## Chinook Salmon Catch and Escapement

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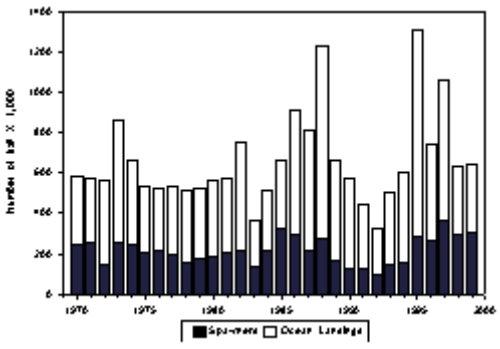
The following information was taken from the February 2000 report Review of the 1999 Ocean Salmon Fisheries by the Pacific Fishery Management Council (PFMC). Copies of the report can be obtained by calling (503) 326-6352.

As in the past few years, in 1998 the PFMC took actions to reduce the ocean harvest of winter-run chinook salmon and Klamath River fall-run chinook salmon. These actions had the ancillary effect of reducing landings of non-target runs and increasing escapement to the spawning grounds of fall and late fall runs.

**Figure One--Central Valley Chinook Salmon Annual Abundance Index**

The index consists of estimated ocean harvest plus total Central Valley escapement. The index does not include inland harvest, which may be up to 25% of the salmon leaving the ocean. The 1999 abundance index of 644 was near the 1970-1998 average of 665.

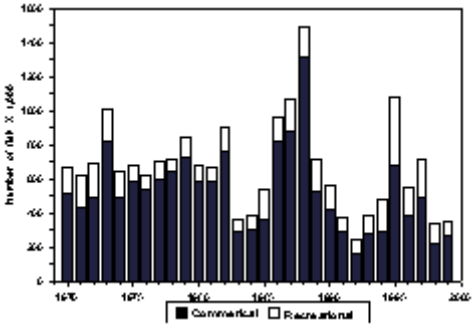
The ocean recreational effort was estimated to be about 148,000 angler trips compared to a 1982-1997 average of 205,000 trips. Commercial fishermen fished an estimated 14,000 days in 1999 compared to an average of 41,000 days from 1982 through 1997.



1. Central Valley chinook salmon annual abundance index, 1970-1999

**Figure Two--Ocean Commercial and Recreational Catch**

In 1998, commercial fishermen landed about 75% of the total number of chinook caught in the ocean, which is slightly higher than the 1970-1997 average of 71%. Ocean conditions and new regulations may have reduced recreational harvest.

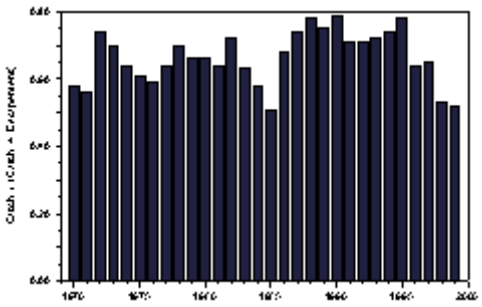


1. **Annual California commercial and recreational chinook ocean catch**

The estimated 1999 ocean harvest index of 52% is the second lowest during the period of record and is significantly lower than the indices in from about 74% to 79% seen from about 1985 through 1995.

**Figure Three--Ocean Harvest Index**

The ocean harvest index consists of the estimated ocean harvest divided by the sum of the ocean harvest and total Central Valley escapement. It does not include inland harvest.



**1. Central Valley chinook salmon Ocean Harvest Index, 1970-1999**

As mentioned earlier, the lower ocean harvest is likely due to harvest regulations to protect winter-run chinook and Klamath fall-run chinook. Some economic factors may be coming into play as pen-reared Atlantic salmon make up a larger portion of the fresh salmon market.

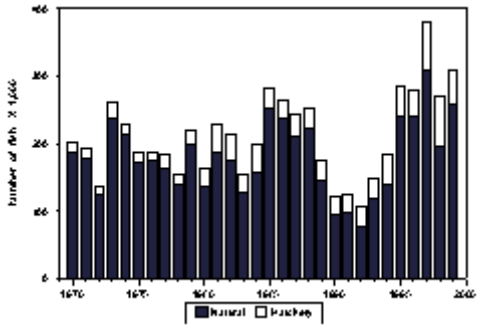
**Figures Four and Five--Sacramento Valley Escapement**

The 1999 natural and hatchery chinook runs to Sacramento River mainstem and tributary streams and hatcheries were among the strongest seen since 1970.

