

## NOAA FISHERIES

### FAQs SRKW & Columbia/Snake River Chinook salmon stocks

# Southern Resident killer whales & Columbia/Snake River Chinook salmon stocks

## What stocks are we talking about?

Seven Columbia and Snake River Chinook salmon stocks appear on a list, developed by NOAA Fisheries and the Washington Department of Fish and Wildlife,<sup>1</sup> of the thirty West Coast Chinook salmon stocks most important to Southern Resident killer whales (SRKW). This list was developed based on three criteria:

- Whether scientists have documented SRKW as preying on the stock through DNA or fecal samples,
- Whether the whales depend on the stock from October through May, when aerial photographs show them as being underweight, and
- The degree of spatial and temporal overlap between the SRKW range and the range of the Chinook salmon stock.

These stocks range from Chinook that return to tributaries of the Columbia below Bonneville Dam, such as the Lewis and Cowlitz Rivers, and others that return to the middle and upper Columbia and Snake rivers. SRKW have been documented as preying on all these runs during the winter, so their ranking in terms of priority varies depending on when and for how much of the year they are available to SRKW.

For instance, lower Columbia River Chinook spend much of their ocean migration near the coast so they are available to SRKW over a greater portion of the year than Snake River spring-summer Chinook.

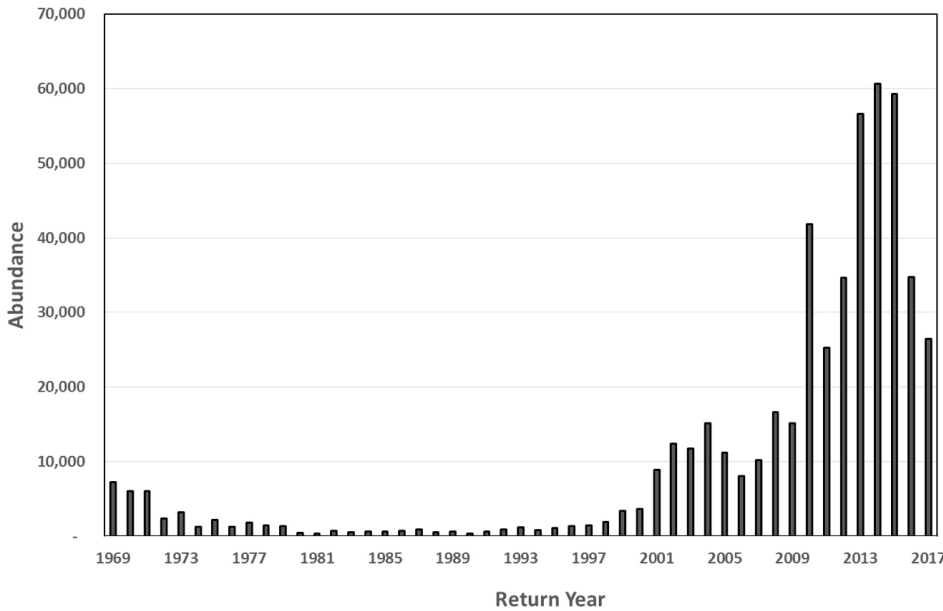
## Which Snake River stocks are on the list?

Two Snake River Chinook stocks appear on the list: Snake River fall Chinook and Snake River spring-summer Chinook salmon.

*Snake River Fall Chinook* spawn in the mainstem Snake River and large tributaries and have increased substantially over the past few decades, thanks to a combination of hatchery supplementation, favorable ocean conditions, and improvements to fish passage conditions. Roughly 40–50% of Snake River fall Chinook salmon are harvested as they complete their ocean migration and before they return to the Snake River to spawn.

