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B.C. farmed salmon sustainability rating downgraded to "Avoid" due to wild salmon impacts, while Nova Scotia rating plagued by lack of public information.

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VANCOUVER and HALIFAX — Shoppers should continue to avoid Canadian open-net farmed salmon.

U.S.-based Seafood Watch's sustainability ratings of Canadian farmed salmon is a win for West Coast wild salmon but problematic for those on the East Coast, according to SeaChoice, Canada's sustainable seafood watchdog.

Following a downgrade, British Columbia salmon farms are once again rated Red (meaning consumers should "Avoid"; i.e., don't buy); New Brunswick and Newfoundland salmon farms also remain Red, while Nova Scotia farms are, concerningly, rated Yellow (meaning a "good alternative"; i.e., Okay, but think twice about buying).

For B.C. farmed salmon, Seafood Watch's shift in rating from Yellow to Red reflects concerns around the population-level impacts of sea lice and disease transmission from farmed fish to wild salmon. "High sea lice loads on farms, elevated by ineffective lice management and several instances of drug resistance, continue to be a significant threat to the growth and survival of out-migrating juvenile wild salmon," said Martin Krkosek, associate professor and Canada research chair in marine epidemiology at the University of Toronto.

"This red-rating should shrink the market for B.C. farmed salmon, because reputable retailers won't want to carry a product that is associated with placing wild salmon at risk from unmitigated pathogens and uncontrolled sea lice outbreaks," said Kelly Roebuck, SeaChoice representative for Living Oceans Society.

On Canada's other fish-farming coast, Nova Scotia's Yellow rating was higher than neighbouring New Brunswick and Newfoundland in several categories, including disease, escapes and chemical use.

"It's troubling to see Nova Scotia with a higher rating here," said Simon Ryder-Burbidge, SeaChoice representative from the Ecology Action Centre. "We are the only province in Canada that doesn't publicly report sea lice counts, and river monitoring data for escaped farmed fish is almost non-existent relative to New Brunswick and Newfoundland. The scoring system seems to incentivize a data-poor environment."

The Seafood Watch assessment acknowledges the limited data availability for Nova Scotia, but fails to take a sufficiently precautionary approach to scoring in a region where wild Atlantic salmon populations are nearing extirpation. "Nova Scotia has by far and away the most endangered wild

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Atlantic salmon populations in Canada," says Dr. Jeffrey Hutchings, Killam Memorial Chair in Fish, Fisheries and Oceans with Dalhousie University. "For many of these rivers, even a few escaped farmed fish, especially when they breed with wild salmon, can have a detrimental effect on the natural populations."

Seafood Watch uses a traffic light rating system for seafood (Green is considered "best choice," Yellow is a "good alternative" and Red means "avoid"). A Yellow rating should not be equated with sustainability, but rather indicates that concerns remain with the farming practices. The Nova Scotia assessment received a score of 4.96 out of 10.

"We recommend that shoppers avoid purchasing all Canadian open net-pen farmed salmon, regardless of provenance due to the risk to wild salmon populations on both coasts," said Kilian Stehfest, SeaChoice representative from David Suzuki Foundation. The Canadian-based Ocean Wise seafood rating program continues to not recommend any West or East Coast open net-pen farmed salmon.

The downgraded assessment for B.C. salmon farms puts their product in the incongruous position of being both Red-rated and certified by the Aquaculture Stewardship Council for sustainability. This is largely because the ASC has given all B.C. farms a "pass" on the assessment criterion for sea lice, continuing to certify farms with lice loads orders of magnitude higher than that prescribed by the ASC Salmon Standard.

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Background:

Updated Seafood Watch farmed salmon ratings for Canada

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British Columbia farmed salmon rating: Red
The 2021 reassessment rates B.C. farmed salmon as an "avoid" (Red). The previous 2017 Seafood Watch assessment rated B.C. farmed salmon as a "good alternative" (Yellow). SeaChoice rejected the upgrade at the time. Prior to 2017, B.C. farmed salmon was long-rated "avoid."

Atlantic Canada farmed salmon ratings: Red (NB, NF) and Yellow (NS)
The 2021 reassessment rates New Brunswick and Newfoundland farmed salmon as "avoid" (Red) and Nova Scotia farmed salmon as "good alternative" (Yellow). Previous Seafood Watch assessments rated all Atlantic Canada farmed salmon as "avoid."

What does this mean for consumers?

No Canadian open net-pen farmed salmon is "recommended" in Canada.
Canada's only seafood rating body, Ocean Wise, does not recommend Canadian open-net farmed salmon. Although Ocean Wise uses Seafood Watch assessments to determine its recommendations, the Nova Scotia farmed salmon assessment's overall score of 4.96 does not meet the Ocean Wise threshold score of 5.5.