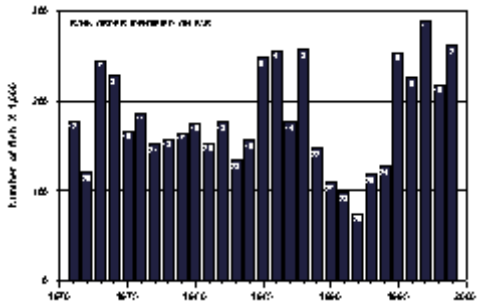
The good escapement was at least in part due to the reduction in ocean catch. Most of the escapement was to the Feather and American rivers and Battle Creek--streams that have major fall-run hatcheries. The 1999 total escapement of over 300,000 spawners exceeded the PFMC's spawning escapement goal of between 122,000 and 180,000 adults. This estimate includes hatchery and naturally spawning fish.

The strength of the 1999 escapement is further demonstrated in Figure 5, which indicates that the natural escapement was the second highest for the period of record. Natural escapement includes adult salmon that were of direct hatchery origin but spawned in the streams instead of entering the hatchery.

Escapement (spawning ground) counts are essential indicators of the impacts of salmon management and effects of natural habitat variation. The counts generally have wide error bars. The IEP's Central Valley Salmonid Team is convening a June 2000 escapement workshop to evaluate existing estimating techniques and recommend improvements.

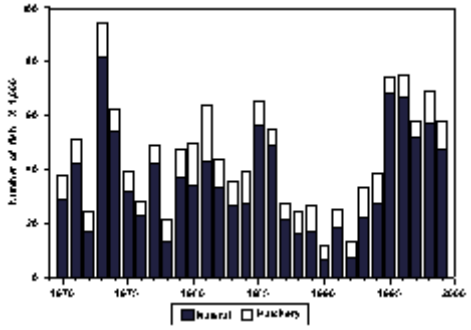


**1. Annual fall-run escapement to Sacramento River and major tributaries, natural and hatchery contribution**



1. **Annual natural fall-run cohort escapement to Sacramento River and major tributaries**

**Figure Six--American River Escapement**



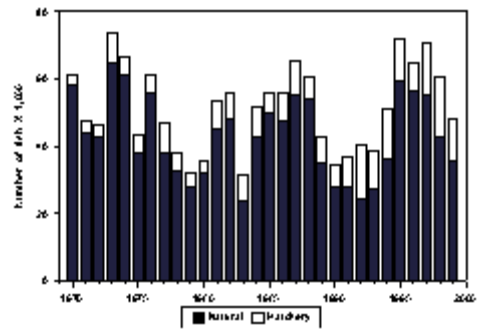
1. **Annual fall-run escapement to American River, natural and hatchery contribution**

The 1999 escapement to the American River was the fifth strong year in a row and the fourth highest year in the 1970-1998 period of record. Note that all production from the Nimbus Hatchery is trucked to near Carquinez Strait for release as smolts.

**Figure Seven--Feather River Escapement**

The 1999 escapement to the Feather River was good, but not exceptional. Similar to the American River's Nimbus Hatchery, the entire production from the Feather River Hatchery is trucked to near Carquinez Strait for release.

DWR continues to tag more than one million Feather River Hatchery spring-run and fall-run juveniles each year to help determine the hatchery's contribution to catch, spawning, and straying. This spring DWR has a target of tagging 200,000 naturally spawned juveniles as they emigrate the reaches below the fish barrier dam and it appears the target will be reached.



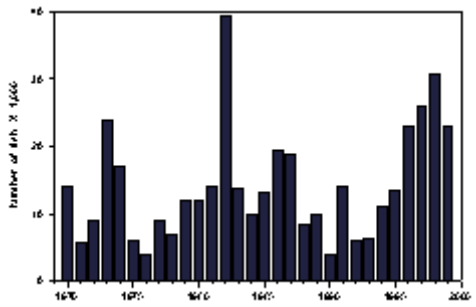
1. **Annual fall-run escapement to Feather River, natural and hatchery contribution**

Feather River escapement to the Feather River Hatchery includes what are now called spring-run chinook. Through the use of a new set of microsatellite markers, UC Davis geneticists will soon be able to determine if there is a genotypic spring run to the hatchery. Use of existing markers, which work best for winter run, indicates that hatchery fall and spring "runs" are genetically identical.

**Figure Eight--Fall-run Chinook Salmon Escapement to the Yuba River**

Earlier data have indicated that Yuba River fall-run chinook are a naturally spawning run with little input from Feather River Hatchery strays. The tagging program now underway on the Feather River and the recovery of tagged salmon on the spawning grounds will be used to help determine the source of fall-run chinook spawning in the Yuba River. Whatever the source of the fish, the 1999 escapement was again quite good.

