

# Central Valley Late Fall Chinook Salmon

*Oncorhynchus tshawytscha*

chances for survival:  
poor

2



PHOTO: DOUG KILLAM

One of four distinct runs of Chinook salmon in the Central Valley, late fall Chinook tend to be larger than fish from the other runs at 30 to 40 inches in length. They are most similar genetically to fall Chinook and are often combined with them into one ESU despite their distinctive life history. As with other Chinook, these fish become olive-brown to dark maroon with numerous black spots while in fresh water. Their basic life history is not well known because they migrate and spawn at times when the rivers are high, cold, and turbid. In the past, adults were a mixture of ages from two to five years old. At the present time, most are three year olds.

Adults migrate upstream in December and January as mature fish. Spawning occurs in late December and January. Fry emerge from the gravel from April through early June.

The juveniles live in the river for seven to 13 months before moving out to sea. Like other Chinook, they are voracious predators on shrimp and fish while living in the ocean.

CATEGORY	SCORE	EXPLANATION
Range	1	Only one population is present in the Sacramento River
Population size	4	If a typical population is 10,000 spawners, the effective population size is around 2,000 fish
Intervention needs	3	Requires periodic actions as for winter run Chinook salmon
Tolerance	3	Moderate physiological tolerance and multiple age classes
Genetic risk	2	Risk of hybridization with other salmon runs and hatchery fish is high although the consequences are poorly known
Climate change	1	There is just a single population that requires cold water from Shasta Reservoir and therefore they are vulnerable to extended drought
Overall status	2	
Reliability	3	Least studied of all Sacramento River Chinook runs

**DISTRIBUTION:** Late fall Chinook are found mostly in the Sacramento River between the Red Bluff Diversion Dam and Keswick Dam. However, some fish spawn downstream of Red Bluff. Small numbers also spawn in Battle Creek, Cottonwood Creek, Clear Creek, Mill Creek, as well as the Yuba and Feather Rivers. Battle Creek spawners presumably originated from the Coleman National Fish Hatchery. Historically, they spawned mostly in river reaches now blocked by Shasta Dam which included the Upper Sacramento, McCloud, and Pit Rivers and in the San Joaquin River.

**ABUNDANCE:** Historic abundance of late fall Chinook is not known. During 1967 to 1976, the run averaged about 22,000 fish annually. Between 1982 and 1991, the run averaged 9,700 fish annually. During 1992 to 2007, total numbers averaged 21,000 fish, with a wide range in annual numbers including a 1998 peak total of over 80,000 fish. The population today may be partly sustained by hatchery production.

**FACTORS AFFECTING STATUS:** The causes of long-term decline and present fluctuating numbers are similar to those of other Central Valley salmon. Principle factors are (1) dams, (2) loss of habitat, (3) commercial fisheries, (4) out-migrant mortality, and (5) hatcheries. In the 1940s, Shasta Dam blocked access to areas where water temperatures were cool enough for spawning, egg incubation and over-summering of juveniles. Subsequent deterioration of downstream habitats and unselective ocean fisheries contribute to present variable numbers.

**STATUS 2:** This run is vulnerable to extinction within the next 100 years or less due to its relatively small population size. Central Valley late fall Chinook salmon are listed as a species of special concern by both the state and federal

agencies. The limited area for spawning and rearing make this species exceptionally vulnerable to changes in water quality and flows in the Sacramento River. Late fall Chinook survival depends entirely on operation of water projects and hatchery operations. Presumably, they have benefited from actions taken to protect winter Chinook with which they co-occur at times. The wild population would benefit from having all hatchery fish marked so that commercial and recreational fisheries could selectively capture hatchery-origin fish of all runs.

**CONSERVATION RECOMMENDATIONS:** Late fall Chinook will benefit from actions taken to protect winter Chinook. Nevertheless, it should be recognized as a distinct ESU (or DPS) and listed as a threatened species. Special consideration needs to be made for restoring late fall Chinook to the San Joaquin River, as part of the restoration efforts taking place there.



Sacramento River. PHOTO: DOUG KILLAM

- 1
- 2
- 3
- 4
- 5

Central Valley Late Fall Chinook Salmon Likely Historic Distribution

