

WHY THE STATE WATER BOARD'S 2021-2022 FLOW REGULATION IS NOT NEEDED FOR COHO SALMON IN THE SCOTT RIVER

Scott Valley Agriculture Water Alliance
April 13, 2022

Background

On August 17th, 2021 the California State Water Resources Control Board (Water Board) adopted water rights regulations potentially halting all agriculture irrigation in the Scott Valley when new minimum flow requirements for the Scott River are not met. These new [emergency curtailment regulations](#) remain in place until August 30, 2022. They call for above-average flows in the Scott during summer months, and are purportedly designed to address a perceived “crisis” for coho salmon (*Oncorhynchus kisutch*), a species that is listed as “threatened” in the region under the Endangered Species Acts (both federal and state). However, well-documented life cycle needs, coupled with the significant increase in the Scott River’s coho returns in the last two decades, demonstrate that the mainstem flows demanded by the Water Board are not needed for coho survival.

Ill-conceived Perception of “Crisis” in 2021

In May of 2021, the California Dept. of Fish and Wildlife (CDFW) wrote in a letter to the Water Board that “surface and groundwater” use was contributing to critically low flows and threatening the survival of coho salmon in the Scott River (CDFW 2021). Unfortunately, these premises were not entirely based on fact. Misconceptions surrounding coho were furthered by a July 1, 2021 petition to the State Water Board by the Karuk Tribe. This petition, perhaps unintentionally, exaggerated the coho salmon’s situation in the Scott River. “Today the Karuk Tribe filed a formal petition...demanding that [the Water Board] use its emergency powers to curtail water use in the Scott River to prevent the extinction of the [Coho]” (emphasis added).

Claims of “extinction,” however, are countered by CDFW’s own data. Adult coho returns have been increasing over the past two decades, and even more so in the past 10 years (Knechtle and Giudice 2021). Further, CDFW’s annual salmon reports clearly show that coho do not occupy the mainstem of the river during July through early October, months in which the Water Board regulations call for mainstem flows that have not been reached in 9 out of the past 11 years (USGS 2021). By July, as the year-plus juveniles have typically migrated out of the Scott and into the Klamath River The young-of-the-year are typically inhabiting the cooler tributaries for summer rearing, as many surveys have shown (Yokel 2006). No coho adults are present in the Scott River system during the summer either; they only come up to spawn from November to February (Knechtle and Giudice 2021).

The misunderstandings about the coho’s life history water needs in the Scott River system have been repeatedly stated as justification for the new regulations. The Aug. 17, 2021 press release after the Water Board’s approval of the regulations claimed that dry conditions “are endangering coho fry, or baby coho emerging from gravel, and juvenile coho that rely on seasonal flows to reach a suitable summer rearing habitat.” The state continued to claim in 2022 that their concern for the Scott River is about “protecting fish species, such as coho salmon, from extinction” (Souza 2022).

Where Do Coho Go in the Scott River?

Like all salmon, coho are cold-water fish that spend part of their life cycle in freshwater and part in the ocean (see [Attachment A](#), “Coho Salmon Facts,” NOAA-Fisheries). Unlike Chinook salmon, whose young usually return to the ocean after less than 9 months instream, coho must seek freshwater habitat where

the juveniles can survive for up to 18 months after emerging from their eggs. For the Scott River, this habitat need means the adults prefer to spawn in the westside perennial tributaries to Scott Valley, where it's not too steep and colder water and densely forested instream cover is available for the juveniles to safely rear through the summer. Surveys have shown that most coho spawn and rear in these creeks: Shackelford/Mill, Patterson (upper), French/Miners, Sugar, South Fork and East Fork (Yokel 2006). Few coho juveniles are found rearing during the summer in the mainstem Scott River, unless low flow during spawning season (November to February) traps the adults in the mainstem. This happens when fall rains are insufficient and certain stretches remain dry (specifically, two stretches: the severely disturbed mining tailings reach of the river, which is a 5-mile stretch at the south end of valley; and the alluvial fan tributary connections, a natural phenomenon) (Magranet 2014). In "wet" water years, coho may be found in other tributaries, but those tributaries' ephemeral flow nature does not bode well for juvenile survival.

History of Coho in the Scott

Coho salmon (*Oncorhynchus kisutch*) are native to the Klamath River and its tributaries like the Scott River. However, it was not readily identified as a separate species from the Chinook salmon (*O. tshawytscha*, previously referred to as "king salmon") by most early observers, so historic data were hard to come by for these "silver salmon" until species identification became consistent (Snyder 1931). By the 1960s, state fisheries biologists were estimating salmon populations for each major river system, with the Scott River's relative annual estimates at: Coho – 800-2,000; Chinook – 10,000; Steelhead – 20,000-40,000 (CDFG 1966).