<sup>1</sup>Southern Resident Killer Whale Priority Chinook Stocks Report. 2018. NOAA Fisheries West Coast Region and Washington Department of Fish and Wildlife. [https://www.westcoast.fisheries.noaa.gov/protected\\_species/marine\\_mammals/killer\\_whale/](https://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/killer_whale/)

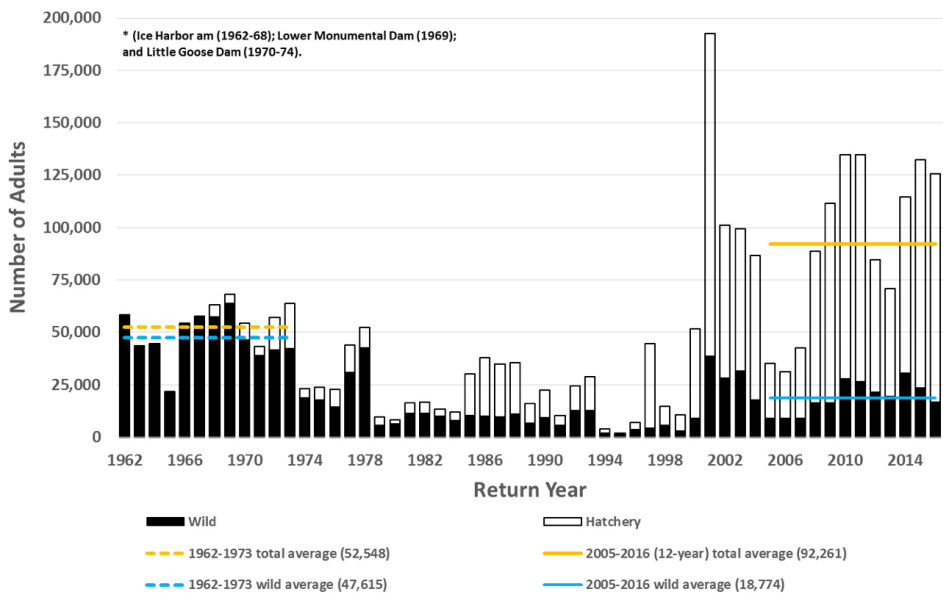
Adult Snake River Fall Chinook (hatchery and wild) Returns to Lower Granite Dam



Combined hatchery and wild Snake River fall Chinook salmon returning to Lower Granite Dam, the uppermost of the four lower Snake River dams. From Idaho Department of Fish and Game, through U.S. v. Oregon Technical Advisory Committee.

The other Snake River Chinook stock on the list is *Snake River spring-summer Chinook*. These fish spawn in smaller tributaries, where the quality of the habitat is a bigger concern. Spring-summer Chinook have also increased in abundance compared to the 1960s. Over the past 12 years, approximately 80% of returning adults have been of hatchery origin. So far as researchers can determine, SRKW do not distinguish between hatchery and wild fish. Hatchery fish today likely make up the majority of fish consumed by SRKW.

Abundance of wild and hatchery adult Snake River spring-summer Chinook salmon at Lower Granite Dam\*



Source: Idaho Department of Fish and Game

Abundance of wild and hatchery Snake River spring-summer Chinook salmon returning to Lower Granite Dam, the uppermost of the four lower Snake River dams. From Idaho Department of Fish and Game.

## How do the four lower Snake River dams affect these fish?

Over the last 20 years, we estimate that about 75–80% of Chinook survive through the four lower Snake River dams. This includes deaths related to warmer water temperatures and other factors in between the dams. Natural survival would not total 100% even in an undammed river. While there is uncertainty in how much the survival rate may be improved without the dams in place, it would not improve dramatically given the already high survival rate through the lower Snake River dams.

## What is latent mortality, & why does it matter?

Some studies indicate that some fish die after they pass through the system of hydroelectric dams from stress related to that passage. This is known as “latent mortality,” which the Independent Scientific Advisory Board (ISAB), a panel of scientists that advises the Northwest Power and Conservation Council, defined as “any mortality that occurs after fish pass Bonneville Dam as juveniles that would not occur if the (Federal Columbia River Power System) dams did not exist.”

The ISAB concluded that there is some degree of latent mortality, but strongly advised against “continuing to try to measure absolute latent mortality. Latent mortality relative to a damless reference is not measurable.”

