Salmon are spawning in Arctic rivers, researchers confirm

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Peter Westley holds a spawning male chum salmon alongside the Anaktuvuk River. Credit: Joe Spencer

Researchers have confirmed that salmon are spawning in an Arctic Ocean watershed, suggesting that at least some salmon species could be expanding to new territory as climate change reshapes their habitat.

The University of Alaska Fairbanks-led project found about 100 chum salmon in the Anaktuvuk and Itkillik rivers on Alaska's North Slope. Both rivers flow into the Colville River, which empties into the Arctic Ocean. All the fish that researchers caught in mid-September 2023 were either actively spawning or had finished spawning at sites where groundwater appeared to be flowing to the surface. Similar conditions have supported chum salmon reproduction throughout their typical range.

UAF researcher Peter Westley, who led the project, said the discovery of these fish aligns with a hypothesis that salmon are being pushed north as their traditional habitat changes. Many established salmon populations, such as those in California, are declining due to climate change. In the Arctic, climate change might be an ally to salmon.

"Throughout most parts of the salmon's range, things have gotten too warm and they're starting to blink off," said Westley, an associate professor at UAF's College of Fisheries and Ocean Sciences. "In the Arctic, the water is getting warm enough and they're starting to blink on."

Westley, who has studied potential shifts in salmon habitat for the past decade, credited a December 2022 workshop for shaping the goals of this research. Scientists, community members and Indigenous fishermen met in Anchorage to discuss the increasing number of salmon being observed in the Arctic Ocean and their possible origin.

The workshop helped steer researchers toward the Colville River watershed, approximately 60 miles southwest of Prudhoe Bay.

"One major theme was that salmon have always been on the North Slope, but they're also increasing in recent years," said Elizabeth Mik'aq Lindley, a UAF graduate student who helped organize the meeting. "I don't want to portray our discovery as the first ever. That assumes no one has ever seen this before, and people have been there for thousands of years."

The research team included UAF's Westley, fisheries professor Andy Seitz, graduate students Lindley and Joe Spencer, and research assistant Julia McMahon, along with University of Washington ecologist Andrew Berdahl.

Salmon are well known for ending their lives after spawning in the same river where they hatched, but outliers to that pattern exist. Sometimes they shift to new habitat as it becomes more hospitable, Westley said.

"Straying is part of the biological story of salmon—it's what they do," he said. "It's a fundamental part of their biology and evolution. In the Arctic, we can see it playing out before our eyes."

It's still unknown whether attempts by salmon to reproduce in the region have been successful. Researchers have left temperature sensors in some of the chum salmon nests to determine whether the rivers completely freeze during the winter, destroying any developing embryos. A return trip is planned in fall 2024 to look for smolt or a new wave of spawning adults. Salmon bones and tissue will also undergo analyses to help determine whether the fish lived their entire lives in Arctic waters.

Alaska is notable for the important connection that many people have with salmon as a dietary staple and influence on the ecosystem. Much of the Arctic has been an exception because it has lacked salmon habitat, Westley said, but that could be changing.

"You're seeing a place where these relationships might be starting," he said.

Provided by University of Alaska Fairbanks

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