
2.0 THE HISTORY OF SALMON

"Dan Jansen looked down from a bluff... "the water was like glass...the [coho] salmon were in rows...they lay there still...every now and then one would wiggle its tail to keep his place in line. They lay there by the thousands as far as the eye could see..."

Thanksgiving on the Garcia River 1930's (Levene et al. 1976)

2.1 LET THE FISH TELL THE STORY

Nearly everyone has a fish story to tell. Some tales talk of a time when "...salmon and steelhead spawning runs were so thick that a person could walk across the stream on their backs" or when the "big one got away"; tales reminding us of a time when coho salmon were abundant and believed "inexhaustible". Even our Roman, French and English ancestors once had fish stories to tell...and they chronicle a species demise.



Photo Courtesy 2: Kelley House Museum, Fort Bragg, California, 1920's

Salmon: Paleolithic Times to Today

Twenty five thousand years ago Paleolithic man carved a life-size salmon into the ceiling of a cave in southern France near the Vézère River; *L'Abri du Poisson* is the oldest known artistic representation of a salmon in the world. Evidence of salmon is frequently found in the debris of the French caves and believed to have been a food preference of

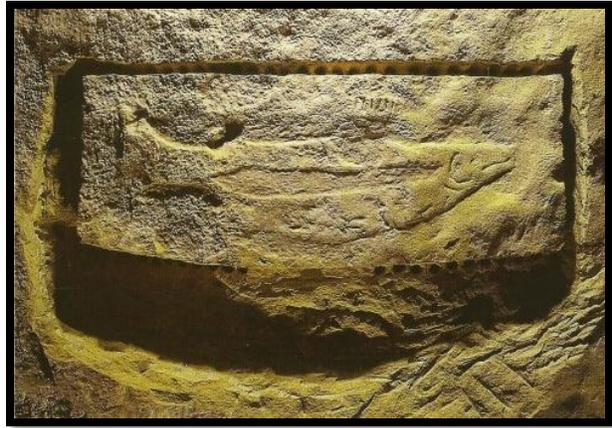


Photo Courtesy 3: *L'Abri du Poisson, Les Eyzies-De-Tayac; Charlotte Ambrose, NMFS,*

Paleolithic and Plinian man. Around the world, our ancestors have relied on salmon as a food source for thousands of years. In 200 BC, Celtic France, lore described salmon as keepers of wisdom. Salmon were believed to be the most intelligent of animals for they braved predators, survived in ocean and river waters, and leaped effortlessly through the air in their journey back to their place of birth; when a person touched a salmon they would gain this sacred knowledge. Two depictions of salmon were made on Celtic coins and standing stones a century before Julius Caesar and his soldiers invaded the land. Around 45 BC, “the soldiers of Caesar, when on their victorious march toward Gaul and Britain, they reached the banks of the Garonne, to behold the fish [salmon] cleaving his joyous way upwards as he made his ascent from the sea” (Dickens 1888). Romans prized salmon in their Gallic and British provinces.

Pliny the Elder, a Roman scholar, was the first to write about salmon in 77 AD in his book



Photo Courtesy 4: CCC Coho Salmon Adult, Albion River; *Marilyn Stubbs*

“Historia Naturalis” saying “...salmon are the most esteemed of fishes...” and Ausonius in 371 AD in his poem *Mosella* writes of the beauties and edible qualities “...Nor will I pass the glistening salmon by with crimson flesh within of sparkling dye...with what colours has Nature painted thee” (Ausonius 371 AD in Dickens 1888).

The struggling salmon populations rebounded in England after the first Magna Carta in 1215 AD ordered the dismantling of the King's weirs to confirm the rights of free navigation; giving salmon access to previously restricted habitat. Salmon were of such importance that regulations on salmon fishing go back as early as 1030 AD. Both Scottish and English laws were instituted in the 12th century to remove obstructions, institute fishing restrictions, control pollution and prevent the killing of salmon out of season; some offenders faced a year in the dungeons. King Richard the First, Lionheart, embodied into the English code that for salmon passage there be *"left in all weirs a gap of such size that a 3-year old pig might turn round in it without touching snout nor tail"* (Dickens 1888). In 1406 AD, the King of Scotland set a closed season for salmon in Scottish rivers, an act that remained in place for over 400 years.

Salmon had been in great abundance throughout European countries and so numerous that one hundred pounds of salmon could be bought for an old knife (Dickens 1888) and so common they were cheaper than all other meat.

In making comparisons between the supplies of fish and other flesh, we must also recollect that fish, or at least salmon, though higher in money value, cost nothing for their "keep", make bare no pastures, hollow out no turnips, consume no corn but are, as Franklin expressed it, "bits of silver pulled out of the water".

Treasures of the Deep, Daniel B. Fearing, 1876

As the human populations grew, the salmon species declined. New methods of preserving salmon for long periods (*i.e.*, storing salmon in ice) resulted in a boom of large scale commercial trade which fed the masses. Fearing wrote that, "It was no uncommon thing, on some of the upper fisheries of the Tweed, to kill within an hour, a greater number of fish [salmon] than had been killed with the rod during the whole season...butchery, slaughterous and wasteful killing" (Fearing 1876).

The collapse of the salmon continued through the Industrial Revolution with England's increase in factories, dams, pollution, sewage and rampant poaching. Attempts were made to institute new laws to protect salmon and their habitats, but many commercial interests opposed any restriction on fishing and protecting habitats. A rising tide of men started to speak out on behalf of salmon and the need to protect them, one of these men was, J. Cornish who authored a treatise on the state of the salmon fisheries and in 1824 wrote:

"The salmon is one of the most valuable fish we have; yet...mankind seem more bent on destroying the whole race of them than that of any other animal, even those that are most obnoxious. Of this there cannot be a stronger and more conclusive proof than their present scarcity, contracted with their former abundance."

(J. Cornish 1824 in Montgomery 2003)

Daniel B. Fearing (1876) in *Treasures of the Deep* opined:

"There is no end to the destructive appliances which man has brought to bear against this lordly fish [salmon]. And the public themselves are impatient of legislation. River fisheries are regulated by more than twenty acts and have been the subject of more government inquiries than we care to count...people, who know little of the economy or its' life history, have come to regard this inhabitant of the waters with something like annoyance."

Charles Dickens, in his weekly magazine "All The Year Round" in 1861 and 1888 wrote:

It will doubtless be news to many that, among the silent effects which our present age is producing upon the animal creation – one of those mighty results which silently and slowly grow from day to day, from year to year, till at last they burst upon our view a stupendous fact, a thundering avalanche composed of thousands of minute flakes of snow – is the gradual extinction of the salmon. The cry of "Salmon in Danger!" is now resounding throughout the length and breadth of the land. A few years, a little more over-population, a few more tons of factory poisons, a few fresh poaching devices...and the salmon will be gone...he will be extinct....And are we, active, healthy Englishmen in heart and soul, full of veneration for our ancestors, and thoughtful for the yet unborn...Shall we not step in between wanton destruction...and so ward off the obloquy which will be attached to our age when the historian of 1961 will be forced to record that: "The inhabitants of the last century destroyed the salmon...." (1861)

“Owing to causes such as drainage, pollution, and the formation of weirs...salmon forsake certain rivers. To see a salmon river in the fullness of its abundance we must cross the Atlantic and visit the waters of the Columbia, Sacramento and other streams which actually swarm with hundreds of thousands of salmon.” (1888)

Parliamentary bills escalated from the 1500’s to the late 1800’s for the protection of salmon:

- ♦ 1548 Bill to continue Act against destroying eels and salmon;
- ♦ 1562 Bill against using unlawful fishing nets in the Thames;
- ♦ 1623 Bill for the preservation and increase of salmon and the fry of salmon;
- ♦ 1816 Bill to prevent the destruction of the breed of salmon;
- ♦ 1826 Bill for the more effectual preservation and increase of salmon and regulating the salmon fisheries throughout Great Britain and Ireland;
- ♦ 1828 Bill to regulate salmon fisheries in Scotland;
- ♦ 1842 Bill for the better regulation of the close of time in salmon fisheries in Scotland;
- ♦ 1846 Bill to regulate the salmon fisheries in England and Wales;
- ♦ 1852 Thoughts on the present scarcity of salmon (Williamson; Rev. Dugald S.)
- ♦ 1854 The natural history and habits of the salmon; with reasons for the decline of the fisheries and how they can be improved and again made productive (Andrew Young); and
- ♦ 1871 Details regarding the extreme limits beyond which salmon are prevented from ascending rivers due to obstructions.

