in the Strait of Georgia." (**Source:** *Assessment of Status and Factors for Decline of Southern BC Chinook Salmon: Independent Panel's Report, The Independent Advisory Panel of the Southern BC Chinook Salmon Science Workshop* p. 110 )

Also important is the **role that herring play as a predation buffer to the Chinook salmon**. Harbour seals eat a large proportion of the juvenile Chinook that enter the Salish Sea. However, Chinook comprise only a part of the seal diet as the seals also primarily eat herring. If the seals have plentiful availability of alternative prey (i.e. herring) their impact on the juvenile Chinook population is likely to be less. However, if the herring population in the Salish Sea declines due to fishing pressure, the seals may increase their predation on their alternative prey, the juvenile Chinook (pers.com).

**It seems obvious that as herring become smaller and fewer over time, there is less food to go around. A collapse of herring populations would cause ecosystem-wide harm for herring-dependent species.**

**Sources:** 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.

#### **Ecosystem considerations in new *Fisheries Act*:**

Pacific herring fishery quotas are currently calculated without all-inclusive ecosystem considerations, contrary to the requirements of the new *Fisheries Act*, which states that the "Minister may consider, among other things, (a) the application of a precautionary approach and an ecosystem approach."

Fisheries and Oceans has conducted no research on the ecosystem impacts of the fishery, despite claiming they are managing for ecosystem needs. The response to an Access to Information request from Pacific Wild was, "Please note that the Fisheries Management branch and Science branch of our Pacific region [sic] advised us that they will be providing a Nil response ... We have been advised that there is no other

research that DFO has done regarding the impacts the commercial herring fishery has on southern resident killer whales.”

**b. Policy on New Fisheries for Forage Species**

DFO's objectives of a conservation-based policy on fisheries on forage species include:

- maintenance of target, bycatch, and ecologically dependent species within the bounds of natural fluctuations in abundance;
- maintenance of ecological relationships (e.g predator-prey and competition) among species affected directly or indirectly by the fishery within the bounds of natural fluctuations in these relationships;
- minimization of the risk of changes to species' abundances or relationships which are difficult or impossible to reverse;
- maintenance of full reproductive potential of the forage species, including genetic diversity and geographic population structure,
- allowance of opportunities to conduct commercially viable fisheries.

"These objectives are not alternatives where some can be ignored in particular cases. Fisheries on forage species should be designed to ensure a high likelihood that all five objectives are achieved." (**Source** <http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/forage-back-fiche-eng.htm>):

Scott Wallace, Senior Research Scientist at the David Suzuki Foundation and the *Pacific Marine Conservation Caucus* (MCC) representative on the *Integrated Herring Harvest Planning Committee* (IHHPC - DFO's "venue for cross-sectoral communication and advice on issues related to herring fisheries") recommends managing the herring fishery as if it were an emerging fishery under DFO's *Policy on New Fisheries for Forage Species*. The MCC believes that the fishery needs to be managed so that ecosystem requirements are the primary objective.

Following this policy, Wallace states in his letter to DFO dated Nov 22, 2019:

- "Pacific herring are currently managed with a target harvest rate of 20% of the spawning stock biomass. While this management approach may serve the purposes of managing herring as a conventional single species fishery, **it is too high of a harvest rate and too rigid to meet the principles of ecosystem based fisheries**

**management.** Target exploitation rates approaching 20% may be appropriate under extremely high biomass and recruitment conditions in combination with other management procedures but in a scenario of declining biomass with poor in-season monitoring, this rate imposes a high risk of over-harvesting."

- "One of the central objectives of the *Policy on New Fisheries for Forage Species* is the "maintenance of full reproductive potential of the forage species (including genetic diversity and geographic population structure, whether genetically resolvable or not)". **The objective is not clearly reflected in the current management of Pacific herring...** The winter fishery may place additional risk to maintaining spawning locations as there is no way of knowing the final spawning area of these fish."
- " As an initial step toward a more ecosystem based fisheries management system **we recommend Fisheries and Oceans Canada uses the modeled management procedure (MP) that would use a minimum escapement threshold and a harvest rate of 10% (MP#2) for setting the 2019/2020 Strait of Georgia total allowable herring catch.** This harvest rate may be modified in subsequent years once a more entrenched ecosystem approach to management has been implemented and alternative harvest control rules have been decided. The recommended management procedure is **consistent with the stock assessment forecast document that has acknowledged that a reduction to 10% is the most effective means of mitigating stock assessment errors.**"

### **3. FIRST NATIONS RIGHTS: UNDRIP** (United Nations Declaration on the Rights of Indigenous Peoples) and the **Douglas Treaties**

In November, 2019, British Columbia became the first jurisdiction in Canada to formally enshrine the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) into law under [Bill 41](#).

First Nations people fished Pacific herring sustainably for thousands of years before industrial fishing. Archaeological records from up to 10,700 years ago show that herring were much 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.)

The Douglas Treaties, which govern half a dozen Coast Salish tribal groups on southern Vancouver Island, are clear. In exchange for access to First Nations lands, those nations are guaranteed the right to hunt, fish and forage “as formerly.” But access to herring is denied because the resource has been commercially over-exploited.

DFO's 2019-20 IFMP (pp. 31-33) includes a discussion of the importance of herring to First Nations, and how they used to harvest the herring - until the herring were overfished mainly by non-First Nations.

