

Three keys to sockeye decline

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(Phys.org) -- Competition with pink salmon in the open ocean could be an important factor in the long-term decline in abundance of sockeye salmon populations in the Fraser River, according to new research from Simon Fraser University scientists and international colleagues.

Salmon farming along migration routes for juvenile Fraser River sockeye and warming [sea temperatures](#) could also play a role.

“Although none of these three factors can explain much of the declines in [sockeye salmon](#) by themselves, when considered in combination they appear to play a very important role,” says Brendan Connors, a post-doctoral fellow in the School of Resource and Environmental Management (REM) at SFU and lead author of the paper published today (May 17) in the journal *Conservation Letters*.

The research team discovered that increasing numbers of pink salmon across the North Pacific Ocean appear to be leading—directly or indirectly—to increasing competition for food with Fraser sockeye salmon, especially in years when the juvenile sockeye salmon first migrate past large numbers of farmed salmon.

“It is possible that passing close to salmon farms early in their ocean life may weaken the ability of sockeye to compete for food with pink salmon in the [open ocean](#),” said co-author Lawrence Dill, a fellow of the Royal Society of Canada and professor emeritus of SFU Biological Sciences. “This could arise if sockeye pick up viruses, bacteria, or parasites as they pass by salmon farms.”

The study also found that increasing ocean temperature early in life reduces survival of juvenile sockeye, but the effect of warming oceans is weaker than increasing numbers of the competitively dominant [pink salmon](#).

“This study is a critical step towards understanding the factors causing decreasing abundance of Fraser sockeye salmon over the last 20 years”, says Randall Peterman, Canada Research Chair in fisheries risk assessment and management in REM and a co-author of the study.

Another co-author, Doug Braun, a doctoral student in the Earth to Ocean Research Group at SFU, adds: “Salmon migrate thousands of kilometres at sea and they obviously do not respect international borders. Our results highlight the need for countries across the North Pacific Rim to manage limited [salmon](#) resources at an oceanic scale.”

The SFU study is the first to consider simultaneously evidence related to multiple possible explanations for the declines in Fraser sockeye populations that began in the early 1990s. Those declines triggered a \$25-million federal judicial inquiry, the Cohen Commission, which held hearings in 2010 and 2011. Its final report is due by Sept. 30.

Provided by Simon Fraser University

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