However, the lack of enforcement, the “old plea of ruin...to undertake such work [salmon protections]” and the “political paralysis over the salmon crisis” (Montgomery 2003) rendered salmon extinct by the end of the 19th century in nearly all English rivers. These catastrophic declines and extinctions were also observed in Scotland, France and many other European counties where salmon had once been in great abundance. Today wild Atlantic salmon in Europe are all but extinct except in only a few countries. In Scotland today, salmon are so rare that commercial fishing is banned, rights to fish for salmon are privately owned and fishing without permission is a criminal offence. To fish for salmon can cost an angler from several hundred to £1,400 per day.

The European story is being recounted today...here on the Pacific Coast for Central California Coast coho salmon with the same warnings of impending extinction; the same calls for action.

“Our modern salmon crisis is a strikingly faithful retelling of the fall of Atlantic salmon in Europe...”

Montgomery 2003

Salmon are an integral link between the oceans and our landscapes. They have inspired art, rituals, lore, feasts, literature, poetic expression and have supported humans and their economies for thousands of years. “A salmon crisis is nothing new...if we fail to learn the lessons from history, it will tell us more about ourselves than it will about our salmon” (Montgomery 2003).

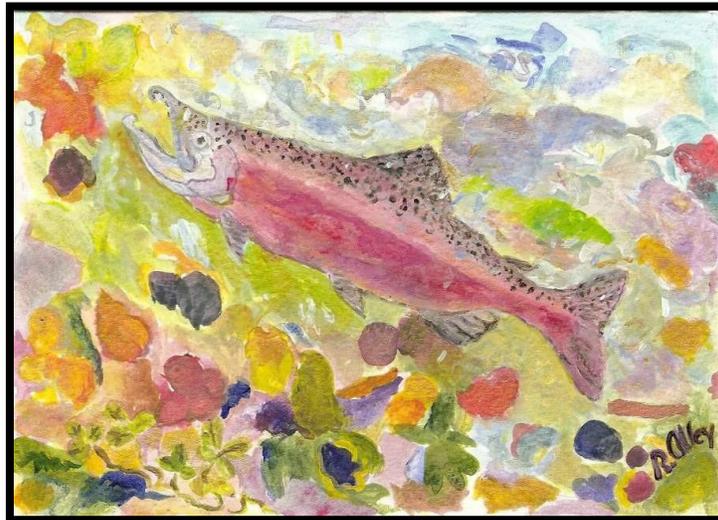


Photo Courtesy 5: A painting of coho salmon by Rosalind Alley, Santa Cruz, CA.

The precipitous decline of coho salmon in California prompted a series of State and Federal listings under the respective Endangered Species Act's in 1995 and 1996 (61 FR 56138). Despite the listings, populations continued to decline resulting in a Federal reclassification of CCC coho salmon from threatened to endangered in 2005 (70 FR 37160). There is no single factor

responsible for the decline of CCC coho salmon; however, the destruction and modification of habitat over 150 years has been identified as a primary cause.

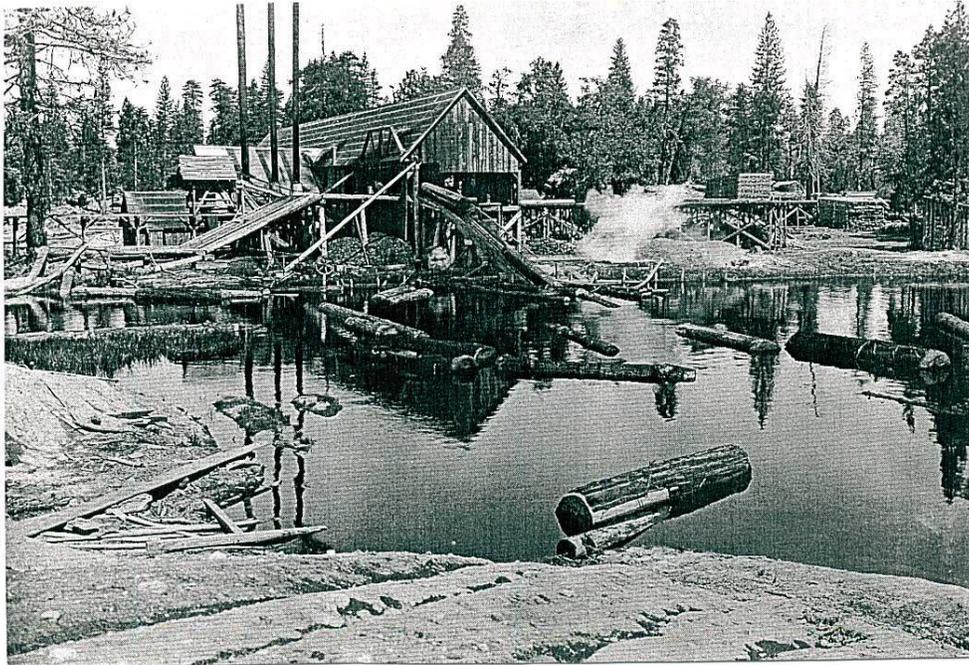


Photo Courtesy 6: Sawmill, Camp Mathers; *Friends of Camp Mathers*

"...[the] sawmill, run by a turbine wheel, having a well-constructed dam, built of hewn logs, well secured across the creek. The dam is twenty feet long and about ten feet high, built in eighteen hundred and sixty-two...no fish have ever passed. Large quantities of sawdust and blocks are deposited in the stream below the dam; fish are found dead, their eyes eaten out by the strong poisonous acids in the water, and their bodies covered beneath the skin with disgusting blisters, like the small pox, whilst the inside is as black as ink. The waters are rendered at times wholly unfit for use...unless some other method be adopted to get rid of it [sawdust], such as burning it or repairing roads with it, there will not be a breed of trout left in a few years."

Wakeman 1880, Pescadero Creek, Santa Cruz County, in Spence et al. (2011)

Now gone from most streams, their precipitous decline is intimately tied to the human story of the region and the expanding human configured landscape and harvest pressure of the last 200 years. While the fate of coho salmon depends on us, humans have also depended on salmon for hundreds of years. This chapter chronicles the progression of the human influence on California's ecosystem and the slow progression of decline of our natural resources from Spanish settlements, redwood forests clearcutting to urban interfaces threatening the quality of our water, our natural resources and the salmon that have depended on them for over a million years. CCC coho salmon are nearly extinct and some argue nothing can be done to save them; we disagree.

"It is difficult to break old concepts and to think along new lines. But when the evidence points strongly in favor of a change of thought, then it is fair and necessary to do so..."

Shapovalov and Taft 1954

"The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so we must think anew, and act anew."

Abraham Lincoln, Message to Congress, December 1, 1862

2.2 THOUSANDS AS FAR AS THE EYE COULD SEE

Within the living memories of California's elders are visions of coho salmon in staggering abundance. It was late November in the 1930's when Dan Jansen looked down from a bluff above the Garcia River in Mendocino County and observed thousands of

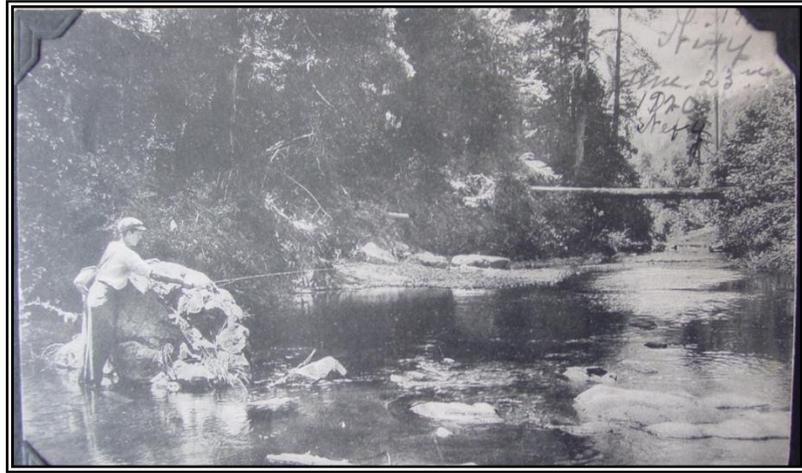


Photo Courtesy 7: Noyo River (1920); Kelley House, Sheppard Album, Post Cards

salmon as far as the eye could see; coho salmon on their ascent from the ocean to their natal freshwater stream to spawn and die (Levene *et al.* 1976). Other rivers are remembered for the size of coho salmon their runs such as the Navarro, the Noyo, the Big, the Russian and the San Lorenzo. These runs “were once a mainstay of California’s sport and commercial fisheries” (Moyle *et al.* 2008). This species, which had survived millennia of predators, droughts, fluctuating ocean conditions, and other natural hazards, was considered abundant and prolific just fifty years ago (Janssen 2008). Unfortunately, CCC coho salmon would barely persist into the 20th century. By 1991 another lifelong resident of the Garcia River, Lando Franci, reported that “the (c)oho are gone” (Monschke and Caldon 1992).

