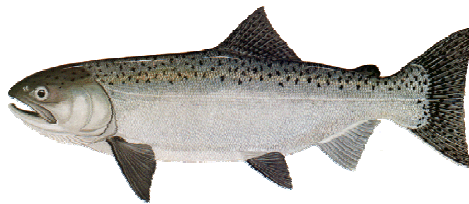


**STATUS OF CENTRAL VALLEY CHINOOK SALMON POPULATIONS
2010 ANNUAL SPAWNING ESCAPEMENT UPDATE**



**DEPARTMENT OF FISH AND GAME
FISHERIES BRANCH**

REPORT TO
State Water Resources Control Board
Division of Water Rights

June 2011

Introduction

Chinook salmon are a valued part of California's cultural and natural heritage. Commercial and recreational fishing for salmon contributes significantly to the state's economy. Four distinct Chinook salmon runs are recognized in California's Central Valley, differentiated by the timing of the adult spawning migration (fall, late fall, winter, and spring-run Chinook salmon).

Historically, Chinook salmon runs were abundant in the waters of the Sacramento and San Joaquin Rivers. Narratives from the late 1880's describe these rivers as "teeming with salmon" (Yoshiyama et al, 1998). Based on data from early commercial catch records, conservative estimates are that Chinook salmon stocks reached between one to two million spawners annually. Today, the winter and spring runs are a small fraction of their historic levels. Sacramento River winter-run Chinook salmon is now state and federally-listed as endangered, and Central Valley spring-run Chinook salmon is state and federally-listed as threatened. Significant regional efforts, including the CALFED Bay-Delta Program and the federal Central Valley Project Improvement Act (CVPIA), have devoted considerable resources to the recovery of these runs.

The following is a summary of the 2010 spawning escapement estimates for each run of Central Valley Chinook salmon. Spawning escapement is defined as fish migrating from the ocean to spawn in the Central Valley (including stream and hatchery returns). Methods of estimating instream spawning escapement vary between streams, and include video monitoring, infrared imaging, mark-recapture carcass surveys, redd surveys, and snorkel surveys. Escapement estimates in this report for 2010 should be considered preliminary and subject to change.

Sacramento River Winter-run Chinook Salmon

The Sacramento River winter-run Chinook salmon was state-listed as endangered in 1989 and federally-listed as endangered in 1994. Draft recovery goals (defined in NOAA Fisheries 1997) include a mean annual spawning abundance of 10,000 females over any 13 consecutive years. In 2007, the NOAA Central Valley Technical Recovery Team concluded that the existing winter-run population may be at low risk of extinction, but the population represents a small portion of the historical Evolutionarily Significant Unit (ESU) and is vulnerable to catastrophic disturbance. The winter-run ESU consists of a single remaining population, spawning outside of its historic spawning range.

As in previous years, a mark-recapture carcass survey was conducted from May through early September 2010 to estimate spawning escapement in the mainstem Sacramento River. Winter-run broodstock for Livingston Stone National Fish Hatchery were also collected at a trapping station at Keswick Dam.

From the 1970's through the early 1990's, the winter-run population experienced a significant decline (Figure 1). The spawning escapement in 1994 was estimated at fewer than 200 fish. From the early 1990's through 2006, the population showed some recovery. In 2006, a total of 17,153 winter-run returned to the Sacramento River, the highest return estimated since 1981. However, beginning in 2007, estimated returns have been relatively low. In 2010, the estimated total return was only 1,596 (including 63 fish transferred to Livingston Stone National Fish Hatchery), the lowest since 2000.

As freshwater habitat conditions for winter-run Chinook in the Sacramento River have remained relatively constant in the past several years, the lower returns of winter-run Chinook in 2007 through 2010 appear to be due primarily to poor conditions for survival experienced by those year classes in the ocean environment.

