

FACT SHEET

Wild Spring Chinook Salmon in the Chehalis Basin



INTRODUCTION

Spring Chinook (*Oncorhynchus tshawytscha*) are culturally very significant and especially revered by indigenous people as they are known as the "first salmon." These salmon store more fat than other salmon as they do not feed in the last stage of their life spent in freshwater. The fat is what makes them delicious and nutrient-dense for humans and wildlife alike.

For the majority of the last 1,000 years, spring Chinook salmon returned in astonishing numbers to rivers from central California to the Fraser River Valley in British Columbia. When the explorers, Lewis and Clark reached the Northwest in the early 1800's, they journaled that "salmon runs were so plentiful you could walk across the rivers on their silvery backs."

AN ANCIENT AND RESILIENT KEYSTONE SPECIES

Wild salmon are an ancient and resilient species. They have survived ice ages and floods, changing climates, competition, predation, and natural catastrophes. Through millions of years of adaptation, wild salmon have evolved into a keystone species: an animal of such critical importance that it threads entire ecosystems.

Chinook are the largest of the salmon species, containing the most calories and fat. Historically, Chinook salmon could be caught weighing up to 100 pounds. Today they are often found weighing only between 10-15 pounds. Mature fish can be about three feet long and weigh 30 pounds.



Chinook Salmon

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SALMON LIFE CYCLE

Chinook salmon are anadromous fish, meaning they are born in freshwater, migrate to the ocean to mature into adults, and then swim back to freshwater to spawn. Of all ocean-going Pacific salmon, spring Chinook salmon are the first to return to freshwater each year. They can arrive in their home rivers as early as March where they hold in freshwater until their fall spawning. As spring Chinook salmon spend less time growing in the ocean, they are generally smaller than similar age fall Chinook.

This is part of a bold and unique survival strategy for Spring Chinook salmon. They forego ocean growth for early access to spawning habitats. In the Chehalis, fall Chinook spawn in similar areas to spring Chinook. What separates the spring and fall runs is that the spring Chinook salmon are able to access spawning habitats first and before the summer flows get so low that they restrict upstream migration. Fall Chinook access these habitats later and after the fall rains begin.

As this bold strategy takes time and energy, spring Chinook salmon need to return from the ocean with ample fat reserves to be able to fast for months before spawning. They seek out cool, deep pools in the summer, and wait before spawning in their home river or stream come fall.



Credit: Lewis Conservation District

This deep pool in the Newaukum River could be a good place for Spring Chinook to seek refuge

When young, salmon takes up the chemical imprint of their home river. Years later, as they navigate home, salmon use the earth's magnetic field like a compass along with their sense of smell to guide them back to their home stream. Salmon can detect the scent of a single drop of their home water in 250 gallons of seawater!

Like most anadromous fish, spring Chinook salmon die after spawning in their natal streams and rivers. Their decaying carcasses add rich marine-derived nutrients into the ecosystem. These carcasses provide food for many animals and enrich plant communities including Western Red Cedar, Red Alder, and salmonberry.

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CULTURAL SIGNIFICANCE

For generations of Indigenous people, the spring run of Chinook salmon is a welcome and nutritious relief from winter. **Spring Chinook salmon in the Chehalis Basin is culturally significant to the Quinault Indian Nation and the Confederated Tribes of the Chehalis Reservation as the first salmon species to return to rivers in the spring.** To Indigenous people in the Pacific Northwest, the fish represents new life, health, vital sustenance, and the annual physical and spiritual renewal of the world.

I don't believe in magic. I believe in the sun and the stars, the water, the tides, the floods, the owls, the hawks flying, the river running, the wind talking. They're measurements. They tell us how healthy things are. How healthy we are. Because we and they are the same. That's what I believe in. Those who learn to listen to the world that sustain them can hear the message brought forth by salmon.

Quote by Billy Frank Jr., Nisqually Tribe

DIFFERENCES BETWEEN SPRING AND FALL CHINOOK SALMON

Each Chinook salmon is genetically adapted to a particular place of origin – stream, temperature, chemistry, timing of spring snowmelt. None of this is random – unique genes enable the fish to thrive in a specific stream or river system and spring and fall-run Chinook are genetically distinct from one another. Genetic analysis reveals that migration timing is determined by differences in one short stretch of DNA in their genomes. This genetic difference explains why some are early migrators (spring Chinook) while others are late migrators (fall Chinook).

“What we need to understand about springers, is that their gene variant is also their major survival advantage. By arriving early and hopscotching high into a river’s upper reaches, spring Chinook have outlasted ice ages and floods, warming temperatures, and changing predators. But because this gene emerged from just one evolutionary event, concentrated in one solitary gene, this advantage is also fragile.”

