

A BRIEF DISCUSSION ON THE IMPORTANCE OF SCIENCE TO SALMON HATCHERY PRODUCTION

By Gale K. Vick, October 2023

The complicated dialogues around fish hatcheries is often emotional and political. For almost 200 years salmon hatcheries that release fish into the wild have been part of salmon management, operating under the belief that we could grow more salmon to replace what industrial civilization displaced with over-fishing, dams, roads and other barriers. Rather than regulate the industry, the thought was just to “grow” more fish.

In 1875, Spencer Baird, the United States Fish Commissioner, advised the commercial fishing industry that artificial propagation of salmon would be so successful it would eliminate the need to regulate harvest. Regulation was a controversial issue at the time, as the salmon runs were being fished heavily for economic gain but without effective regulation, and some scientists already were concerned that overfishing might prove catastrophic to the runs. In response to a request from the Oregon Legislature, Baird outlined the problems he saw for the salmon industry: 1) excessive fishing; 2) dams; and 3) altered [habitat](#). Baird believed each of these problems could be resolved through artificial propagation of fish. That is, sufficient numbers of fish could be produced in hatcheries to satisfy the demand of commercial fishers, hatcheries could be located on tributaries of the Columbia where the fish would not have to pass dams on their way to the ocean as juveniles or back from the ocean as adults, and altered natural habitats would be of minor consequence because so many fish would be spawned artificially at the hatcheries.¹

Unfortunately, we are now discovering that salmon hatcheries, along with all barriers and poor management, may have precipitated the demise of wild salmon stocks rather than enhanced them.

“There has been a long history of production of hatchery salmon along the Pacific coast - from California’s first efforts in the 1870s using eggs from chinook and rainbow trout to the recent large-scale production hatcheries for pink salmon in Japan and the Russian Far East. ..This paper addresses the history of hatcheries around the Pacific Rim and considers potential negative implications of hatchery-produced salmon through discussions of biological impacts and biodiversity, ecological impacts and competitive displacement, fish and ecosystem health, and genetic impacts of hatchery fish as threats to wild populations of Pacific salmon.”²

The growth of hatcheries has been a failed promise.³ Even with a growing body of evidence on negative hatchery impacts, both in Alaska and the Pacific Northwest, we continue to spend *billions* of dollars (in loans, subsidies, and management) to support hatchery production.

“Jim Lichatowich’s 2014 book, *Salmon, People and Place: A Biologists Search for Salmon Recovery*, and a sequel to his *Salmon Without Rivers*, claims that the listing of several stocks of Pacific Salmon during the last two decades has led to spending billions of dollars on recovery efforts, despite making no discernable effect on the fact that salmon have fully lost 40percent of their historic range.” Lichatowich indicts salmon hatcheries for being the center of a flawed conceptual foundation for salmon management, which has sacrificed salmon habitat for what he calls a “simplified industrial production system. That system has traded away habitat for hatcheries, countenanced widespread overharvesting, largely ignored adverse effects on wild salmon, and lost sight of the salmon’s essential attachment to place.”⁴

Most hatcheries have operated for decades without benefit of significant research. The negative consequences are just recently being realized. Including Alaska state research on hatchery straying, there is a proliferation of academic and independent research that we should be incorporating in our quest to save Alaska's wild salmon stocks. Among hundreds, some of the most important to consider:

- (1) Dr. Greg Ruggione, et.al: *From diatoms to killer whales: impacts of pink salmon on North Pacific ecosystems*, 2023.⁵ This paper illustrates the negative impacts that pink salmon production has had on the North Pacific, from other salmon to marine mammals and the entire ecosystem. This paper is probably the most critical in the need to lower egg production in Alaska's PNP (private-non-profit) hatcheries.
- (2) John McMillan, et.al, *A global synthesis of peer-reviewed research on the effects of hatchery salmonids on wild salmonids*⁶. This paper enumerates 206 global peer-reviewed literature on hatchery impacts on wild salmonoids.
- (3) Dr. Jan Oehlberger, et.al, *Non-stationary and interactive effects of climate and competition on pink salmon productivity*" August 2021 Evidence that hatchery pink salmon that threaten the size and productivity of wild salmon.
- (4) Dr. Timothy Beechie, et.al, *Process-based Principles for Restoring River Ecosystems*", 2010, describing four fundamental principles, with the underlying theme that salmon will find their own way to restoration if we remove the barriers.
- (5) Dr. Kerry A. Naish, et.al, *An Evaluation of the Effects of Conservation and Fishery Enhancement Hatcheries on Wild Populations of Salmon*, 2008 Defines different types of hatcheries and which hatcheries could hurt wild stock.
- (6) Dr. Brendan Connors, et.al, *Climate and competition influence sockeye salmon population dynamics across the Northeast Pacific Ocean* 2020 Highlights the importance of international cooperation to potentially constrain the number of hatchery salmon released into the ocean to help Pacific salmon adapt to a warming and increasingly uncertain future.
- (7) Dr. Daniel Schindler, et.al, *Pacific salmon and the ecology of coastal ecosystems* 2003. Challenge for the management and conservation of coastal resources to protect entire networks of productive and viable freshwater habitats and maintain the diversity of salmon populations and life history characteristics that provide system-scale resilience to environmental change.
- (8) Dr. Robert T Lackey, *The Great Pacific Northwest Salmon Conundrum*, 2022. Discusses basic need for examining how we manage salmon in light of billions of dollars spent on hatcheries with no significant results.
- (9) Dr. Jamal Moss, et.al, *Conservation of Western Alaskan Salmon Stocks by Identifying Critical Linkages between Marine and Freshwater Life Stages and Long-term Monitoring* 2009 Recommendation for a long-term monitoring and ecosystem research program with a strong emphasis on teaching ecology, environmental biology, and salmon conservation developed for the AYK region.

¹ “Hatcheries”, Northwest Power and Conservation Council <https://www.nwcouncil.org/reports/columbia-river-history/hatcheries/#:~:text=In%201877%20Columbia%20River%20cannery,in%20the%20Columbia%20River%20Basin>

² *History and effects of hatchery salmon in the Pacific Speaking for the Salmon* -15 By: Jennifer L. Nielsen Edited by: Patricia Gallagher and Laurie Wood USGS 2004

³ *Billions spent on hatcheries, habitat fails to help native Columbia River salmon, study finds* By Alex Baumhardt (Oregon Capital Chronicle) Aug. 5, 2023

⁴ *Salmon Hatcheries as Fish Factories: Forgetting the Lessons of Leopold* Michael Blumm Lewis & Clark Law School, blumm@lclark.edu 2014

⁵ **From diatoms to killer whales: impacts of pink salmon on North Pacific ecosystems** Gregory T. Ruggerone*, Alan M. Springer, Gus B. van Vliet, Brendan Connors James R. Irvine, Leon D. Shaul, Matthew R. Sloat, William I. Atlas 2023

⁶ ***A global synthesis of peer-reviewed research on the effects of hatchery salmonids on wild salmonids*** July 2023 John R. McMillan, Helen M. Neville, Gregory T. Ruggerone,