In the 1980s, few spoke about "silver salmon" in the Scott River. CDFW was not monitoring their numbers, unlike Chinook salmon, which was monitored due to its commercial importance. During cooperative work with the French Creek Watershed Advisory Group to reduce excessive sediment in French Creek in the early 1990s, habitat evaluation monitoring measured the numbers of juvenile salmonids in selected stream reaches. The Advisory Group started finding young coho in summer rearing habitat in 1992, along with more numerous steelhead. But coho numbers were relatively few. By 1995, researchers started noticing one strong coho brood year and two weaker ones, as coho have 3-year life cycles and populations can be tracked that way. Data continued to show this pattern through 2005, with each brood year's juvenile numbers increasing (CDFG 2006).

Habitat Restoration Efforts

Over the past 30 years, local habitat restoration projects targeting coho have been undertaken, including many sacrifices from the agriculture, mining and forestry industries. Some of these efforts include: fish screening of all surface-water diversions; increasing riparian shade; reducing sediment discharge from mountain roads; logging practices that reduce disturbance/sediment; closure of all suction dredge mining; instream water transactions via forbearance agreements and 1707 dedications (coordinated by the Scott River Water Trust in priority coho streams); and other projects (see [Siskiyou Resource Conservation District website](#)). Since juvenile coho seem to find refuge within woody debris, efforts have also been made to add more large wood to stream habitat or mimic beaver dam habitat (see also Scott River Watershed Council). The CDFW environmental program manager in Yreka has acknowledged that "efforts to enhance over-summering habitat for coho in the Scott don't get as much credit as they deserve" (Joe Croteau, personal communication).

It should be noted that many external conditions beyond the Scott River watershed and drought also influence salmon populations, such as ocean conditions; predation; hatchery impacts; over-fishing; disease in the Klamath River; and floods. The major "100-year" flood events of 1955, 1964, and 1974

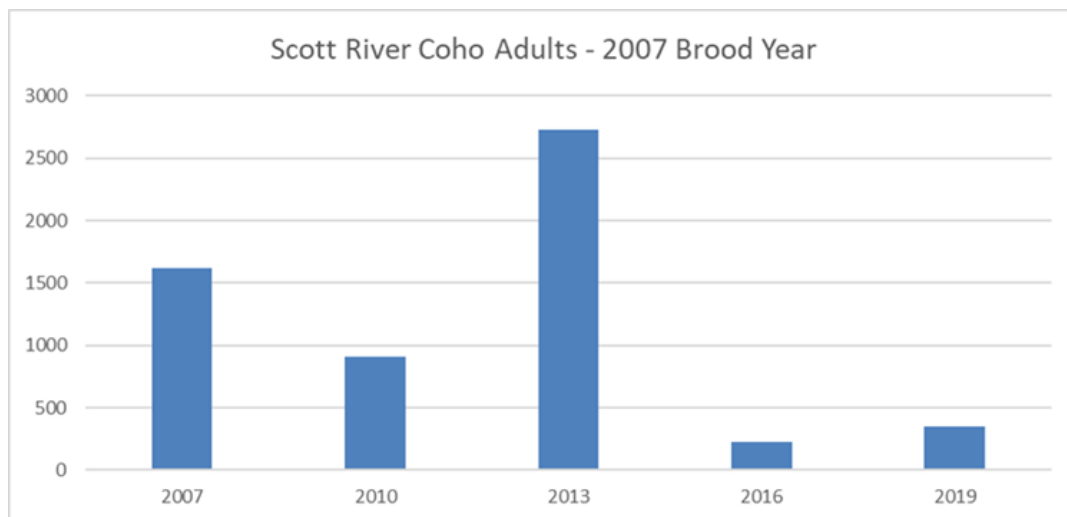
caused significant damage in the Scott River watershed and to its fish populations, which has also taken decades to recover from.

Coho Adult Populations Are Increasing

Since coho in this region became listed as “threatened” under the federal Endangered Species Act (ESA) in 1997 and the state ESA in 2005, great attention has been given toward the recovery of the species. Whether because of these recovery efforts, external circumstances, or both, coho salmon populations in the Scott River are, fortunately, not near “extinction.” Instead, the 3 brood years have generally been increasing.