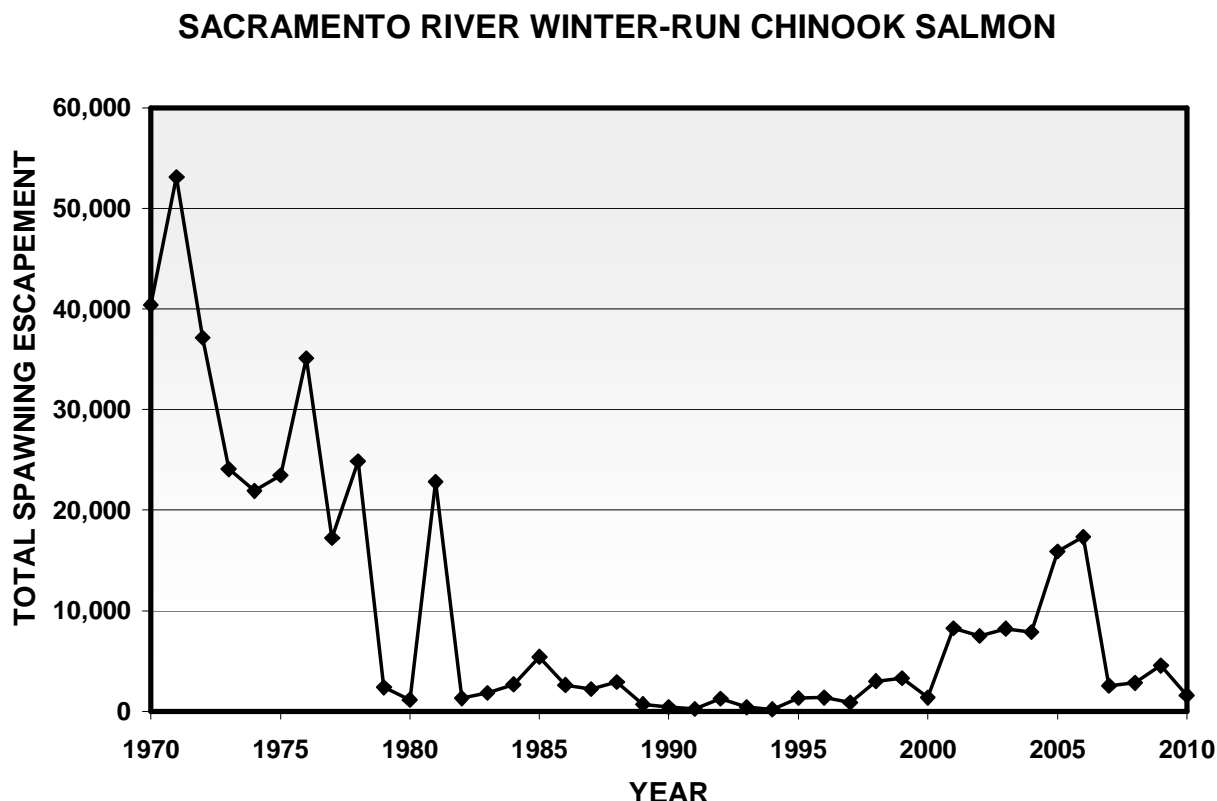


Figure 1. Spawning escapement of Sacramento River winter-run Chinook salmon, 1970 - 2010.

Central Valley Spring-run Chinook Salmon

Central Valley spring-run Chinook salmon were state and federally-listed as threatened in 1999. Mill, Deer, and Butte Creeks, tributaries of the Sacramento River in the northern Sacramento Valley, are the only streams currently supporting significant populations of non-hybridized spring-run. In 2007, the NOAA Technical Recovery Team found that these populations may be at low to moderate risk of extinction, but the existing populations represent a small portion of the historic Evolutionarily Significant Unit and are vulnerable to catastrophic disturbance due to their close proximity (Lindley 2007).

As in past years, adult spring-run Chinook returning to Central Valley streams were monitored by a variety of methods in 2010. A snorkel survey and mark-recapture carcass survey were conducted in Butte Creek. The escapement estimate was based

on the snorkel survey. A snorkel survey was conducted on Deer Creek, and a redd survey was conducted on Mill Creek.

In 2010, spawning returns to Butte, Deer, and Mill creeks were estimated at 1,160, 262, and 482 fish, respectively. Total spring-run returns to these streams were 1,904 fish (Figure 2). These estimated returns were the lowest since 1997 on all three streams, and continued the declining trend observed since 2005. The low returns are of significant concern.

Similar to the other Chinook runs, freshwater habitat conditions in recent years have not been unusually poor for spring-run Chinook spawning and rearing in these streams. The very low returns of spring-run Chinook in 2010 appear to be due primarily to continued poor conditions for survival experienced by these year classes in the ocean environment.

