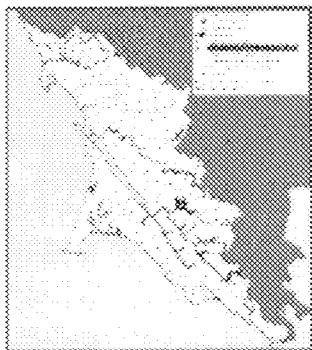




Hypothesis #1: The distribution and abundance of anadromous salmonids in the KRIS West Marin-Sonoma project area are in decline.

The distribution and abundance of salmonids have declined in California compared to historical conditions (Brown et al. 1994, Busby et al. 1996, NMFS 2001, CDFG 2002) and the West Marin-Sonoma region is no exception to the general trend. This area has experienced population decreases and some streams have lost their entire runs. Adams et al. (1999) confirmed the presence of coho salmon in only 6 out of 17 streams where they were previously known to exist, and all of the streams where coho were found were located within the Redwood Creek and Lagunitas Creek watersheds. Data on steelhead trout is sparse, but historic fishing activity describes abundant populations in contrast to the rare or absent fish in recent years. The University of California Cooperative Extension (1995) completed a report that summarizes findings on the decline of salmonids in Marin.

Trends in abundance and distribution over recent years are not clear, but continued monitoring will allow for testing this more specific and interesting hypothesis. Lagunitas Creek and its tributaries are the only streams in the region subject to monitoring of abundance. Presence and absence surveys will continue to be used to track a recovery in the distribution of coho salmon, but these surveys do not measure abundance and are limited in their inference because coho may actually reside, at least during some years, in streams where none were found. Nevertheless, inconsistent presence is an indication of low abundance. For example, Adams et al. (1999) reported coho as absent in Pine Gulch Creek, a tributary of Bolinas Lagoon but coho have been found in recent surveys during 2001 and 2002 (Brown and Ketcham 2002, Ketcham and Brown 2003). The California Department of Fish and Game memo (Cox, 2003) lists coho as absent in Nicasio Creek and present in Tannery Creek, but the opposite result was reported for those streams by Adams et al (1999).



This map shows the presence or absence of juvenile coho salmon in streams of the KRIS West Marin-Sonoma project area for the years 2000-2002. The map contains data for all the streams known to historically harbor coho salmon, according to the California Department of Fish and Game database, but there may be other historical coho streams in the area. The map shows data at the scale of entire streams, and does not show differences in coho presence/absence between different reaches in the same stream. Absence data are provisional pending more extensive study, because coho may exist in some streams but only occur in some years or may have resided in other reaches of streams not surveyed. Click on map to enlarge. [120 Kb]

R Salmon Creek currently supports a steelhead population and at least historically supported coho salmon. Bill Cox of CDFG reported that coho have not been seen in Salmon Creek since 1992 (Brouwer and Hall, 1996), and were not found during limited 1986 salmonid spawner surveys. Electrofishing during 2001 in Tannery and Fay Creeks did not find coho (CDFG 2001, 2001) but Cox (2003) does list Salmon Creek, and its tributary Tannery Creek, as currently known to support coho salmon.

According to California Department of Fish and Game (CDFG), local residents stated the Americano Creek and Stemple Creek watersheds historically supported steelhead and coho, but that the runs have been absent for many years (Madrone 1977). UCCE (1995) noted that the Stemple Creek watershed perhaps never supported a significant coho run, but a steelhead run existed as recently as the 1960's. One old-timer recalled that Stemple Creek was a "well-moving" creek, where one found steelhead as far upstream as Two Rock. Prunuske Chatham Inc. (1994) called Stemple Creek a historically marginal coho and steelhead stream, although a small dam built for livestock in the early 1960's closed off the last available spawning areas. Merritt Smith Consulting (1996) found two steelhead adults in the Estero Americano, the estuary of Americano Creek, during 1989-1990 surveys, but it was assumed that these fish were strays from other watersheds because of the absence of salmonid spawning habitat in the watershed. Cox (2003), of CDFG, lists Americano Creek, but not Stemple Creek, as currently supporting steelhead trout. Neither streams are listed as historically supporting coho.

The Walker Creek watershed, which had good historical coho salmon and steelhead trout runs, has experienced substantial declines as noted by many sources (Kelley, 1976, Emig, 1984, Rich, 1989). These reports refer to the records of California Department of Fish and Game Warden Lt. Al Giddings, who documented higher steelhead angling in the mid-1950's than through the 1960's and 70's, and practically no coho angling. Emig (1984) noted that steelhead abundance increased in this watershed compared with populations sampled prior to flow releases from the Soulajule Reservoir. However, the success of the flow augmentation program in restoring salmonid populations has been questioned (Rich 1989, UCCE 1995).