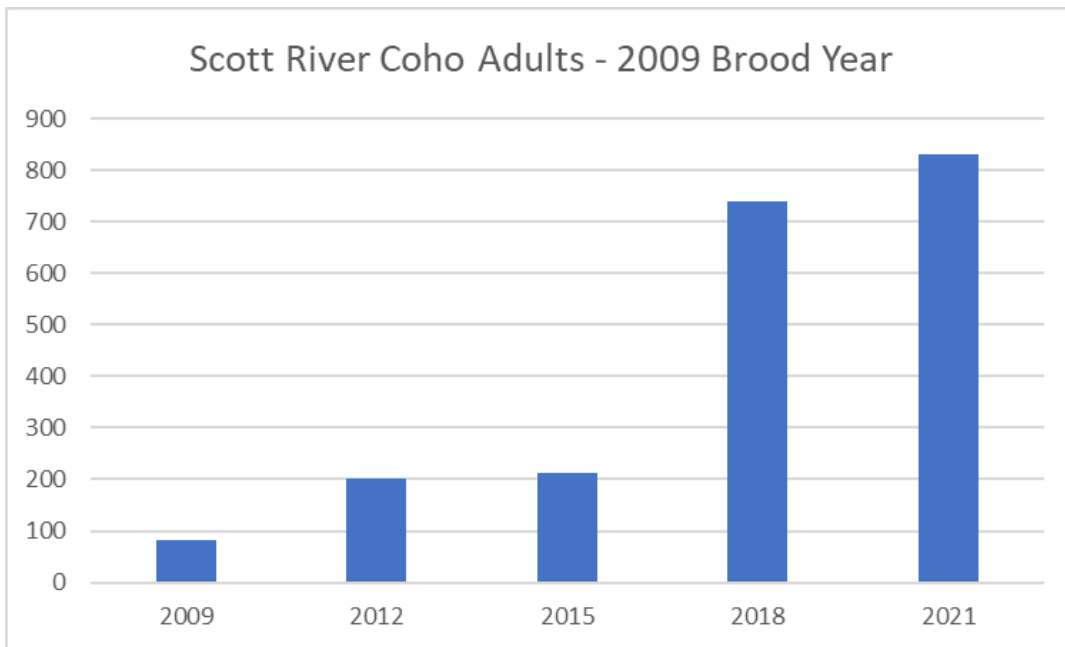
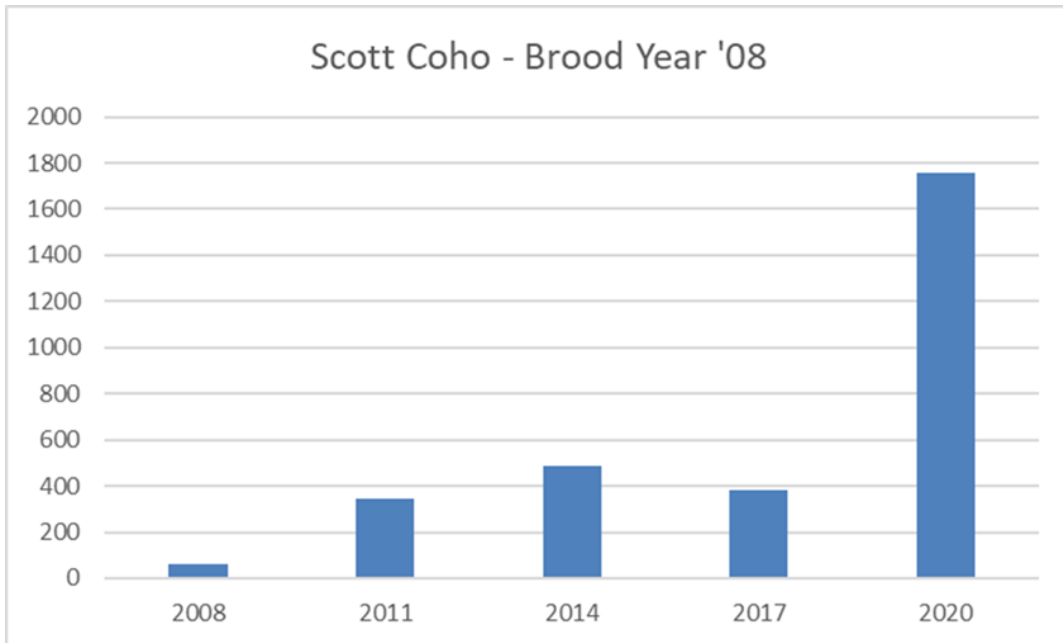
Adult coho numbers only began being monitored consistently in 2007 with the installation of a seasonal video weir by CDFW at Scott River mile 18, below the Scott Valley in the canyon. This initial adult count was the same strong brood year that researchers had initially documented as juveniles in French Creek ('95-'98-'01-'04-'07) (CDFG 2006). The data ended up showing that 1,622 adults had moved upstream of the weir in the fall of 2007. In 2010, despite good discharge in October-November (mean flows of 126 to 348 cubic feet per second (cfs)), the population went down to 927 adults, for unknown reasons. (Note: counts can be prone to yearly underestimation, due to the fact that when water in the Scott rises, the video weir is removed by CDFW employees to prevent equipment failure.)