2.3 COOL, MOIST, AND COASTAL

The distribution of CCC coho salmon at the time of European settlement included most coastal streams from the Santa Cruz County portion of the Pajaro River north to Usal Creek in Mendocino County. Watersheds draining into San Francisco Bay with similar conditions (*e.g.* ample cool water and conifer forests), also supported coho salmon. The first scientific specimens of CCC coho salmon in California were collected from a San Francisco Bay stream, San Mateo Creek in San Mateo County, by Alexander Agassiz in 1860. Historical presence of

coho salmon is confirmed for Corte Madera Creek and Arroyo Corte Madera del Presidio in Marin County. Less definitive evidence suggests CCC coho salmon presence in streams further east to include the Napa River, Walnut Creek, San Leandro Creek, Coyote Creek, and the Guadalupe River. A longtime Berkeley resident reported in 1939 that Strawberry Creek, “the one which runs through the University of California Campus . . . [once] supported a run of silver salmon” (Leidy 2007). This observation is supported by archeological evidence predating Spanish settlement (Gobalet *et al.* 2004). While up to a quarter of Bay watersheds may have supported coho salmon, conditions may not have



Photo Courtesy 8: Juvenile coho salmon, *Oncorhynchus kisutch*, collected in San Mateo Creek, a tributary of San Francisco Bay, in 1860; Harvard Museum of Comparative Zoology. Specimen 68471.

been ideal. The persistence of coho salmon in the San Francisco Bay probably depended on “immigration from coastal populations” (Spence *et al.* 2005). Drier and hotter inland areas probably had intermittent runs, with coho salmon runs likely not surviving during drought conditions. A similar pattern was observed in the Russian River, with coho salmon abundant in the lower watershed, in the cool fog belt near the ocean, but likely did not persist in the middle or upper reaches of the Russian due to a drier hotter climate (Levene *et al.* 1976). In the upper Russian River, when it was wetter and cooler, “occasional migrants were likely present for short periods of time.” But in the long run it was “too warm or dry to allow coho to complete their life cycles” (Spence *et al.* 2005). A similar situation existed along the coast south of the Pajaro River, where the presence of coho to at least the Big Sur River (Monterey County) has been hypothesized, but not documented (Anderson 1995). Recently recovered archeological evidence confirmed coho salmon at least as far south as Elkhorn Slough in Monterey County (Gobalet 2008). Evidence suggests that the CCC coho population was likely concentrated near the coast where habitat conditions were ideal. At the edges and interiors of their range, coho

salmon were probably found occasionally, and likely disappeared when conditions became too warm and dry.



Photo Courtesy 9: Early logging operation, Sonoma County c. 1880. *Sonoma County Museum Collection*

2.4 “EN ESPECIAL SALMON”

Salmon, because they represented a significant seasonal food source, have always attracted humans. The settlements near these food sources are reflected in the location of many native villages, and held true when the Spanish began to arrive in California in the late 18th century.

Place names like *Pescadero* (“fishing place”) illustrate the importance of fish as a food source. At the Carmel Mission (Monterey County), “Father Serra had a lagoon created . . . and they diverted the Rio Carmelo and raised salmon/steelhead in it” (Lydon 2003). Decades later, during the founding of the last California mission, Father Altamira recorded the observation of a native guide, who told him that Sonoma Creek had plenty of fish, “*en especial salmon*” (Altamira 1823). While Spanish and Mexican settlers caught, ate and even raised salmon, it seems unlikely they had much effect on coho salmon populations. The number of settlers was small, the fish abundant, and their habitats relatively unimpaired.

2.5 A CHANGING LANDSCAPE

As the Mission era drew to a close in the 1830s, ownership of land shifted from the Catholic church to private individuals. Land grants of thousands of acres were given out. The mature forests and ample water that coho salmon require were the very resources that attracted the attention of the American settlers; a significant shift in how man would alter the natural resources began. The population of American settlers in Mexican California was slowly increasing, and so was the demand for lumber.



Photo Courtesy 10: *Kelley House Museum, Mendocino County, CA.*

From the earliest mission days, redwoods and other trees had been cut and milled by hand. Two men working a sawpit could produce about 100 board feet of lumber a day (Carranco and Labbe 1975). It could take a year or more to reduce a medium-sized redwood to boards. Several historical coho salmon streams still bear Spanish names which point to early timber harvesting in these watersheds, including Corte Madera Creek, and Arroyo Corte Madera del Presidio. A “*Corte Madera*” is a place to “cut lumber.” California’s first water-powered sawmill was built in 1834 on a coho stream—Mark West Creek, a tributary of the Russian River. It could process about 500 board feet a day (Carranco and Labbe 1975). A flood washed the mill away before the decade was out, but other mills were soon in operation. General Vallejo built a mill on Sonoma Valley’s Asbury Creek in 1839 (Dawson 1998). The Santa Cruz area developed its first mill in 1841, with another built in 1845.

By 1857, there were ten sawmills in the county and by 1864 the number had increased to twenty-eight. This exponential growth of sawmills was not driven by local need, but paralleled the exponential population growth associated with the Gold Rush and developing San Francisco (Figure 5). Santa Cruz County became “one of the major suppliers for the builders” of

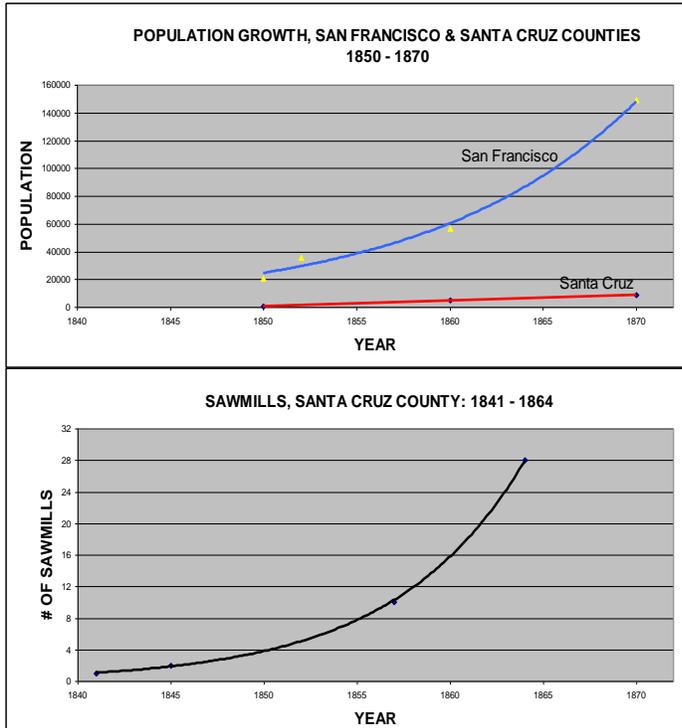


Figure 5: Growth of sawmills and human population

San Francisco (Lehmann 2000). North of the Golden Gate, mills appeared along the Sonoma coast in the 1840s, and by 1852 on Big River, in Mendocino County (Downie *et al.* 2006). Again, demand from San Francisco drove these mill operations; Mendocino County’s population was small enough that its affairs were administered by Sonoma County until 1859.

