



Study points to freshwater factors in king salmon decline

By Elizabeth Earl - KDLL - July 20, 2020



Chinook salmon make their way up Ship Creek to spawn. (Ryan Hagerty/USFWS)

Alaskans pretty well know at this point that king salmon are in trouble. Biologists have been looking into why for about a decade now, without a single smoking gun. And that seems to be the way it's going to be—no single answer.

A group of researchers led through the University of Alaska published a study this week probing a little more into the freshwater part of the lives of king salmon, also known as chinook. They focused on fifteen streams in the Cook Inlet basin, from the Chulitna in the north to the Anchor River in the south, to find some answers about how what happens in the freshwater affects king salmon survival. And, like other studies have shown, it's complicated.

One main finding has been that big rain events in the spring and fall can spell trouble for king salmon. Kings lay their eggs in gravel nests on the bottoms of streams. When big rain events cause floods, particularly in the spring when babies are hatching, or in the fall when the eggs have just been laid, it can affect productivity. Erik Schoen with the University of Alaska Fairbanks says that trend actually held true across all the streams they studied, despite how different they are.

"That was surprising to me, because the hydrology of these systems are totally different," he said. "The Kenai has these glacier floods that cause high flow events that aren't connected to rain at all, but we still found that the years that have the heaviest fall rains are associated with lower productivity. There seems to be something about rain in particular, that maybe is not entirely driven by streamflow, but it could be that these big events wash pollutants into these streams."

Big rain events are fairly common in the fall on the Kenai Peninsula, and the Cook Inlet basin saw about a five-year string of them between 2014 and 2018.

Another factor that seems to impact productivity is high water temperatures in the summer. Sue Mauger, the science and executive director for Cook Inletkeeper, has been tracking that data on about 48 streams across the Cook Inlet basin for the past 18 years and has watched the water temperatures rise. While the flooding events seem to be bad for king production across the board, she says temperature increases were a little more nuanced.

"There's a lot of streams, and they all function a little bit differently," she said. "So that's one of the challenges, making sure that we're actually collecting data sets that help us understand the variability in there. Yes, it's a challenge. Cook Inlet or in Alaska generally is we have a lot of great habitat, and we need to understand how it varies. One of the important findings I think in the paper is that for temperature, a little bit more heat is a good thing in some of these systems, the ones that drain from high elevation, and that a little heat in some of our lowland systems is not a good thing and begins to have a hit on productivity."

Climate change is affecting Alaska more than the Lower 48, and that includes changes in salmon habitat. While climate change's effect on precipitation is hard to forecast, it's a little more clear about temperature—it's going to get hotter. Mauger says last year's record-breaking temperatures aren't included in this study, as it was finished before last summer, but the effects were in line with their findings.

Chinook salmon began declining around 2008-2009 all across the state. Biologists have long been pointing to marine factors as the main cause rather than freshwater. Schoen says their study isn't meant to negate that, but rather to bring up that freshwater factors are probably playing a role, too.

"Let's not rule out the importance of freshwater drivers," he said. "True, our study doesn't prove that they cause the decline, but it shows that it's plausible that this string of five years of poor freshwater conditions across all of the streams in Cook Inlet, it certainly appears to have contributed. And that means that we need good conditions both in freshwater to support strong salmon runs."

Mauger says human impacts like planning around streambanks to allow them to use their floodplains during high water events and making sure overhanging vegetation is present may help relieve some of these impacts, too.

"What I think the study helps us understand is what our vulnerabilities are, like where salmon when they're in our river systems, what are the things that make us vulnerable and that reduce their productivity," she said. "I think the study does a nice job of highlighting that our lowland systems are prone to warming and that flooding events can be challenging for our eggs. If we think about what we do on a landscape, we want to make sure that we don't add to that problem."

So far, 2020 is continuing years of king salmon declines in Cook Inlet. The Kenai River king salmon run has been weak enough to prompt the Alaska Department of Fish and Game to close it to retention, and the Anchor River and Deep Creek closed to all sport fishing earlier this summer to protect king salmon. The runs up north in the Mat-Su rivers are doing a little better, with both the Deshka and the Little Susitna rivers reaching their king salmon escapement goals this year.

Reach Elizabeth Earl at earl@kdll.org.

Elizabeth Earl -KDLL

Select Language ▼