On Dec 18, 2019, the WSÁNEĆ (Saanich) Leadership Council in a letter to Fisheries Minister Bernadette Jordan demanded that there be a moratorium on all commercial herring fishing within their territory until herring populations have recovered and the WSÁNEĆ are involved once again in their caretaking. They state that DFO has co-opted the sacred obligations of the WSÁNEĆ people and is attempting to manage the herring population without their involvement. They reject DFO's assessment that herring population numbers are at historic highs in the Strait of Georgia. WSÁNEĆ oral histories and the archeological record speak of an abundance within WSÁNEĆ territory far beyond that of both the current herring population and the 1951 baseline data DFO uses to assess population numbers. The continued operation of commercial herring fisheries is in **direct violation of the WSÁNEĆ Douglas Treaty right** to “carry on our fisheries as formerly,” which will be impossible should the fragile herring population collapse. Their letter (attached) and report on November's **HELIT TFE SŁON,ET (Let the Herring Live)** forum can be found here:

<https://wsanec.com/wlc-requests-commercial-herring-fishery-moratorium/>

**Further References:** [\*Recommendations for Marine Herring Policy Change in Canada: Aligning with Indigenous Legal and Inherent Rights\*](#) (von der Porten et al, 2016)

#### 4. ECONOMICS

- a. Herring fishers make too little for their catch.
  - a. 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. Winter food and bait value is only \$150 per ton.
  - b. The roe fishery is shockingly wasteful: the carcasses (between 84% and 89% of the landed weight) are reduced into meal and oil to feed farmed Atlantic salmon. (McGrath, Pelletier, and Tyedmers 2015) This fact is not mentioned in the IFMP.
  - c. 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.
  - d. 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.
  - e. **Source:** BC Ministry of Agriculture, *Corporate Statistics and Research data*.  
**Source:** Morley, 2016. *Testimony to the Standing Committee on Fisheries and Oceans, Canadian Parliament*.

#### b. 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 when wild salmon and herring catches were comparable (24,700 tonnes and 24,100 tonnes, respectively), wild salmon generated 5.4x as many processing jobs (annual average of 1,400 compared to 332 for herring) (AgriService BC 2018). Similarly, these jobs resulted in higher wages for wild salmon that generated just over \$2,000/tonne processed while herring was \$525/tonne.

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 including fishing, processing, trucking, marketing and sales was **fewer than 500 full-time-equivalent jobs.**

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.*

**Source:** *The Economic Value Of Pacific Herring In The Strait Of Georgia* Report prepared by Tim Cashion for Pacific Wild, March 2019 See <https://pacificwild.org/the-economic-value-of-pacific-herring-in-the-strait-of-georgia/>

### **c. Taxpayers are supporting this wasteful fishery**

Dr. Daniel Pauly in his *book Vanishing Fish* argues that.." there is an urgent need for governments to ...stop subsidizing the fishing-industrial complex and awarding it fishing 'rights' when it should in fact pay for

the privilege to fish". (Source: Pauly, Daniel. *Vanishing Fish*. Greystone Books, 2019, p. 32 )

In Canada as in other countries, the herring fishery is subsidized by taxpayers in various ways such as: dock validations, on-vessel observers, DFO staff and contractors, fuel subsidies, wharfage subsidies, and exemptions from paying GST.

Regarding DFO's 2019-20 Pacific Herring IFMP - p 101 s. 5.1.4 " HIAB has requested that DFO consider not collecting license fees for inactive commercial licences due to the high cost compared to the limited commercial opportunities. " **We believe the herring fishers should pay license fees whether they are inactive or not, as is the case in other fisheries.**

## 5. RECOMMENDATIONS

- a. **Reduce commercial fisheries** intake to 0% until appropriate ecosystem data is available to make a fully informed decision, and until the downward trend in SoG biomass is reversed.
- b. Apply an **ecosystem-based approach** and ecosystem understanding to Pacific herring fisheries management following DFO's own *Policy on New Fisheries for Forage Species* for increased understanding of the links between Pacific herring and other species, increased sustainability of Pacific herring fisheries and increased resilience of the marine ecosystem overall.
- c. Include **best available climate data** and impacts of climate change on Pacific herring in stock assessments and quota setting for longer-term resilience and viability of Pacific herring stocks and fishery
- d. Support more **sustainable roe harvesting methods** by increasing allowed amounts of spawn-on-kelp harvesting and decreasing amounts of roe fishing so herring are able to spawn multiple years, leading to older, larger herring with more eggs and more roe harvest.
- e. **Fund a "Pacific Herring Recovery Program"** as has been done for salmon on numerous occasions. This program should be adequately funded to: provide assistance to herring fishers, assistance to First Nations to resume the herring egg transplanting techniques they developed historically to restore decimated herring populations, identify key

spawning sites and create protected areas for population recovery, and create herring habitat recovery programs.

- f. **Restore Funding for independent science** to advise DFO on the ecosystem impacts of herring fishing on predators.
- g. **Support valid public consultation:** Presently DFO is advised by the Integrated Herring Harvest Planning Committee (IHHPC) and the Herring Industry Advisory Board (HIAB). As the names of both of the groups imply, their role is to advise DFO on industry issues, not on Marine Ecosystem Based Management (EBM). We recommend **a new public consultation process that recognizes marine EBM, UNDRIP principles of representation and is not industry biased.**