Coho salmon habitat was at the center of this logging boom. Many coho salmon streams were named after their mills or

mill owners: Mill Creek in Marin County; Mark West Creek in Sonoma County; and Waddell Creek in Santa Cruz. Usal Creek in Mendocino, is said to be named for the initials of the “United States of America Lumber” Company. Likewise, Duncan’s Mill gave its name to the small town on the Russian River where it once stood. How did this first wave of logging affect coho salmon? On Mendocino’s Big River, and elsewhere, early logging occurred adjacent to rivers and large trees were cut from the riparian zone, floated downstream to impoundment near a mill (Downie *et al.* 2006). This method resulted in dammed streams, changes in flows and channel features and increased stream temperatures from reduced riparian shade. Coho salmon were now faced with barriers to their migration from the sea, warm summer temperatures for their young and a completely altered stream system for the young to mature and outmigrate to the sea.

South of the Golden Gate, streams did not have the volume of water to carry logs, so they “had to be skidded down using oxen, or processed where they fell. The best the lumbermen could do was fell the redwoods . . . and split them on site, carrying the posts, pickets, or shakes out . . . on mules or wagons.” Coho salmon spawning beds and rearing pools were altered as “roads were laid out in stream bottoms or drainage swales, and no attempts were made to control the resulting erosion. Gullies from these early operations are still visible... Landslides and slumps were often precipitated by these logging practices... Many of today’s mapped landslide deposits probably date from this period” (County of Santa Cruz 1976).



Photo Courtesy 11: *Kelley House Museum, Mendocino County, CA.*

A variety of products were produced from forests of California’s central coast—lumber, shingles, fencing, as well as tan oak bark for tanning leather, a major industry at the time. Redwood was, “the best wood known for railroad ties . . . Sonoma and Mendocino Counties provided ties for the Central Pacific Railroad [the first trans-continental railway]. Every eastern train that crosses the Sierra rolls over the product of the forests of Sonoma . . . ties from the county synchronized to “maximize the flow.”

To avoid log jams, men cleared the stream channels in the drier months of “all obstructions and debris.” These log drives had severe consequences for coho salmon: they flushed away gravel spawning beds; deposited huge amounts of fine sediment in the estuary; destroyed rearing pools by eroding streambeds, in some cases to bedrock; and created jams which may have acted as migration barriers. This act, called “splash damming” continued into the early 1930s and more than 70 years later, the devastating effects of these log drives are still apparent. The Big River watershed was recently described as being “beat up the worst” of any river on the central coast, due to this practice (Downie *et al.* 2006). Splash dams were also used on the Garcia and Navarro Rivers and other parts of the Mendocino Coast.

2.6 “A MOVING MASS OF TURGID FILTH”

By twentieth century standards, the pace of early logging was modest. About a thousand acres a year were being harvested in Sonoma County during the 1870s (Thompson 1877), a rate that may have been nearly sustainable for both trees and salmon. However, downstream the operations of the mills themselves caused other problems. Sawmills produced tremendous quantities of sawdust. A common practice in the 19th century was to dump the waste into the same stream that powered the mill. As early as 1867, the *Santa Cruz Sentinel* reported that, “the sawmills on the Pescadero have . . . injured the fishing, from the sawdust running down the creek.” Four years later, an article in the same newspaper described how the “impact of sawmills on trout fishing was always a matter of contention in the communities along the streams flowing out of the redwood-covered canyons of the Santa Cruz Mountains.” For years it had been the practice of lumber companies to remove sawdust from the various mills by sluicing it into the running streams. This system had become universal . . . “until our pure limpid streams were discolored, and the water became, in some instances, as black as tar,—a moving mass of turgid filth” (Santa Cruz Sentinel 1871). The problem was not limited to sawmills, creeks were seen as handy disposal systems. In Santa Cruz, Bausch Beer Gardens lost business on days a nearby winery dumped pungent tailing in the creek and the [San Lorenzo] river ran red when Kron’s tannery empties a tanbark vat” (Gibson 1994).

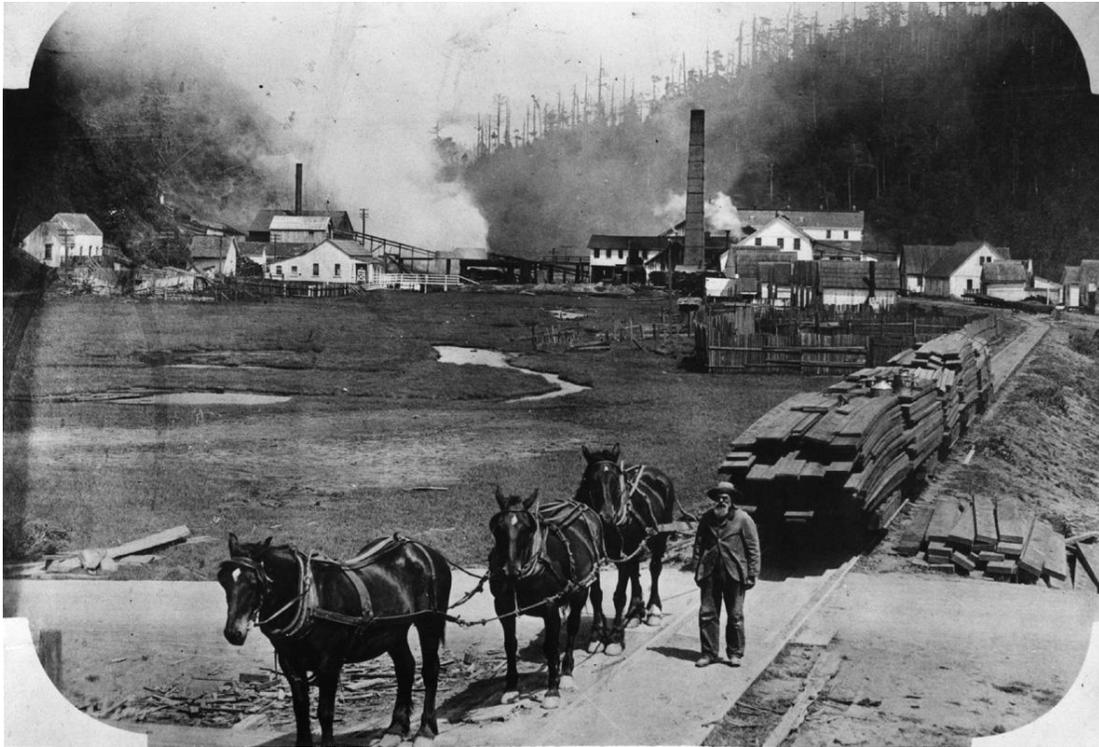


Photo Courtesy 12: Mill, Mendocino County, CA.

Some of the earliest environmental protection laws in California were passed during this era. In Santa Cruz “local laws curbed mill dumping of sawdust.” North of the Golden Gate, the Big River Mill, near the town of Mendocino, was temporarily shut down in 1889 to instigate a new sawdust disposal system required by the County Fish Commissioner (Downie *et al.* 2006), and the following year, the *Point Arena Record* reported the mill at Gualala was “constructing a large furnace . . . to burn their sawdust instead of dumping it into the river” (Mendocino Beacon 1890).

Stream and rivers were also used for other purposes besides log transport and waste disposal. In 1873, it was reported that “every dairyman along the many streams which drain the western slope of the Santa Cruz range,” was preparing to tap these creeks for irrigation and domestic use. These included waterways like San Vicente Creek (where coho salmon still persist), and most “...streams along the coast south of Waddell's creek, to the Pajaro.” Water which flowed into the ocean rather than put to human uses was considered “waste water” (Santa Cruz Sentinel 1873).

2.7 HOOKS, NETS, PITCHFORKS, AND DYNAMITE



Photo Courtesy 13: Fishing Fleet at Noyo, Mendocino County, circa 1930; *H.H Wonacott, Mendocino County Museum.*

The impacts were having a noticeable effect on salmon and trout numbers. In 1878, A.J. LaMotte, who arrived in Sonoma Valley in the early 1860s, lamented, “(s)ome years back great numbers of trout could be taken, but as fishermen increased, the fish rapidly decreased in number” (Munro-Fraser 1880). The same situation was true in at least one

tributary of the Russian River. A Russian River local newspaper in the 1870’s reported that Santa Rosa Creek, “once a splendid stream for trout” had gotten so bad that “now no one thinks of trying to fish there” (The Sonoma Democrat 1876). Besides steelhead, Santa Rosa Creek also supported coho salmon (Merritt Smith Consulting 1996).