Dr. Miller, geneticist, University of CA, Davis

The advantage is fragile in part because Spring Chinook are less common than fall Chinook. In the Chehalis Basin, core spawning areas for spring Chinook are just the Skookumchuck and Newaukum rivers. When river systems change from human modifications and climate change, they can force fall and spring Chinook to spawn near each other, which could mean spring Chinook genetics diminish and could eventually disappear. Currently a process called “hybridization” is happening. A river's spring and fall Chinook salmon can sometimes interbreed and their offspring will have intermediate return timing to the river.



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CHINOOK SALMON AND SOUTHERN RESIDENT KILLER WHALES

Chinook are important prey for the endangered Southern Resident Killer Whales (SRKW), or orca, that frequent the Salish Sea and Pacific Northwest Coastline. In every ocean in the world, orcas target specific prey they have learned to hunt, using local environmental features and seasonal patterns in the water they dominate. **Our SRKW evolved to depend on Chinook salmon as there was once a huge abundance of Chinook salmon available year-round -- a reliable and rich food source.**



Spring Chinook salmon are an especially prized meal as they arrive fat from the ocean. They are a key food source when other fish are not available. However, spring Chinook are now among the most depleted of all of the salmon populations, and there are now major gaps in the calendar of food for SRKW. Of 396 populations of Chinook that used to be available to SRKW, 159 are now gone. **For SRKW to survive, they must eat up to 350 pounds of Chinook salmon or other fish per day.**

"You can't de-link orcas from salmon. They have evolved over thousands of years to take advantage of this wonderful food source. Salmon are absolutely core to the survival of SRKW."

Greg Taylor, a B.C. based fisheries consultant

RESEARCH IN THE CHEHALIS BASIN

For over a decade, the Chehalis Basin Strategy www.chehalisbasinstrategy.com has provided funding to support research and studies for aquatic species, including Chinook salmon, that utilize habitat across the Chehalis River Basin. Studies include assessment of smolt and adult abundance, life history diversity, fry genetics, adult **"escapement"** -- *number of adults that return to a basin to spawn*; **productivity per spawner** -- *number of juveniles produced by one spawning female/pair*; predation by native and non-native fish, and options for alterations to the Skookumchuck dam to improve habitat conditions for Chinook and other species.

Monitoring has also identified the density of **redds (nests)**-- *number of redds identified by species throughout the study area/basin each river that is used by Chinook*. Temperature monitoring is also underway to locate potential thermal refugia (cooler water pockets) during the warm summer months.

The Newaukum River and its tributaries provide critical habitat for spring Chinook salmon.



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THREATS TO SPRING CHINOOK SALMON

The spring Chinook's life history of spending summers in freshwater prior to spawning makes them extra susceptible to high summer water temperatures and low summer flows. These physical conditions impact their metabolism, immune system and ability to migrate, which subjects them to illness, predators, parasites, and even starvation. Changes in climate are making these conditions more severe.

Threats:

- Warm temperatures
- Insufficient low flows
- Scouring high flows
- Ocean conditions
- Predation
- Hybridization between spring and fall runs

- Ocean conditions are resulting in poorer nutrition for salmon, leading to smaller and fewer salmon returning to rivers. National Oceanographic and Atmospheric Administration (NOAA) in 2018 noted that Chinook salmon in the ocean are 20% lighter and 7% shorter than they were just 40 years ago.
- Data collected in the Chehalis basin's rivers show a sharply declining trend in Chinook abundance over the past 20 years. If these trends continue, this species may become extinct.
- Both spring and fall Chinook populations are also declining in the upper Chehalis Basin, with predation by non-native fish (especially smallmouth bass) identified as a potentially significant factor. As water temperatures are rising, this further stresses native species and favors non-native predators. Additional habitat factors are likely contributing to ongoing declines as well.
- In July 2023, NOAA received a petition to list Washington Coast spring-run Chinook under the Endangered Species Act. In December, 2023, NOAA released their 90-day finding and concluded that the petition "presents substantial scientific or commercial information" indicating the petitioned action to list them as Threatened or Endangered may be warranted.
- Next steps in NOAA's process include a status review of Chinook salmon on the Washington Coast to determine whether the petitioned action to list is indeed warranted. The timeframe of a decision to list and what that might mean for the Basin, is estimated to be at least 1-3 years (from 2023). For more information on the petition, contact Shivonne Nesbit, National Marine Fisheries Service, West Coast Region, at shivonne.nesbit@noaa.gov.

More than 137 species depend on salmon – in their varying stages of life like bears, to fish, to owls, and salamanders and our Southern Resident Killer Whales (SRKW). As salmon numbers decline, ecosystems suffer. In recent years, scientists have determined that just 6 to 7% of the marine derived nutrients – nitrogen and phosphorous historically delivered by returning salmon is currently reaching Pacific Northwest streams.