## What is NOAA Fisheries doing to inform this discussion?

The Northwest Fisheries Science Center continues to monitor salmon survival on the Snake River including dam passage. Also, we are analyzing scenarios involving dam breaching as part of the ongoing Columbia River System Operation analysis under the National Environmental Policy Act. We will use life-cycle models that account for the different characteristics of specific salmon populations to estimate increases in abundance in the event of dam breaching. We will consider a broad range of assumptions to represent the

different hypotheses of the magnitude of latent mortality. There are many views as to how significant latent mortality is. If it is a small effect, we would get little benefit from dam breaching. If it is large, we would get greater benefit.

## Which SRKW pods likely benefit from Columbia/Snake River salmon?

The three pods of the SRKW population differ in their range depending on the season.

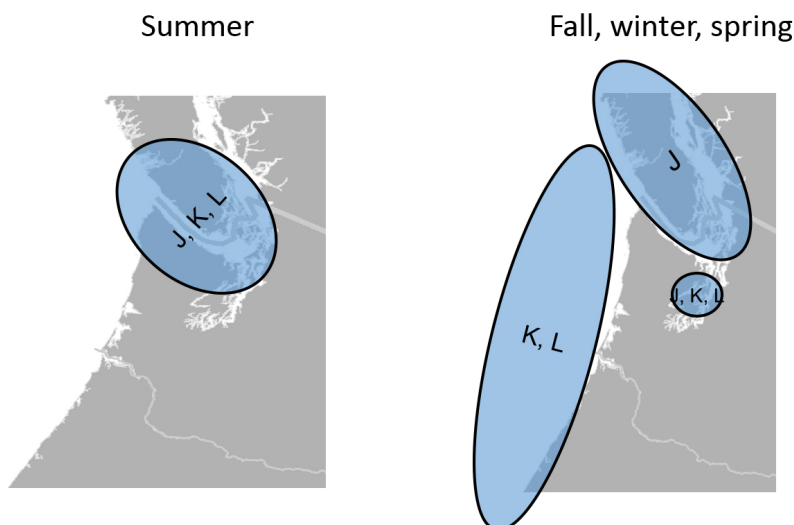
**Summer:** J, K, and L spend much of the summer in the inland waters of Washington and British Columbia, and sometimes on the west side of Vancouver Island, preying on spring, summer, and fall Fraser River and Puget Sound Chinook salmon and likely other stocks, including Columbia stocks, when venturing out of the Salish Sea.

**Fall, winter, spring:** J Pod remains largely in inland waters and near Vancouver Island, preying primarily on Salish Sea stocks and possibly some coastal stocks. K and L Pods shift to a more coastal distribution along the West Coast, preying on salmon and other species as far south as California. All three pods are also occasionally seen in Puget Sound.

Given their more coastal distribution in fall, winter, and spring, K and L Pods are most likely to prey on Columbia/Snake River stocks directly. They would encounter Snake River fall Chinook along the outer coast, as fall Chinook typically migrate closer to the coast than spring-summer Chinook, which spread out much more widely over the Gulf of Alaska.

J Pod might encounter Snake River fall Chinook on the outer coast during forays to the west side of Vancouver Island, but would be less likely to encounter Snake River spring-summer Chinook. That is because spring-summer Chinook congregate at the mouth of the Columbia River during a brief window, when J Pod is several hundred miles away in Puget Sound.

## SRKW temporal and spatial distribution



General seasonal range of the three Southern Resident killer whale pods. From *Salmon recovery and southern resident killer whale status*, Northwest Fisheries Science Center, 2018.

## Might other salmon benefit from dam breaching?

Other important salmon species, such as Snake River sockeye salmon, could potentially benefit from dam breaching. However, it is important to understand that regardless of the species, dam breaching is a long-term proposition. Even if it were decided on today, breaching one or more Snake River dams would require congressional authorization and several generations of salmon, at least, before any results could become clear.

## Learn more:

Sharing our work with other scientists, policymakers, and the public is important to us. To learn more about what we do, please visit our:

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