



## Species of Concern

NOAA National Marine Fisheries Service

## Chinook salmon

*Oncorhynchus tshawytscha*  
Central Valley Fall, Late-fall run ESU



Photo credit:  
US Geologic Survey.

### KEY INFORMATION

#### Areas of Concern

Sacramento and San Joaquin rivers, California.

Year Identified as “Species of Concern”  
1999

#### Factors for Decline

- Dams and other impediments
- Water development projects
- Introduced species
- Hatchery fish interactions
- Pollution
- Habitat loss

#### Conservation Designations

IUCN: Not Evaluated

Species of Special Concern: CA

### Current Status:

#### *Demographic and Genetic Diversity Concerns:*

This **Evolutionarily Significant Unit** (ESU) includes all naturally spawned fall-run Chinook salmon in the San Joaquin and Sacramento Basins, east of Carquinez Strait, California. Natural spawning abundance was high up to 1999, the most recent status review (avg 190,000 natural spawners for the Sacramento River). The number of mainstem fall-run spawners continues to decline in the upper Sacramento, as indicated by counts at Red Bluff Dam. The dam counts represent the total number fish returning, including hatchery fish. Available evidence suggests that at least 20 to 40% of natural spawners are of hatchery origin. The other Sacramento River streams showing continued declines are Deer and Mill Creeks. All other streams for which there are abundance data show increases in abundance from 1988 to 1998. As discussed by Myers et al. (1998), many streams with high abundance in this ESU are influenced by hatchery programs (especially the Feather and American Rivers and Battle Creek), so their contribution to the overall persistence of the wild portion of the ESU is not clear. The late-fall portion of the Sacramento River run

continues to have low, but perhaps stable numbers. Populations of fall-run Chinook salmon in the San Joaquin River exhibited synchronous booms and busts and appeared to be increasing as of 1998. The influence of hatchery fish on natural production in the San Joaquin Basin is unclear. The uncertainty about the effects of hatchery operations was a major factor in the inability of the review team to determine the status of this ESU.



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### Existing Protections and Conservation Actions:

ESA listing was found to be not warranted in 1999 but the ESU was made a **Candidate species** due to specific risk factors; it was transferred to the new Species of Concern list in 2004. Under CALFED and the Anadromous Fish Restoration Program, conservation actions are improving habitat for fish in the Central Valley, including this ESU (see further info links). Ocean salmon fisheries targeting this ESU are curtailed to protect ESA-listed winter-run Chinook and to conserve Klamath River Chinook.

### Brief Species Description:

Chinook salmon are the largest salmon, with adults often exceeding 40 pounds (18 kg); individuals over 120 pounds (54 kg) have been reported. Chinook salmon appear similar to coho salmon while at sea (blue-green back with silver flanks), except for their large size, small black spots on the tail, and black along the base of the teeth. Adults migrate from the ocean into the freshwater streams and rivers of their birth to mate (called **anadromy**). They spawn once and then die (called semelparity). Chinook feed on terrestrial and aquatic insects and other crustaceans while young, and mostly on other fishes when older. Their populations exhibit considerable variation in size and age of maturation and migration timing, and at least some of this variation is genetic.

In the Central Valley, juvenile fall-run Chinook spend 3 to 6 months rearing in freshwater, while late-fall run Chinook spend about 1 year, before migrating to the sea in the spring. As the time for migration to the sea approaches, juveniles lose their parr marks, the vertical bars and spots useful for camouflage, and gain the dark back and light belly colors of open water fish. They seek deeper water, avoid light, and their gills and kidneys begin to change so that they can process salt water. They then spend 1 to 4 summers at sea, with San Joaquin River fall-run Chinook spending the least, and late-fall-run Chinook spending the most time at sea, on average (Myers et al., 1998). Fall-run Chinook return to freshwater in September-October, and late-fall-run Chinook in December or January. Adult females will prepare a redd (or nest) in a stream with suitable gravel type, water depth and velocity. The adult female may deposit eggs in 4 to 5 "nesting pockets" in a single redd. After laying eggs, adults guard them for 4 to 25 days before dying. The eggs hatch, depending upon temperature, after 90 to 150 days. Presently, fall- and late-fall-run Chinook spawn in the Sacramento and San Joaquin rivers and their tributaries between Keswick Dam and the Merced River.

### Data Deficiencies:

Current sampling and marking regimes are insufficient to estimate how many hatchery origin fish are spawning naturally. Also, the location and size of self-sustaining natural production is poorly known.

### Contact Information

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### References:

- NMFS Northwest Regional Chinook Salmon ESU Info  
[http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon - Populations/Chinook/](http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Chinook/)
- CALFED Bay Delta program: <http://calwater.ca.gov/>
- USFWS Anadromous Fish Restoration Program  
<http://www.delta.dfg.ca.gov/AFRp/>
- Myers, J.M., et al. 1998. Status review of chinook salmon...  
NOAA Tech, Memo. NMFS-NWFSC-35.
- West Coast Chinook Salmon Biol Rev Team. 1999. Status review update for deferred ESUs of West Coast Chinook.  
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