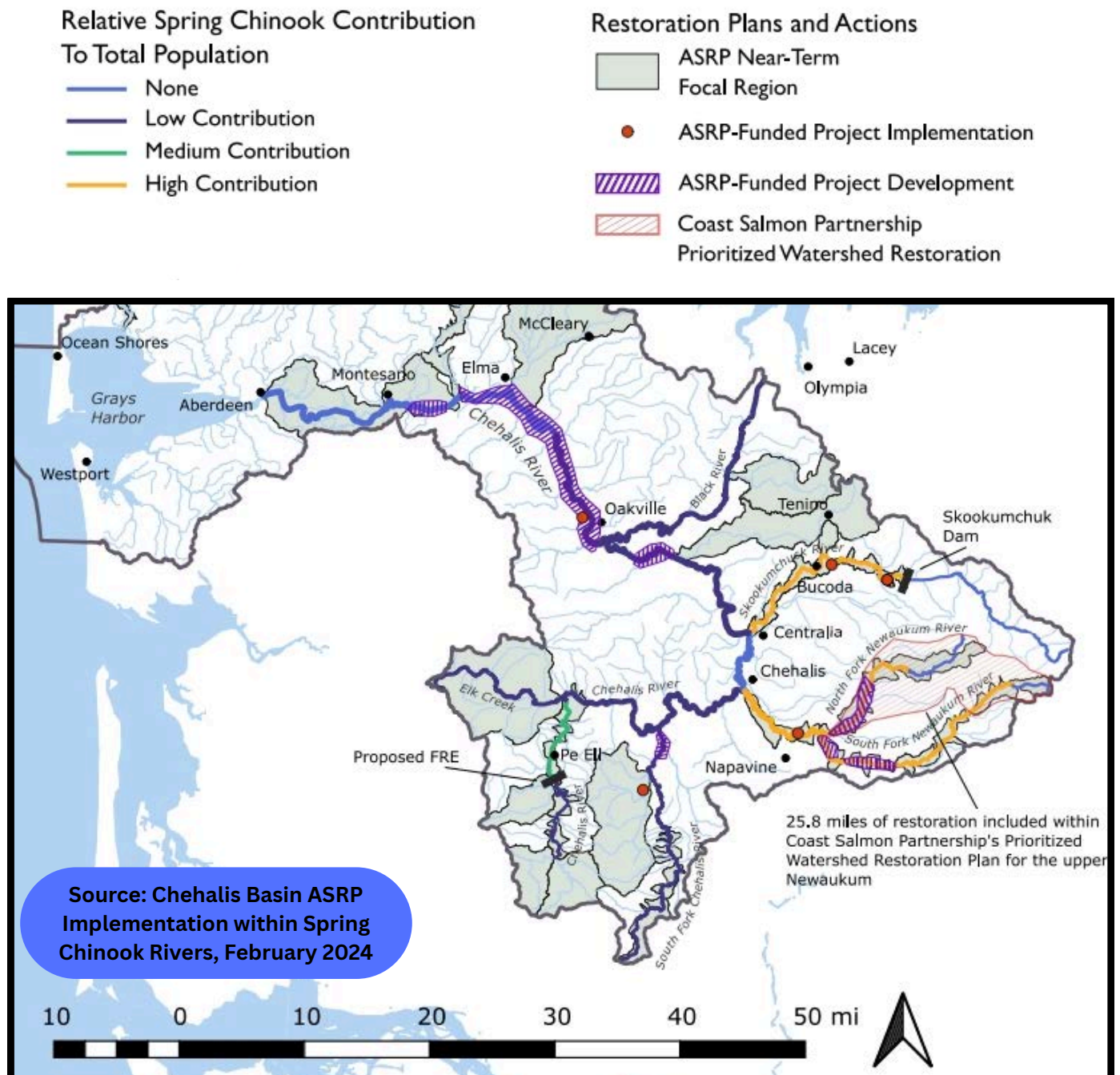


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WORKING TOGETHER TO RESTORE SALMON HABITAT IN THE CHEHALIS BASIN

Five reach-scale restoration projects in spring Chinook rivers have been completed or are in progress, with funding provided through The Aquatic Species Restoration Program (ASRP). **More than six miles** on the mainstem of the Newaukum, the Skookumchuck River and Stillman Creek, a tributary to the South Fork of the Chehalis have been restored.

Another 42.5 miles of ASRP-funded landowner outreach and restoration planning has been completed in spring Chinook rivers. Other projects that could also benefit spring Chinook, such as barrier corrections, have been funded by other funding programs (not included in below diagram.)



ASRP is a state funded grant program which supports a science-based plan to improve and restore aquatic habitat in the Chehalis Basin, as well as protect communities and landscapes from the predicted increase in flooding disasters. <https://chehalisbasinstrategy.com/asrp/>.