State Water Resource Board hearings and potential restoration and other measures in the Yuba River watershed have increased the need for more information on Yuba River salmon and steelhead runs. Studies to be conducted over the next several years will lead to increased understanding of these runs.

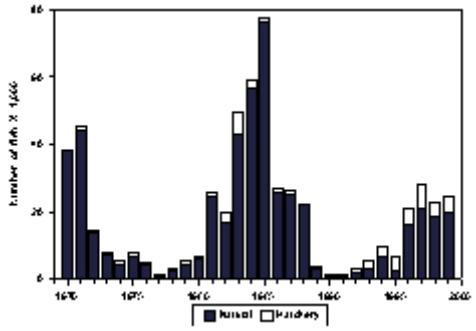


1. **Annual natural fall-run escapement to Yuba River**

**Figure Nine--Escapement to the San Joaquin System**

Although 1999 was the fourth consecutive year with reasonably good escapement to San Joaquin tributaries, it was not as good as might be expected based on flow: escapement data from past records (Figure 9). The relatively low numbers of returning adults are in spite of the lower ocean harvest.

Preliminary genetic information indicates that San Joaquin fall run cannot be distinguished from other Central Valley fall runs. DFG received a CALFED grant to further investigate the genetics of San Joaquin stocks spawning in the main tributaries. Dr. Bernie May of UC Davis will do the work.

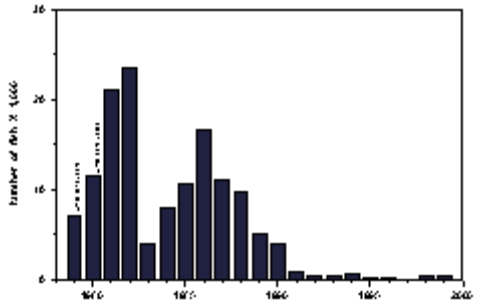


1. **Annual fall-run escapement to the San Joaquin River system, natural and hatchery contribution**

**Figures Ten and Eleven--Spring-run Chinook Salmon Escapement**

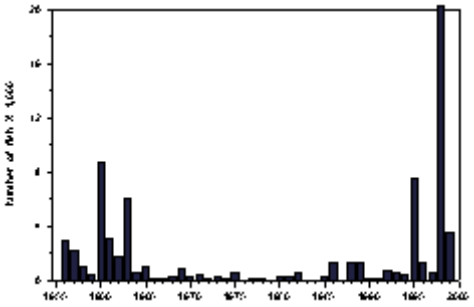
In 1998, the California Fish and Game Commission listed spring-run chinook as threatened. NMFS listed spring run as threatened in 1999.

Figure 10 includes those spring run estimated to have spawned in the mainstem Sacramento River. The trend of low, in-river spawning, which began in 1991, continues.



1. **Annual spring-run escapement to upper Sacramento River**

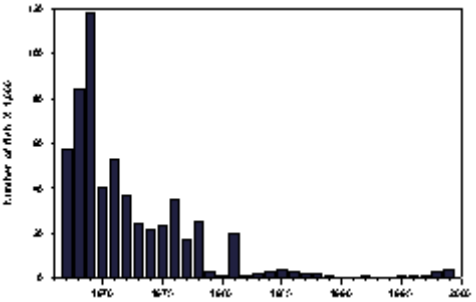
As shown in Figure 11, the 1999 spring run escapement to Butte Creek was relatively good at about 4,000 fish, the fifth best on record. Perhaps more importantly, there were about twice as many adults in 1999 than in the 1996 parent run that produced them. Although not shown, 1999 spring-run escapement to the other tributaries (mainly Deer and Mill creeks) totaled about 2,000 adults.



1. **Annual spring-run escapement to Butte Creek**

**Figure Twelve--Winter-run Chinook Salmon Escapement**

The 1999 spawning estimate was more than 3,200--the highest escapement in the past decade.



1. **Annual winter-run escapement to upper Sacramento River**

The cohort replacement rate for the 1999 escapement was 1.45, below the goal of 1.77, but slightly above the 1998 replacement rate of 1.38. (The cohort replacement rate is the number of spawners in a given year divided by the number of spawners that produced the run.)

The Pacific Fisheries Management Council conducted two ocean test fisheries in 1999 to determine the catch of winter-run chinook. One fishery did not attract enough boats. In the second fishery (between Pillar and Pigeon points), of the 617 tissue samples collected for genetic analysis, 31% were estimated to be Feather River spring chinook and less than 1% to be winter chinook.