Photo Courtesy 14: Noyo River Post Card 1930’s; *Kelley House Museum, Mendocino County, CA.*

In addition to sport fishing, coho salmon were commercially harvested in a few places during the 1860s, including Pescadero and San Gregorio Creeks in San Mateo County (Gobalet *et al.* 2004). Two decades later, over 183,000 pounds of salmon were canned near Duncan’s Mills on

the Russian River (Sonoma County) in 1888. The size of the fish, 8-20 pounds suggest many were coho salmon. Coincidentally or not, declining numbers of salmon were first noted in the Russian River that same year (Steiner Environmental Consulting 1996).

It is impossible to know exactly how much impact commercial and recreational fishing had on salmon populations in that era. The popularity of fishing is evidenced by this account: “(w)hen the railroad reached Santa Cruz in 1876, it was the river as much as the beach that drew tourists. Santa Cruz promoted itself as a ‘sportsmen’s paradise,’ with most hotels only two blocks from the river. Hotels and downtown campgrounds saw a business boom each year at the start of fishing season” (Gibson 1994). There were no limits or fishing regulations in those days. Fish were caught with hooks, nets, pitchforks, fish wheels, even dynamite. In the San Lorenzo River (Santa Cruz County), “railroad workers . . . while building the South Pacific Coast Railroad in the late 1870s, often used explosives to ‘fish.’” (Lydon 2003). Though no longer legal, the same technique was used by at least one individual in Sonoma Valley as late as the 1930s (Dawson 1998). Most historical sources lump several species under the term “salmon,” so it is difficult to estimate what impact 19th century fishing had on the coho salmon population. Hard to catch with hook and line (Janssen 2008), spawning runs would have been vulnerable to nets, pitchforks, fish wheels, and dynamite. The coho salmon life cycle makes them especially sensitive to human impacts, suggesting their population followed the general decline of California “salmon” and “trout” recorded during the mid-19th century, perhaps more steeply than other species.

Declining numbers of salmon and trout prompted action. As mentioned, the dumping of waste into streams was prohibited. The California Fish Commission was created in the 1870s, and established early fishing regulations. The state’s first fish hatchery was built on a tributary of the Sacramento in 1872.



Photo Courtesy 15: Salmon Spear, Kelley House.

Hatcheries soon proliferated, built with both public and private funding (including railroads hoping to attract tourists). While early hatcheries raised steelhead and Chinook salmon, “propagation of coho dates back to at least the 1890s” (CDFG 2002) Beginning around 1906, the San Lorenzo River was stocked with coho salmon and steelhead (Becker and Reining 2007). It was common practice in those days to plant fry (fish a few months old or less), which have a much lower rate of survival than larger, year-old smolts. Hatcheries also used eggs from watersheds as far away as Oregon and Washington, and the young fish were not genetically adapted to the waters into which they were released (Bjorkstedt *et al.* 2005). However, in general, coho salmon planting was “infrequent before 1929” (Spence *et al.* 2005) and for many reasons, planting hatchery fish probably had little to no effect on wild coho before the mid-twentieth century.

2.8 BALES OF SMOKED COHO



Photo Courtesy 16: Coho salmon. “Mouth of Garcia, Oct. 1932. This is what we caught.” *Sheppard Album, Kelley House Museum, Mendocino, California*

Initially, the center of California’s salmon industry was the Sacramento River, with its abundant runs of Chinook salmon. As that fishery declined, “commercial trollers began harvesting salmon offshore. By 1904, some 175 sail-powered fishing boats were operating out of Monterey Bay” (Lufkin 1991).

Coho salmon that had survived more than a year in freshwater and following migration out to sea, faced a new challenge. Human activity was now affecting coho salmon at every life stage. In Mendocino County, commercial fishing began near Fort Bragg, on the Noyo River in the 1890s with “a few men using dories or rowboats on the river,” who “netted or seined silver salmon in the winter”

(Stebbins 1986). Elmer Walker, who was born on the Garcia River in 1889, recalled how his father sent fish to San Francisco:

“They had what they called a card. [It] had timbers that would float, with slots in there so that the fish couldn’t get out. But they’d put them right in there and keep them alive . . . everything was shipped by boat at that time. They towed the cards. From where it was located it wasn’t too far down to the mouth of the river . . . and then they had a dip net that they dipped them out with when they got ready to ship them. They were shipped in wooden crates and nailed up and sent to San Francisco. They knocked ‘em in the head. Salmon and steelhead: there was no designation as far as marketable fish”.



Photo Courtesy 17: Sheppard Family Photo Album, Kelley House Museum Mendocino County, CA.

Roy Bishop, who also grew up on the Garcia River, remembered seeing “bales of smoked coho” that his grandfather sold. This was around 1925 (Levene *et al.* 1976). By the 1920s, California’s salmon and steelhead streams had earned worldwide acclaim, and the “economic value of the sport fishery exceeded commercial fishing by two-to-one” (Lufkin 1991). Special trains brought anglers from the San Francisco Bay Area to fish for adult coho salmon in Lagunitas Creek (Brown and Moyle 1991). By one account, “the San Lorenzo River became the number one fishing river in northern California, and remained so for half a century.” At the same time, the advent of the automobile granted fishermen ready access to once remote streams. Soon after,

the Great Depression saw a resurgence of subsistence fishing as people fell on hard times. Vernon Piver recalled:

“Times were really tough. My mother told me, to this day, she don’t have a taste for smoked salmon, because they netted fish on the Garcia River and my grandfather smoked salmon and sold them for revenue, to pick up a few nickels and dimes. One of their main staples was that smoked fish” (Russell and Levene 1991).

While diminished to some degree from their numbers a century before, CCC coho salmon continued to occupy most of their original range. To some extent the land was recovering from the 19th century logging. By 1942, the Big River basin, whose channels had been so badly “beaten up” by the use of splash dams, had “some of the finest redwood second growth in the state”(Downie *et al.* 2006). World War II may have granted coho a temporary reprieve from fishing and planting, because industry focused on building weapons to fight the war. But ultimately, the war had repercussions that reached to the heart of the coho salmon’s domain.

2.9 WAR TANKS TO BULLDOZERS: BUILDING A MOONSCAPE

In the late 1940s, “the technologies of World War II . . . spun off the highly mobile track-driven bulldozer,” which delivered the large trees of the central coast “for conversion to two-by-fours for a national building boom driven by the affluence of the returning soldiers” (House 1998). In essence, the industrial capacity used to build tanks was retooled into building bulldozers. Transient “gypsy loggers and sawmillers invaded the region with Gold Rush zeal”(Lufkin 1991). The combination of heavy equipment and the way it was used caused significant erosion and sediment delivery to streams. The equipment’s size required the use of wide skid roads. Water breaks to curb erosion were rarely installed. To brake going downhill, tractor drivers scraped the ground with their blades. The construction of logging roads on unstable ground was common practice. Even worse, a 1962 Fish and Game survey of the Garcia River (Mendocino County) noted that “numerous roads were constructed in the stream channels,” themselves, “oftentimes moving the stream out of its natural channel” (Monschke and Caldon

1992). Trees were harvested “practically to the bottom of small gullies” (Downie *et al.* 2006). Individual “layouts” were created, up to 300 feet long and 20 feet wide, to prevent falling trees from shattering on impact. By the end of 1956 it was estimated over 1000 miles of California streams had been damaged. The 1962 survey of the Garcia found more than 85 percent, of the channels had suffered some damage, and more than a third was “severely damaged” (measured by length). A person who saw it from the air in the late 1960s described the upper Garcia as “...a moonscape. Blue-line creeks were skid roads” (Monschke and Caldon 1992). Even in an average year, such conditions caused serious problems for coho: “These hills are prone to erosion in the first place, so if you build roads and take out the trees, it’s going to cause sedimentation” (Craig Bell quoted in Monschke and Caldon 1992)).