The State Water Resources Control Board (1995) noted that the historical annual coho salmon escapement from the Lagunitas Creek watershed was 3,000-5,000 fish, compared with fewer than 400 returning spawners in recent years. Al Giddings (1992), formerly with the California Department of Fish and Game, estimated coho and steelhead runs in the 1930's and 1940's numbered 3000 adults in good years. He describes a noticeable decline in coho and steelhead runs after the initial construction of Peters Dam (1954) and Nicasio Dam (1961). Cox (2003) believes that there are presently no coho salmon using Nicasio Creek and describes records documenting coho salmon just after construction of the dam.

Recent data from Lagunitas Creek suggest that populations may no longer be in decline there. MMWD (Ettlinger et al., 2001) noted that overall the juvenile steelhead population throughout the drainage appeared to be increasing while the juvenile coho population was variable. In addition, Bill Cox of the California Department of Fish and Game stated in 1995 that he has observed increases in adult coho salmon from early 1980's compared with the last few years (UCCE 1995). Chinook and chum salmon have also been recently found in the watershed (Ettlinger and Andrew 2001). Currently the Marin Municipal Water District, the Salmon Protection and Watershed Network, and the National Park Service conduct annual juvenile and spawner salmonid surveys to attempt to determine future trends in salmonid populations.

The Redwood Creek watershed supports both coho and steelhead populations, but both have decreased from historic numbers (Kimball and Kondolf 2002, Fong and Shook 1997, Snider 1984, Hofstra and Anderson 1989, Arnold 1971). Historically hundreds of coho returned to spawn in this creek, but now the run has greatly declined (NPS, n.d.). Wild southern coho live to and spawn at 3 years old and therefore populations are considered to have 3 year classes. While coho numbers are less than historic populations, two juvenile coho year classes are considered to be doing relatively well. However, one year class (2000) is considered extremely weak and at a risk of being lost (Smith 2001). Redwood Creek is believed to have never been stocked and therefore this coho population is considered especially important as a remnant native population (Fong and Shook, 1997). In addition, this population may be one of the most southerly runs of coastal coho in California (GOGA, 2002). Steelhead fluctuate

substantially in this creek, however the population is considered healthy and at low long-term risk of decline (Smith 1996).

All Bolinas Lagoon tributaries have steelhead trout populations (Tetra Tech 2002). Fong (2002) and Szychowski (1999) confirmed the presence of steelhead in east-side tributaries. Fong noted that local residents indicated steelhead adults were much more abundant in these creeks as recently as 1970's. Historically, coho also spawned in Easkoot and Pine Gulch Creeks (Tetra Tech 2002). Coho were thought to be extirpated from Pine Gulch Creek during the mid-1970's, until they were found during 2001 and 2002 surveys (Brown and Ketcham 2002, Ketcham and Brown 2003). There have been no current findings of coho in Easkoot Creek. Muddy Hollow Creek, a tributary to Drakes Bay, has confirmed trout populations from 1997 surveys (NPS 2001). NPS believes that it is likely that part of this population is anadromous, or ocean-going.

KRIS Topics

The following Topics in KRIS West-Marin Sonoma provide data relevant to the hypothesis. The two-letter abbreviations refer to the sub-basin where the topic is located. From each topic, the Info Links tab provides access to background information and relevant documents.

(BW) Fish: Presence/Absence of Coho in W. Marin-Sonoma 1988-1999

(BW) Fish: Presence/Absence of Coho in W. Marin-Sonoma 2000-2002

(WC) Fish: 1949-1974 Angler Adult Steelhead Catch, Walker Creek Total

(WC) Fish: 2001 Electrofishing for Coho Salmon Walker Creek

(LC) Fish: Spawner Survey, Adult Live Coho Basinwide 1997-2001

(LC) Fish: 1961-1971 Nicasio Creek, Adult Salmonid Catch, CDFG Trap

(LC) Fish: Abundance (Fish/30m) Juvenile Steelhead Basinwide 1970-2000

(LC) Fish: Abundance (Fish/30m) Juvenile Coho Basinwide 1970-2000

(RC) Fish: Redwood Creek Juvenile Salmonid Abundance (Fish/100ft) 1992-01

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California Department of Fish and Game (CDFG). 1998. Walker Creek, Marin County, water temperatures - summer 1998. Unpublished CDFG file memo by W. Cox. Yountville, CA. 1 p. [35kb]

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