Then a record number of 2,752 arrived in the severe drought year 2013 with mainstem flows of only 45-50 cfs – but with no fall rains, the tributaries where they prefer to spawn never connected. As a result, spawning occurred only in the mainstem and the juveniles were never able to migrate into the cooler tributaries for later rearing. A cooperative fish rescue effort was undertaken during summer 2014 to try to relocate the 160,000 juveniles into the upper streams, even though they were already stressed by low flows and the new sites were already occupied by steelhead juveniles (Magranet 2014; CDFW et al. 2015). Despite this major effort, the reduced survival of these juveniles contributed to the decreased adult return of about 250 adults in 2016. Nonetheless, this brood year is rebuilding, as shown in the graph below by the increase to 365 in 2019, demonstrating the resilience of wild coho populations in the Scott.



The '08 and '09 brood years were once considered “weak” but are now increasing significantly, as shown in the two graphs below. In 2020, the '08 cohort showed “an increase of 3.5 times from returns of 2017,” up significantly from the estimated 153 counted originally in 2008 (Knechtle 2021). The '09

cohort has expanded from an initial count of 81 adults to 830 in 2021. This impressive rebound in population has not been publicly touted by the fish advocacy community.



Juvenile Coho Outmigration Reporting Misinterpretations

After at least a year, coho juveniles move downstream to the Klamath River as “outmigrants” in the spring, with the peak timing often in May (Morrow et al. 2022). A rotary screw trap is operated by CDFW near the mouth of the Scott River to monitor juvenile salmon and steelhead outmigrants. During the spring of 2021, a rumor was circulating that “juvenile coho are being killed in the Scott River,” but this rumor proved to be ill-informed. Flows were adequate that year to sustain this outmigration, with no alarms made by CDFW in their reporting.

The source of the rumor may have been CDFW's outmigrant "raw" data, which can be easily misinterpreted when it's shared quickly via email networks. The "raw" numbers usually represent a small fraction of actual numbers, due to the inefficiency of CDFW rotary screw traps. CDFW's annual reports present their fish population estimates by species and age, and extrapolate the raw data using trap efficiency rates of 1 percent to 5 percent (Morrow et al. 2022). Given the 1 to 5 percent efficiency rate, a report of 10 coho juveniles (a "raw" number) could, for example, actually translate to 500 (at 5% efficiency) and 1,000 fish (at 1% efficiency). It should also be noted that the screw traps, like the video weir, are sometimes pulled by CDFW staff when the river flow increases, thus creating possible under-reporting of yearly totals.

Nonetheless, alarms were sent out via an email network of fish advocates about apparent low numbers. Fortunately, as of spring 2022, outmigrant monitoring weekly reports by CDFW are now clarifying that "raw catch numbers are not population estimates." CDFW now appears to be reporting population estimates only when they have sufficient trap efficiency data (CDFW 2022).

New Flow Requirements Not Targeting Coho Needs

Trying to protect coho was the purported primary intent of the Water Board's minimum flow targets adopted in 2021; however, they are a distraction from the coho's actual needs. The 2020 coho brood year was primarily located in French Creek and Shackelford Creek, where the adult spawners had flow access during the brief runoff of Nov-Dec 2020. These streams have adjudications separate from the Scott River Decree. Voluntary measures, particularly instream flow transactions via the Scott River Water Trust, have helped improve summer flows in the coho tributaries and monitoring has validated coho juvenile presence below water leases (see www.scottwatertrust.org). Coho juveniles are not rearing in the mainstem Scott in the summer months, so the July-August flow minimums of 30 cfs are not needed to sustain them there.