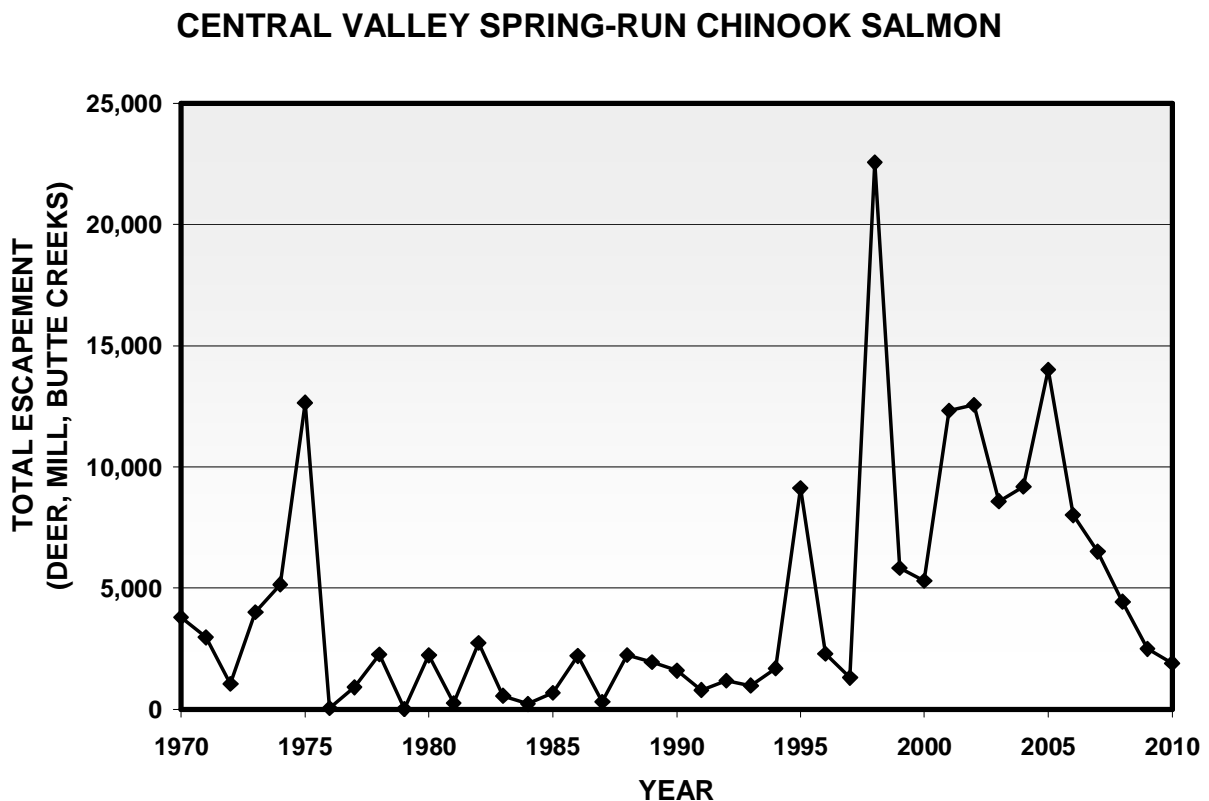


Figure 2. Spawning escapement of spring-run Chinook salmon in Deer, Mill, and Butte Creeks, 1970 – 2010.

Central Valley Fall-run Chinook Salmon

Fall-run Chinook salmon are currently the dominant run in the Central Valley. In most years, the run contributes to significant ocean and inland fisheries. Fall-run Chinook in the Sacramento River system are a key indicator stock in management of the ocean fishery off the California and much of the Oregon coasts. The run is supported to a large extent by hatchery production; in a typical year, the five hatcheries in the Central Valley release over 32 million fall-run juveniles each year.

Spawning returns of fall-run Chinook salmon in the Central Valley have fluctuated widely over the past 30 years. Record high returns were estimated from 2000 – 2003. Chinook salmon returns were high throughout much of the West Coast during these years; it is therefore probable that these high returns were the result of good conditions for ocean survival. Since 2003, returns have declined significantly.

As in recent years, spawning escapement in 2010 was estimated primarily using hatchery counts and mark-recapture carcass surveys in the major spawning streams. Spawning returns in 2010 were slightly higher than in the previous three years, but escapement remained relatively low compared to the long-term record (Figure 3). Conservation goals for Sacramento River fall-run Chinook for ocean harvest management were barely met (a spawner escapement goal of 122,000 to 180,000 hatchery and natural adults combined in the Sacramento River system). Spawning escapement in 2010 in the Sacramento River system was estimated at 152,831 fish (including returns of adults and grilse, 2-year-old fish, to hatchery and natural areas). In the San Joaquin River system, spawning escapement was estimated at 10,350 fish in 2010. Total estimated Central Valley fall-run returns were 163,181.