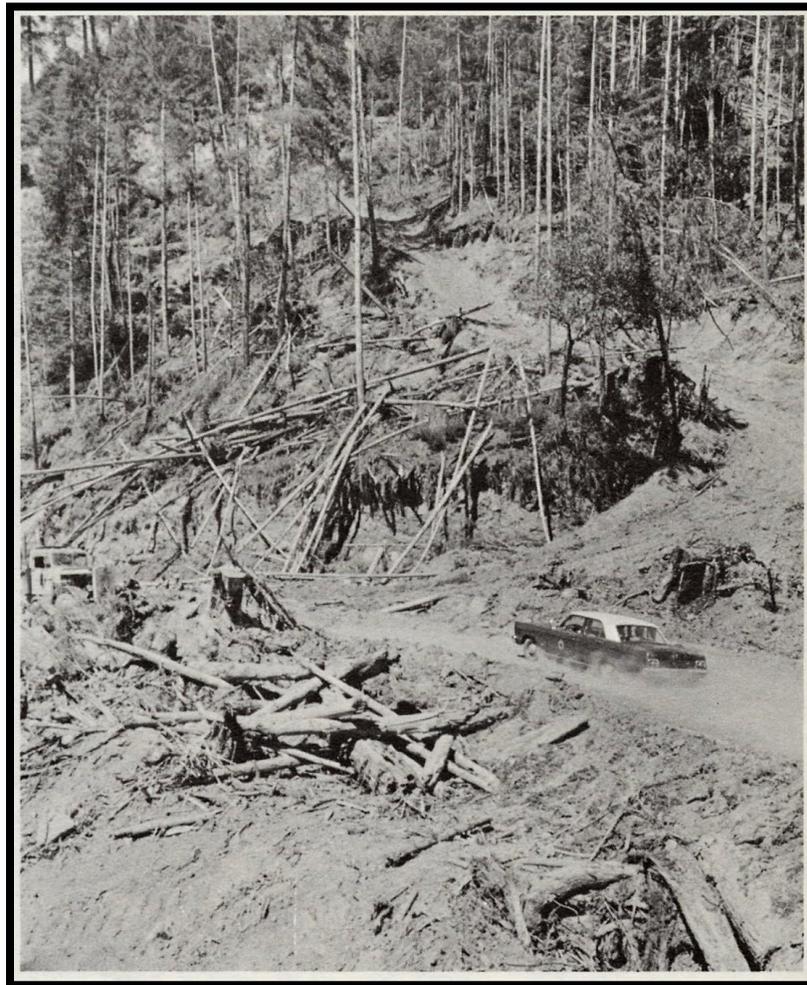


Photo Courtesy 18: Salmon Creek, Mendocino County, CA; David Wright.

The intensity of the timber harvest was summed up by a resident of the Butano/Pescadero watershed: “They built a road to every tree they cut down” (Environmental Science Associates *et al.* 2004). By the 1970s, “more than 80 percent of the virgin forests had been cut, milled, and shipped,” in most watersheds along the central coast (Lufkin 1991). In an unfortunate coincidence, two of the region’s biggest floods on record happened in 1955 and 1964. Several residents of the Butano Creek (San Mateo County) basin reported that “the cause of the first damaging flood in the watershed . . . was due to logging undertaken by the Santa Cruz Lumber Company . . . beginning in 1955.” Trout fishermen saw fishing decline rapidly: “(t)he creek silted up so bad . . . that the pool at the bottom of the ‘Falls’ was completely silted in.” A resident who flew over the area at the time reported “hundreds and possibly thousands of landslides in the upper Butano” (Environmental Science Associates *et al.* 2004). Silt from landslides clogged spawning gravel and filled rearing pools, and landslides themselves directly blocked streams, creating migration barriers for coho salmon.



Photo Courtesy 19: Hal Janssen with two coho salmon caught in the San Lorenzo River, 1964. *Alameda Creek Alliance*

Attempts at flood control were made in response to these events. On the lower San

Lorenzo River in the City of Santa Cruz, the river was leveed for flood control and “all riverside forests were stripped and the river was straightened by the Army Corps of Engineers.” These actions “transformed the river from a tree-lined and very scenic part of town, to a sterile drainage ditch. The siltation of the channel and the lack of deep water pools of water, coupled with low summer flows and a lack of shade . . . decimated fish populations.” Where before, “trout and salmon had been routinely caught in the city,” now “the river was barren of most wildlife,” and “the fish populations declined” (McMahon 1997). Today, although the San

Lorenzo River runs right through the center of the City of Santa Cruz, most building face away from the river, no restaurants over look its banks, and it is generally viewed as more of a nuisance than an attribute.

2.10 THE BABY BOOM

The postwar building boom increased the demand for other building materials besides lumber. In the early part of the twentieth century, gravel mining was conducted by hand in local streams. Elders in Sonoma Valley remember people driving small trucks down to the creek. “A number three scoop [shovel] and a strong back, that was how you did it” (Dawson 2002). Local gravel went to construct nearby buildings, bridges, and roads. The Garcia River saw its first commercial gravel operation in the 1930s (Monschke and Caldon 1992), but it was not until after the war that such operations increased to the point where they were significantly impacting rivers and streams (Dawson 2002).

Population growth drove the postwar boom. The number of people living in the Russian River basin increased 400 percent in the second half of the 20th century. More people brought a corresponding increase in the demand for water. Dams of every size were constructed on coho salmon streams throughout the region. Two large dams were built on the Russian River; Coyote Dam was completed in 1959, and Warm Springs Dam in 1982. While these dams pose a barrier to other salmonids, these migration impediments were probably not significant for coho salmon, as they likely did not spawn in the middle or upper Russian River. Downstream, however, these dams altered the dynamics of the river, reducing peak flows, reducing the magnitude of channel forming winter flows, eliminating replenishment of spawning gravel, and increasing summer flows more than 15 to 20 times above historical levels (Steiner Environmental Consulting 1996). This last effect may be the most significant. During the warm months, coho salmon rely on the cooler water at the bottom of deep pools. Higher summer flows raise the temperature of this cooler layer by mixing it with warmer surface waters.

Medium-sized dams were built in smaller coho salmon watersheds, such as Lagunitas and Nicasio Creeks in Marin County. Nevertheless, the small dams may have had the greatest cumulative effect. Five hundred small dams were counted on key CCC coho salmon tributaries of the Russian River in 1996 (Steiner Environmental Consulting 1996). Besides acting as migration barriers on the lower Russian's coho salmon streams, these dams reduce spawning gravel and summer water supply downstream.

2.11 AN AMAZING TIME TO LIVE

As the second half of the twentieth century progressed, coho salmon faced ever-increasing pressures at every stage of their life history: they were cut off from some of their prime spawning and rearing habitat in many streams, they laid their eggs in silted spawning beds, they lost cool summer refuges at the bottom of deep pools, and faced increasing commercial fishing at sea. It is really no surprise their numbers declined; however, it did not happen at once. During the 1960s and 1970s, commercial and sport fishermen were still seeing and catching coho salmon.

In places, coho salmon were still abundant. Hal Janssen, who grew up on Alameda Creek on San Francisco Bay in the 1950s, has spent a lifetime on the central coast, fishing "300 days a year . . . for thirty-five, forty years." Hal called the fifties "an amazing time to live." Speaking of coho salmon, he recalls the abundance of coho salmon in Big River, Ten Mile River and other coastal streams. "Huge schools and schools of them in California in the fifties and sixties in the San Lorenzo River and Pescadero" he has said (Janssen 2008). As fishing declined on the San Lorenzo in the early 1960s, he moved north, to the Russian and then up into Mendocino County. One September a friend called him up and said, "Come to the Garcia; you can't believe it. It's loaded with silvers (coho); they're jumping everywhere!" Sure enough, when he arrived on the Garcia River, coho salmon "were everywhere."

Of the Navarro River, he said, "(t)he tidewater used to be absolutely packed with salmon. Packed! You'd go down there in September, it was more packed than the Garcia was." Hal

witnessed first-hand the decline of coho salmon and other salmonids. For the Navarro River Hal says: “Now there’s none! They’re gone!” and attributes the decline to a number of things, including: poachers, who take advantage of the lack of game wardens in the field; the flood of 1955, and predation by marine mammals (Janssen 2008). Today Hal concentrates his fishing efforts in stillwater and lakes since the rivers no longer support a suitable experience.