Understanding Seafood Watch's traffic light ratings
Seafood Watch uses a "traffic light" rating system for defining the sustainability of seafood products:
Green or "best choice" = Buy, the product is produced (farmed or caught) responsibly.
Yellow or "good alternative" = Buy, but be aware there are concerns with how the product is produced.
Red or "avoid" = Don't buy, as the product is produced in ways that harm marine life and/or the environment.

Yellow does not mean "go" or "sustainable"
Seafood Watch defines "Yellow" or "good alternative" as "Buy, but be aware there are concerns with how they're caught or farmed." In other words, Yellow means some concerns remain with the farming practices used to raise these fish and is not interchangeable with "sustainable." Unfortunately, many market actors lump both Green- and Yellow-rated products in the same "sustainable" category. Instead, yellow should be considered "proceed with caution."

What caused the rating changes?

What caused the B.C. rating to change back to Red?
A score shift under the disease criterion of the Seafood Watch assessment from a moderate concern (score of 4 or Yellow) to a high concern (score of 0 or Red) caused the overall assessment rank to change from "good alternative" (Yellow) to "avoid" (Red).

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What caused the Nova Scotia rating to change to yellow?
Score shifts under escapes and disease criteria of the Seafood Watch assessment from a high concern (scores of 2 and 3 or Red) to a moderate concern (scores of 4 or Yellow); and a score shift under chemical use criterion from a high concern (score of 1) to a low concern (score of 8) caused the overall assessment rank to change from "avoid" (Red) to "good alternative" (Yellow).

Why does SeaChoice agree with the B.C. rating change but disagree with the Nova Scotia change?
The 2017 B.C. assessment incorrectly described the occurrence of sea lice outbreaks on B.C. farms as an anomaly and inappropriately stated that there was insufficient evidence to conclude that sea lice (and pathogens) were causing population-level impacts to wild salmon. The 2021 reassessment acknowledges that substantial sea lice outbreaks regularly occur on B.C. salmon farms, with likely mortality impacts on juvenile wild salmon.

The reassessment also acknowledges the rapidly developing research on bacterial and viral pathogens, including research by Strategic Salmon Health Initiative, and the complexities in conclusively quantifying population-level impacts. As such, unlike the 2017 assessment, the 2021 reassessment takes a precautionary approach given that salmon farms continuously discharge pathogens and parasites into water bodies shared with at-risk wild salmon populations.

SeaChoice believes that, concerningly, a similar precautionary approach was not taken for Nova Scotian farmed salmon and that the Seafood Watch methodology was not applied appropriately. As such, the product does not deserve a Yellow rating, particularly because disease and escapes impacts on COSEWIC- and SARA-listed endangered wild Atlantic salmon populations remain a serious concern.

Further details on SeaChoice's concerns regarding the Nova Scotia rating

1. The precautionary principle should have been applied.
The Seafood Watch methodology calls on the precautionary principle where there is potential for substantial impact, but a lack of information and absence of data:

"The practice of assigning low scores in the event that information is 'unknown' adheres to Seafood Watch's use of the Precautionary Principle when there is potential for substantial impact, but information is not available. The absence of data showing impact does not equate to no impact. (i.e., 'No evidence of impact' is not the same as 'Evidence of no impact').

The potential impact to wild salmon is substantial as SARA-listed endangered collective populations of Inner Bay of Fundy have been reduced to as few as 100 adults (from 40,000 earlier in the 20th century) returning to a small number of rivers (originally ~40). For example, the mean count over the

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past decade for returning fish to the Gaspereau River in Nova Scotia was just seven (range two-16).[1] The SARA action plan states, "*Although the populations have historically fluctuated widely, the populations have declined to critically low abundance levels and the DU is currently at imminent risk of extinction.*"[2] Additionally, IBoF and Nova Scotia Southern Uplands populations are listed as endangered under COSEWIC. **Both populations navigate directly through salmon farming areas across the Scotian Shelf and Bay of Fundy region.**

SeaChoice believes that the uncertainty surrounding population impacts on endangered wild Atlantic salmon from disease and escapes originating from salmon aquaculture and the lack of definitive evidence to absolve the industry means the precautionary principle should have been applied in the Nova Scotia 2021 Seafood Watch assessment. Unfortunately, the assessment unequivocally failed to evoke the precautionary principle for the disease and escapes criteria scores.

2. Disease and escape impacts on endangered wild Atlantic salmon remain serious concerns.

Under the Seafood Watch methodology, disease and escape interaction risk between farmed and wild fish is assigned a score from 0 (high/critical concern) to 10 (no concern). Seafood Watch guidance recommends applying the most "appropriate" score.