Mainstem flow targets for coho adult spawning migration do not reflect this species' essential need to migrate with spikes in flow, as is well documented in CDFW's annual Scott River Salmon Studies (e.g., Knechtle & Giudice 2021). A constant flow, as happened in Fall of 2013 at 50-60 cfs, does not help their spawning success when increased runoff has not triggered their inborn need to move up the tributaries to spawn (Magranet 2014). Coho are tributary spawners, not mainstem spawners if they can help it, and can spawn as late as late November to early February. Thus, they have a more flexible window than they're often given credit for. Data shows they are resilient, and fishery biologists are coming to appreciate this fact.

Scott's Coho Status Is Commendable

The Scott River has the strongest wild population of coho in the Klamath basin, according to CDFW (W. Sinnen, pers. comm.). Its average coho run size since 2007 is now 732 adults, with a peak return of 2,752 recorded in 2013 and a 2021 return of 830 fish (Knechtle & Giudice 2021; Knechtle, pers. comm.). Historic estimates from the early 1960s of the Scott River's coho population ranged from 800 to 2,000 adults, so current numbers are in the range of that "historic" era for which much nostalgia seems to remain (CDFG 1966).

Despite recent drought years and despite early predictions that coho were going "extinct", the coho salmon have shown resilience and rebounded in the Scott River. Local attention to the needs of coho salmon seems to have helped to improve its population, and these efforts will continue. This Success Story needs to be praised rather than punished.

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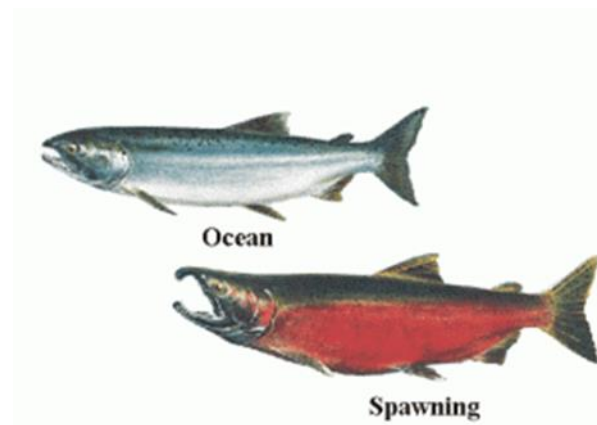
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ATTACHMENT A

COHO SALMON FACTS

Appearance

- Commonly called silver salmon, coho have dark metallic blue or greenish backs with silver sides and a light belly.
- While they are in the ocean, they have small black spots on their back and on the upper lobe of the tail.



(U.S. Fish and Wildlife Service)

- The gumline in the lower jaw has lighter pigment than on Chinook salmon.
- In fresh water, spawning coho are dark with reddish-maroon coloration on the sides.
- Spawning males develop a strongly hooked snout and large teeth.
- Before juvenile coho migrate to the sea, they lose their parr marks (a pattern of vertical bars and spots useful for camouflage) and gain the dark back and light belly coloration of coho living in the ocean.

Biology

- Coho salmon are anadromous—they hatch in freshwater streams and spend a year in streams and rivers then migrate out to the saltwater environment of the ocean to feed and grow.
- Some stocks of coho salmon migrate more than 1,000 miles in the ocean, while other stocks remain in marine areas close to the streams where they were born.
- They spend about 1½ years feeding in the ocean, then return to their natal streams or rivers to spawn, generally in fall or early winter.
- Adult coho salmon usually weigh 8 to 12 pounds and are 24 to 30 inches long.
- They typically spawn between the ages of 3 and 4.
- Female coho dig out gravel nests (redds) on stream bottoms where they lay their eggs.
- The eggs incubate for 6 to 7 weeks until they hatch.
- All coho salmon die after spawning.
- The newly hatched larvae remain in the gravel until the yolk sac is absorbed.

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- While in fresh water, young coho salmon feed on plankton and insects.
- While in the ocean, they switch to a diet of small fishes such as herring, sandlance, anchovies, and sardines.
- Adults are also known to eat juveniles of other salmon species, especially pink and chum salmon, as well as juvenile sablefish.
- Otters, seals, and a variety of fish and birds prey on juvenile coho. Sharks, sea lions, seals, and orcas feed on adult coho.
- After salmon spawn and die, [salmon carcasses](#) are a valuable source of energy and nutrients to the river ecosystem. Carcasses have been shown to improve newly hatched salmon growth and survival by contributing nitrogen and phosphorous compounds to streams.

Source: NOAA-Fisheries: <https://www.fisheries.noaa.gov/species/coho-salmon>