2.12 COMPUTERS, ACCIDENTAL ANGLERS AND MILLIONS OF FRY

Coho salmon numbers are estimated to have plummeted statewide from as many as 500,000 in the 1940s, to as few as 13,000 by 2002 (CDFG 2002) (CCC coho would have represented a fraction of this number). Moreover, while most coho salmon in the 1940s were native to their streams, as few as 500 purely native fish remained. The gene pool of the rest has been diluted by out-of-basin plantings. A troubling development is the disappearance of coho salmon from many parts of their range, the general pattern being from south to north. In Santa Cruz County, the Pajaro River and Soquel Creek lost their native runs around 1968, followed by Aptos Creek in 1973. In 1957, the San Lorenzo River was called “the most important steelhead and salmon fishery “ south of the Bay area (Becker and Reining 2007). Just twenty-seven years later, its coho salmon run was gone. Many San Mateo County streams lost their runs in the late 1970s and early 1980s, due to the drought of 1976-1977 coupled with land and water development. By 1995, only Waddell and Scott Creeks were believed to maintain sustained natural runs of coho south of San Francisco (Anderson 1995). Today, the run in Waddell Creek is extirpated and only Scott Creek maintains all three cohorts of coho salmon. Coho salmon persistence in Scott Creek is largely due to the Conservation Hatchery operated by the Monterey Bay Salmon and Trout Project (a volunteer organization) with support from CDFG, NMFS and NOAA Southwest Fisheries Science Center.

Urbanization is a more prominent factor for the future, than logging, and likely a more significant influence on the fate of CCC coho salmon; particularly around the San Francisco Bay area. As late as 1965, runs of coho salmon were reported in Marin’s Corte Madera Creek, the declines of coho salmon around the San Francisco Bay were being documented. CDFG reported

in 1965, that coho salmon in the Napa River “had been eliminated”, had become rare in Walnut Creek, and had been last reported in the South Bay’s Guadalupe River (Santa Clara County) in the 1970s (Leidy 2007). The growth of Silicon Valley fueled a sharp rise in development in the upper watershed of San Lorenzo River in Santa Cruz County that peaked in the 1970s (County of Santa Cruz 2001).

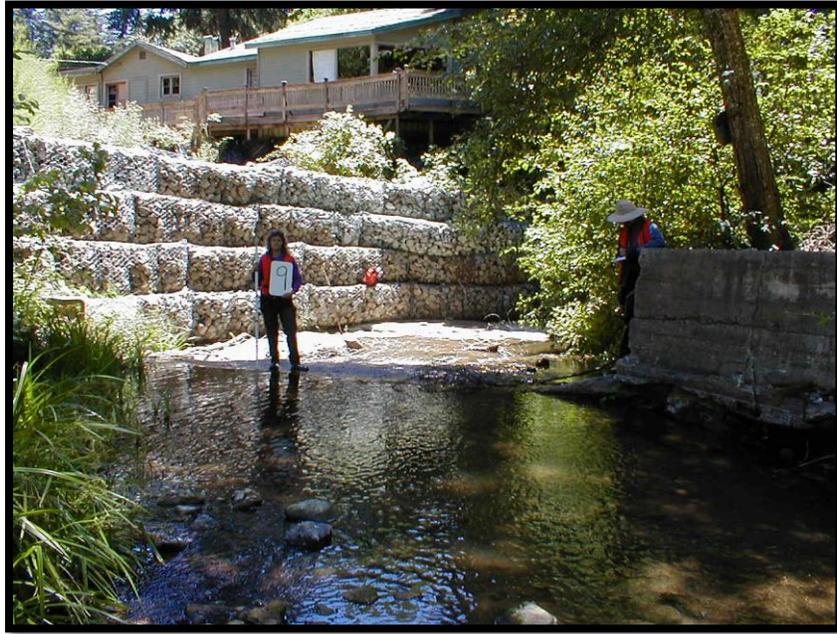


Photo Courtesy 20: Urbanization of stream channels, Santa Cruz County; Kristen Kittleson, County of Santa Cruz

“It is sobering to think that salmon could take the worst nature could throw at them for millions of years – from floods to volcanic eruptions – but that little more than a century of exposure to the side effects of Western civilization could drive them to the edge of extinction.”

David Montgomery 2003

The expanding urban footprint resulted in even more significant changes and alterations to rivers and their floodplains. Unlike logging impacts, where the impacts from past practices are healing over time and current practices are regulated according to the California Forest Practice Rules, the impact of urbanization is profound and largely permanent. Of all 78 watersheds that

historically had a coho population, many with significant amounts of urban development, have lost abundant populations of coho salmon save one, Lagunitas Creek².

In Lagunitas Creek, the 2007/2008 coho run was probably the smallest run observed since annual surveys began in 1995. There was a 70 percent decline in the number of redds (gravel “nests” where eggs are laid) compared the parent generation, which hatched three years earlier. Similar or greater declines were seen in other coastal watersheds in Marin County. This is consistent with a 73 percent decline in counts for returning CCC coho throughout their range. The decline has been attributed to reduced populations and influences of “poor ocean conditions and food supply when these coho salmon migrated to the ocean as smolts in 2006” (Ettlinger *et al.* 2008). Remarkably, as bad as the 2007/2008 spawning run was the 2008/2009 spawning run was worse, with only 40 fish returning from the ocean.

On the Russian River, the number of coho salmon smolts entering to the ocean is estimated to have declined 85 percent in just the sixteen years between 1975 and 1991. By the winter of 2007/2008, Joe Pecharich, a coho salmon researcher who worked at the Warm Springs Dam Fish Hatchery and now works for the NOAA Restoration Center, said, “...we know of only two coho that came back. The year before that we know of only two. The year before that were five.” And in the current winter of 2008/2009, the only known coho female to return was caught and, inadvertently, killed by an angler (Norberg 2009).

Along the Mendocino coast, the pattern was more varied, in some cases the opposite of that seen in the southern portion of the species coastal range. On Big River, which had seen intensive logging, only two coho were reported in 1955. Yet by 1978, its coho salmon run had rebounded and was estimated at 2000 spawning adults. Stocking of coho salmon began there in 1956, and a hatchery was built in the early 1960s (Stebbins 1986). A half million eggs and fry

² Lagunitas Creek coho are persisting due in large part the dedication and organization of local citizens and the common vision of local agencies and political bodies to implement restoration actions and policies necessary to protect CCC coho salmon.

were planted in Big River between 1956 and 1978 (Downie *et al.* 2006). As with past stocking efforts using fry, the effectiveness of the plants was probably minimal. Current run size is unknown, but juveniles have been consistently found in many tributaries, showing that some adults are still spawning on the Big River. On the Garcia River, Lando Franci recalled that “(s)almon were already starting to dwindle” by the 1940s. Craig Bell remembers seeing “(s)ilvers and Kings . . . rolling in the tidewater” in October 1979. But “by about ‘(19)85 it was history” (Monschke and Caldon 1992). The fish were gone.

As on Big River, declining numbers of coho salmon inspired vigorous hatchery and planting programs. Unfortunately there was still no effort to plant native streams with native stock. In all, over 11.5 million out-of-basin fry and fingerlings were released in central coast streams, mostly from the 1950s through the mid-1990s (Spence *et al.* 2005). Despite all the planting, commercial catch of coho salmon declined sharply in the late 1970s, believed to be the result of poor conditions in both the ocean and the freshwater habitat. By the early 1990s, ocean stocks of coho salmon were so low commercial and sport fishing were closed (CDFG 2002) and have remained closed ever since.

2.13 RAYS OF HOPE

By the winter 2006/2007, native coho were estimated to have declined more than 99 percent in less than seventy years. Most spawning populations are reduced to less than fifty fish (Moyle *et al.* 2008). California’s once abundant central coast coho salmon are now nearly extinct. Only a sustained and vigorous effort by the public, landowners, and decision-makers at every level, will bring them back. While their survival hangs in the balance, a handful of places have seen modest increases in coho salmon in recent years. On a tributary of the Garcia River where coho salmon had not been seen for at least twenty years, schools of juveniles were discovered at ten locations in 2008. One researcher believes that the sustainable forestry now being practiced there, “might be the best way left to preserve woodland ecosystems, watersheds and fish” (Fimrite 2008). Additionally, gravel mines have closed or improved their activities to be more compatible with habitat needs, such as Homer and Steve Canelis from Austin Creek

Aggregates, and extensive restoration efforts on agricultural and forested landscapes have been ongoing for 15 years and are resulting in substantial improvements in habitat quality.

Large wood is being placed into streams to promote gravel sorting and pool development for improved spawning and rearing habitats. One such project on the South Fork Ten Mile River facilitated the restoration of 9.4 miles with 245 logs and 65 rootwads placed across 138 sites. Coho salmon were observed shortly after completion in the mainstem South Fork Ten Mile for the first time in a decade with freshwater conditions improving. Similar projects are being implemented for the North Fork and Clark Fork Ten Mile; projects that are a very high priority for preventing extinction and ensuring survival of coho salmon.