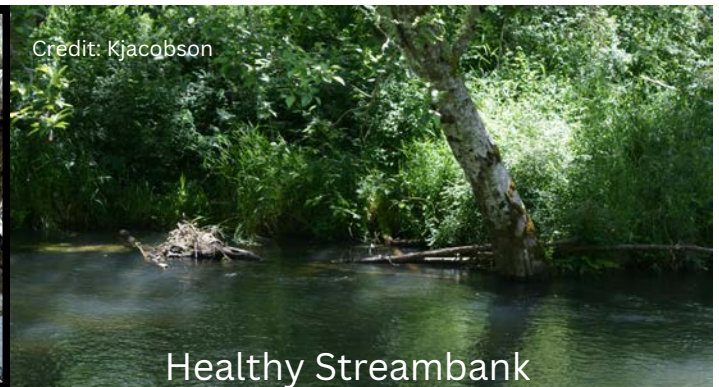
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WAYS YOU CAN PROTECT SPRING CHINOOK AND OTHER SALMON SPECIES!

It is critical that adult spring Chinook salmon holding in pools in the mainstem Chehalis, Skookumchuck, and Newaukum River prior to spawning be protected from poaching, harassment and disturbance. Here are a few recommendations.

REMOVE ROCK DAMS THAT BLOCK FISH! LET THEM PASS!

When rock dams are present, they block fish. Fish can't move upstream to find cool water, spawn, and feed. Rock dams are illegal because when they are present, they block fish migration. You can help maintain healthy habitat by not leaving rock dams in the stream. *Report rock dams and stranded fish at 360-902-2936 or WILDCOMM@fw.wa.gov.* Please provide the dam location, dam description, photo, date and time.



KEEP TREES AND SHRUBS ALONG THE RIVERBANK AND LEAVE WOOD IN STREAMS

Native riparian trees and shrubs support the formation of deep pools and keep them cool. The roots of these plants also help stabilize riverbanks and provide protection from erosion.

GO ROCK HOUNDING OUTSIDE OF SPAWNING SEASON

Stepping on salmon nests (redds) can disturb or kill eggs and baby salmon.

KNOW AND FOLLOW CURRENT WDFW FISHING REGULATIONS

Illegal fishing of spring Chinook salmon is a major threat to this imperiled salmon species.

KEEP STREAM AND RIVER POOLS DEEP AND COLD FOR SALMON

Salmon depend on “cold water refugia” for optimal shelter to escape the thermal stress of warm waters. Cold water refugia is an area in streams and rivers where the water is consistently cooler, like in deep pools. Avoid swimming in cool pools where Chinook salmon are present, since your movement disrupts water layers and the cold water refugia is lost.



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Resources and References:

- Aquatic Species Restoration Plan (ASRP) Steering Committee. (November 2019). Chehalis Basin Strategy: Aquatic Species Restoration Plan. Publication 19-06-009. Chehalis Basin Strategy Aquatic Species Restoration Plan - Phase 1 document
- Center for Biological Diversity: <http://www.biologicaldiversity.org>
- Coast Salmon Partnership Annual Report, 2022.
https://www.coastsalmonpartnership.org/document_library/
- Email correspondence with Mara Zimmerman, PhD., former Executive Director of the Coast Salmon Partnership, current Chief Scientist with the Washington State Department of Fish and Wildlife.
- NOAA and the National Marine Fisheries Service. (2023). <http://fisheries.noaa.gov>. Endangered and Threatened Wildlife; 90-Day Finding on a Petition to List Chinook Salmon on the Washington Coast as Threatened or Endangered Under the Endangered Species Act. <https://www.fisheries.noaa.gov/action/petition-list-washington-coast-chinook-salmon-threatened-or-endangered-under-esa>
- Office of the Chehalis Basin/ The Chehalis Basin Strategy: <https://ecology.wa.gov/water-shorelines/shoreline-coastal-management/chehalis-basin/strategy>
- “Protect Your Local Chehalis Basin Salmon” Publication, The Chehalis Basin Collaborative for Salmon Habitat: <http://www.chehalisleadentity.org/get-involved/#For-Landowners>
- Washington State Department of Fish and Wildlife: <http://www.wdfw.wa.gov>
- Wild Salmon Center: <https://wildsalmoncenter.org/>



“Deep cold-water pools are essential to spring-run fish survival because of their early entrance to freshwater and dependence on cold water through the heat of the summer.”

Katlyn Nielsen, Newaukum WDFW Biologist

This publication was produced by the
Chehalis Basin Collaborative for Salmon Habitat.

To learn how you can be involved in projects that support salmon recovery,
visit their website: www.chehalisleadentity.org. Or contact Watershed
Coordinator, Kirsten Harma: kharm@chehalistribe.org