Disease: While SeaChoice agrees with the use of the risk-based assessment tool. But we have issues with the assigned disease score of 4 under this methodology: "the production system has some biosecurity protocols in place, yet is still open to introductions of local pathogens and parasites and is also open to the discharge of pathogens." This fails to take a precautionary approach on the potential for such pathogens discharge to impact endangered wild salmon, particularly given that:

- The report recognizes that "data are very limited" for Atlantic Canada and, as such, scores disease data availability low (2.5 out of 10).
- Nova Scotian data is particularly poor with no public information available on sea lice, fish health and mortality data.
- Industry has long claimed that sea lice is not an issue for Nova Scotian farms; however, recent hearings tied to a Cooke Aquaculture expansion in the Bay of Fundy revealed two concurrent sea lice outbreaks at both salmon farms in the Annapolis Basin, one lasting upwards of three weeks after ineffective in-feed treatment efforts by the company.
- Atlantic Canada lacks research on farm-derived disease transfer and impacts on wild salmon. However, research from other salmon-farming regions, including SSHI in B.C., "highlight the potential for salmon farms to act as reservoirs for potentially poorly studied pathogens."
- Infectious Salmon Anemia has occurred on Nova Scotian farms.

[1] https://waves-vagues.dfo-mpo.gc.ca/Library/40873146.pdf
[2] Atlantic Salmon inner Bay of Fundy population: action plan

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- Detection of farm-originated disease in wild fish is confounded by the death of infected fish (i.e., "[ISAv] pathogenic strain causes acute disease and is therefore unlikely to be detected in sampling of wild fish").

SeaChoice contends a score of 0 would have been more appropriate: "Discharge of water from farms with known disease events occurs, with wild hosts that are considered 'vulnerable', 'endangered', IUCN Red List, etc."

Escapes: We also find the assigned competitive and genetic interactions score (under the escapes criterion) of 4 — "Competition, predation, disturbance or other impacts to wild species, habitats or ecosystem occur, but are not considered likely to affect the population status of the wild species" — fails to take a precautionary approach on the potential for competition and introgression impacts on endangered wild salmon populations.

The Seafood Watch guidance says to assign the "lowest relevant" score. Therefore, a score of 0 "Native — genetically distinct from wild conspecifics (e.g., clear evidence of selected characteristics) with evidence or potential for genetic introgression, and relevant wild stocks are considered vulnerable or endangered" should have been applied because, as the report acknowledges:

- "The domesticated strains of Atlantic salmon used as broodstock are genetically distinct from wild populations."
- There is "demonstrable genetic introgression in wild salmon populations."
- Wild salmon "populations throughout Atlantic North America have remained at risk, including many that are endangered."

Yet, the assessment goes on to conclude that though introgression may occur, its impact is "not likely to affect the population status" of endangered salmon. SeaChoice believes such a conclusion lacks a precautionary approach, particularly given that:

- This year, two aquaculture escapees were found among seven Gaspereau River wild salmon. It is the second year in a row and the third time since 2017 that an escapee has been removed from the Gaspereau River.

- DFO's Inner Bay of Fundy Atlantic Salmon Live Gene Bank notes evidence of European farm salmon presence and successful spawning in several rivers, and European farmed salmon genetic materials present within the IBoF LGB salmon, which is "somewhat more extensive in the Gaspereau River LGB population." [3]

[3] Genetic Change in Inner Bay of Fundy Atlantic Salmon (Salmo salar) Across Three Generations of Captive Breeding and Rearing

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- Research suggests where the percentage of escapes within a river population equals or exceeds 10 per cent, genetic introgression and demographic decline can be expected.[4] Thus, just one escapee present in Gaspereau River (based on a mean of seven wild salmon returned population) has the potential to cause introgression and decline.
- The Inner Bay of Fundy SARA action plan recognizes: "There are a few salmon farms in this area that could lead to negative effects of interbreeding or ecological interactions with escaped domestic salmon."
- Escape data relies on self-reporting by industry, and questions remain around incidents that have resulted in no reported escapes.
- To our knowledge, Cooke's Nova Scotia farms are not using any escape-prevention methods or construction designs that are any different from their operations in other Atlantic provinces (that score lower).
- Unlike other provinces, there is no active monitoring system in place for escapee detection in Nova Scotia rivers, and past data that are available are ad hoc and limited. In comparison, NB's Magaguadavic River has a dedicated fish trap for monitoring.
- Even if monitoring were occurring, the LGB program review notes the likely impossibility of accurately identifying Saint John River strain farmed salmon escapees from wild counterparts.

In SeaChoice's view, a lack of river-monitoring data and industry self-reporting does not meet a sufficiently precautionary bar to score fish farms operating in a region with such precarious wild salmon populations.

[4] https://www.int-res.com/articles/aei2020/12/q012p045.pdf