Photo Courtesy 21: Ten Mile wood projects for CCC coho salmon, *David Wright, Campbell Timberlands.*

In Santa Cruz County, San Vicente Creek had apparently lost its coho run by the early 1980s. Yet, in the fall of 2002, several hundred coho were discovered in an agricultural off-channel pond on the Coast Dairies Property by NOAA's Office of Law Enforcement (Environmental Science Associates 2004). Researchers believe the cool, deep water in this pond, which is connected to the creek by an inlet and outlet channel, mimics natural "off channel" conditions preferred by coho for rearing. Recently, when water flow into this pond became disconnected, numerous agencies and concerned citizens joined together and completed a complex restoration effort in record time, solely for the purpose of saving this important southern coho salmon population. In 2010, the California Coastal Conservancy and Santa Cruz Resource Conservation District funded and permitted the construction of a high flow refugia project and in 2011, the first large wood restoration effort in more than a decade to improve juvenile rearing conditions. In 2012, scientists from NOAA's Southwest Fisheries Science Center (SWFSC) documented juvenile coho salmon rearing adjacent to the structures.

The Monterey Bay Salmon and Trout Project (MBSTP) are working with NMFS' Science Center and the California Department of Fish and Game (CDFG) to ensure the King Fisher Flat facility on Scott Creek is managed appropriately. The Sonoma County Water Agency, US Army Corp of Engineers, NMFS, CDFG and others are collaborating on Warm Springs Hatchery operation as part of the Russian River Coho Salmon Captive Broodstock Program to maximize genetic diversity and improve distribution and abundance of coho salmon. In early 2012, after years of effort, coho salmon adults were detected spawning in tributaries of the Russian River basin where they have not been detected for many years.

CDFG, NOAA Restoration Center, Trout Unlimited, The Nature Conservancy, Resource Conservation Districts, private timber companies, State Parks, State Demonstration Forests, and many others have dedicated substantial sums of money to restore passage, install woody debris, and reduce sediment inputs from problem roads in many watersheds. The Marin Municipal Water District and SPAWN, work to ensure Lagunitas Creek maintains a strong population. The National Park Service conducts extensive monitoring for Lagunitas and Olema Creeks



Photo Courtesy 22: Monterey Bay Salmon and Trout Project, CCC coho salmon. *Michelle Leicester, CDFG.*

(Marin County) and water agencies have provided funding to the recovery efforts. Significant improvements have been realized by the Giacomini Wetlands restoration. The Counties have joined together under the FishNet 4C program and meet regularly to pool resources in an effort to streamline permitting, train staff, and obtain additional grant monies for the benefit of coho salmon. Timber companies and conservation organizations have dedicated significant resources, including staff and equipment, to monitor coho salmon populations and their habitat, fix problem roads and stream crossings, and restore instream habitat.

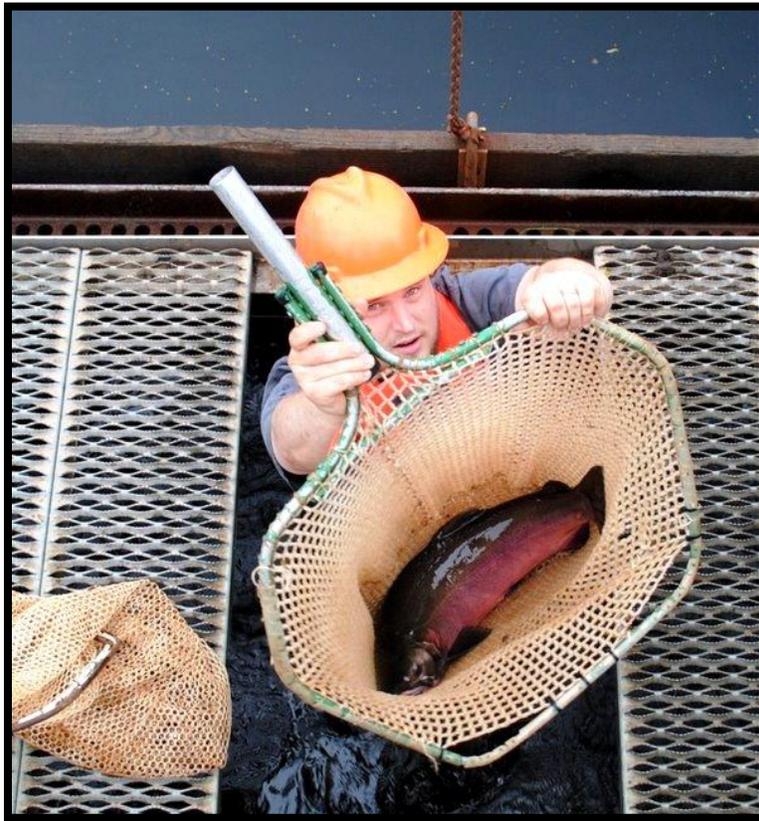
California's redwood forests are now some of the last areas where coho salmon persist. Unlike other land uses such as agriculture or urbanization, timberland management in California is regulated according to Forest Practice Rules. These Rules have standards for road construction and maintenance to reduce sediment to streams, riparian canopy retention along fish-bearing

and non-fishbearing watercourses and mechanisms for forest growth and regeneration. Watershed processes that provide for salmon spawning, rearing and sheltering are relatively intact on many forestlands. The future and fate of salmon is inextricable to the future and fate of California's redwood forests.

2.14 YES WE CAN!

The plight of salmon is inexorably tied to the story of the changing landscape. Many naturalists, fishermen and biologists across Europe, Eastern Pacific and North America have monitored salmon and chronicled their decline and extinctions. The story of the salmon crisis is nothing new and their recovery is up to us. For over a century salmon were seldom seen in England or France, that is, until recently. Actions to reduce pollution and improve stream conditions are working and small numbers of salmon have returned in recent years to rivers such as the Thames in England, and the Seine in France. When CCC coho salmon return to their natal streams in California each winter to spawn, it is reason to celebrate and act anew. These few fish represent the past, present and future and the struggling remnants of a once abundant species and a thread back in time (not so very long ago) when our creeks and rivers ran clean, cool, and flowed unimpaired from their headwaters to the sea. Some argue nothing can be done to save them; we disagree. Montgomery (2003) stated, "Success or failure will depend on whether salmon are recognized as equal stakeholders".

Fisheries biologist alone cannot shift a species trajectory from extinction to recovery; it requires a united community forming alliances and strategically implementing recovery actions to this single purpose. Salmon survival will depend on us not regarding "...*this inhabitant of the waters with something like annoyance*" (Fearing 1876), but embracing a paradigm that we can live, work and use the land and water compatibly with the needs of the larger ecological community, including fish. Salmon survival now depends on us as much as our ancestors depended on salmon for their survival nearly 25,000 years ago.



*Photo Courtesy 23: Pudding Creek Monitoring, Mendocino County, CA; CDFG and Campbell
Timberland*

The situation is daunting, but it is not hopeless. There are few large dams and many areas are not irreversibly lost to urbanization; the CCC coho salmon ESU is represented by coastal communities, redwood forests and people who are connected and care about our CCC coho salmon. To bring CCC coho salmon back from the brink we must do something uniquely human: contemplate our impact on the environment and shift our actions. Improving and sustaining the human well-being, while sustaining our natural resources (including our wild salmon), are one in the same challenge. By reading this plan and working to implement it, you are placing yourself in a position to help save a species. It is our fervent hope that with your help, we can turn the tide, and bring CCC coho salmon back from the brink. Your children and grandchildren will thank you when they can enjoy the benefits of healthy salmon populations and healthy watersheds.

Please join us! If we can do it for the California condor, the bison, the bald eagle, the whooping crane...we can do it for our CCC coho salmon. Yes we can.



Photo Courtesy 24: *Operation Migration, Whooping Cranes*

"...a procession of salmon shining in glittering panoply of silver, sweeping onwards like an invading army, swimming as cranes and wild geese fly, in a wedge; some large old salmonids at the apex of the triangle, and young males at the base..."

Olaus Magnus 1500 AD in Dickens 1888

Preventing extinctions of species is possible. The purpose of this plan is to build upon these successes and educate our children so that the spawning runs witnessed on the Garcia River in the 1930's, as well as healthy spawning runs throughout the Central Coast, will be a part of our future.



Photo courtesy 25: *Bob Coey, NMFS*