In 2008 and 2009, the ocean salmon fishery was severely constrained off the California coast and much of Oregon, primarily due to predictions of poor spawning returns of Sacramento River fall-run Chinook. In 2010, regulations allowed restricted commercial and recreational ocean fisheries and a limited freshwater sport fishery in the Sacramento River Basin. In 2011, regulations are allowing less restricted ocean and inland fisheries, based on the forecast of improved spawning returns of Sacramento River fall-run Chinook in 2011.

As inland conditions and hatchery production levels in the Central Valley have remained relatively constant in the past several years, the relatively low returns of fall-run Chinook in recent years appear to be due primarily to poor survival conditions for these Chinook salmon year classes in the ocean environment (NOAA Fisheries 2009).

CENTRAL VALLEY FALL-RUN CHINOOK SALMON

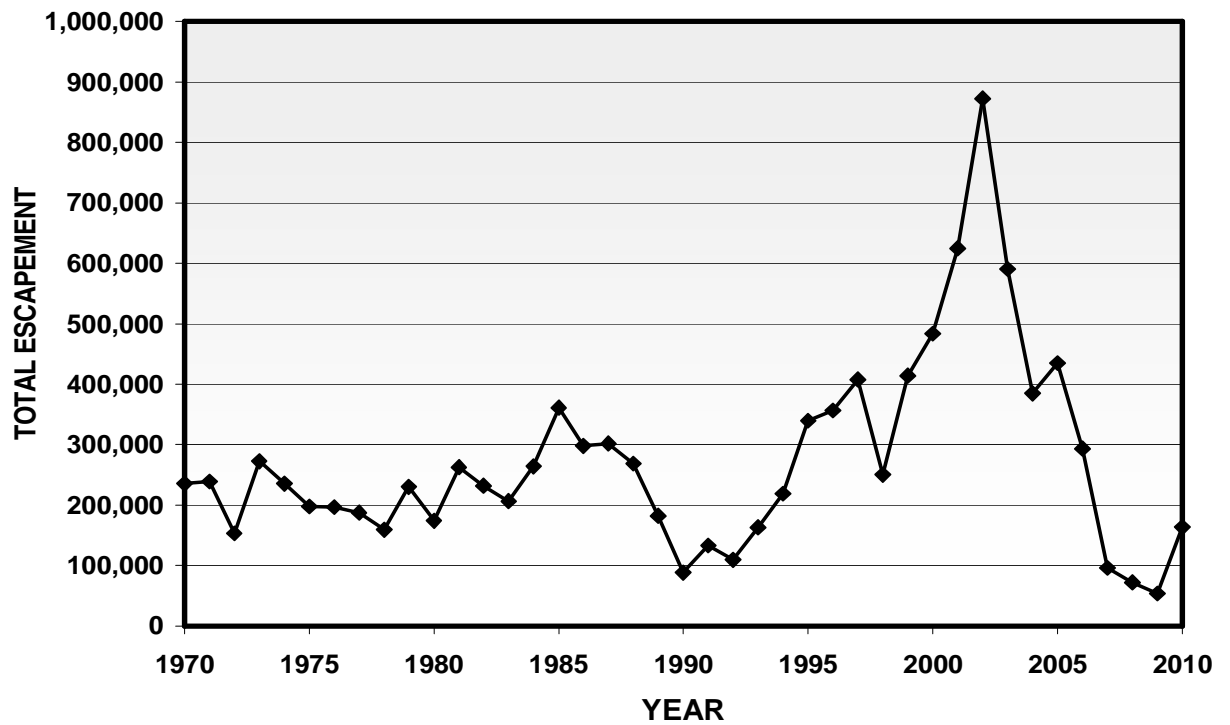


Figure 3. Spawning escapement of fall-run Chinook salmon in the Central Valley, 1970 – 2010.

References

Lindley, S.T. 2007. Framework for Assessing Viability of Threatened and Endangered Chinook Salmon and Steelhead in the Sacramento-San Joaquin Basin. San Francisco Estuary and Watershed Science. Vol. 5, Issue 1.

National Marine Fisheries Service. 1997. NMFS Proposed recovery plan for the Sacramento River winter-run Chinook salmon. NMFS Southwest Region, Long Beach.

NOAA Fisheries. 2009. What caused the Sacramento River fall Chinook stock collapse? Workgroup report to the Pacific Fishery Management Council. Agenda Item H.2.b. April 2009.

Yoshiyama, R.M., Fisher, F.W., & Moyle, P.B. 1998. Historical abundance and decline of Chinook salmon in the Central Valley region of California. N. Am. J. of Fisheries Managmt. 18: 487-521.

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