

WILL THERE BE CHINOOK IN THE CENTRAL VALLEY?

Historically, up to 600,000 spring-run Chinook salmon inhabited 6,000 river-miles in the Central Valley, including the Sacramento River as far as Mount Shasta City and Fall River. The San Joaquin River supported a population of 50,000 to 200,000 spring-run Chinook. However, water diversions and dams eliminated spring-run Chinook in the San Joaquin River, and by 1997, Central Valley populations had declined to less than 1 percent of historic levels, with only 20 percent of historic habitat still accessible. Today, all Chinook runs are limited to about 300 river-miles, mostly in the main stem of the Sacramento River.⁸⁵

Global warming is a major long-term threat facing Central Valley salmon, including all runs of Chinook.⁸⁶ Warming will shorten the period when fall-run Chinook have access to sufficiently cool habitats, particularly affecting fish in the San Joaquin River and its tributaries.⁸⁷ Winter- and spring-run salmon, already the most harmed by dams, are especially likely to be affected by global warming because they depend on rivers and streams for rearing habitat in the warm summer months.⁸⁸ If air temperatures rise 3.6 degrees Fahrenheit, the Tuolumne and Merced Rivers and Butte Creek will become too warm for spring-run Chinook.⁸⁹ If air temperatures rise about 9 degrees Fahrenheit, expected if global warming pollution continues unabated, it is doubtful whether any Central Valley Chinook will be able to survive.⁹⁰

The 2008 collapse of the Sacramento River's fall-run Chinook is a testament to the instability and vulnerability of Central Valley Chinook. Although it is not yet known what specific conditions caused the collapse, scientists have implicated insufficient river flow and disruptions in marine food sources caused by warm ocean waters.⁹¹ Such threats to salmon populations and fishing will be more frequent with global warming.



Tom Weseloh



Sacramento-San Joaquin Delta:

ENCROACHING SEAS AND ALTERED FRESHWATER INFLOWS

Fish and waterfowl flourish in coastal estuaries where freshwater flows into the ocean. Fortunately for wildlife enthusiasts, California is home to the largest estuary on the west coast of North and South America: the Sacramento-San Joaquin Delta. Located just east of the San Francisco Bay area where California's two largest rivers converge, the Delta is comprised of more than 700,000

acres of waterways, wildlife habitat, reclaimed farmland, and agricultural towns. Tens of thousands of waterfowl use freshwater areas of the Delta as important resting, feeding, and breeding habitat in their migration along the Pacific Flyway.⁹² Over 40 fish species live or pass through the Delta, including catfish, sturgeon, steelhead, and striped bass.⁹³

These conditions, coupled with the

Delta's proximity to large urban population centers, provide some of the best access to hunting and fishing opportunities in the western United States. The Delta's Suisun Marsh area alone is home to 158 private duck clubs as well as public hunting areas.⁹⁴ In 2000, visitors made approximately 2.13 million boating trips through the hundreds of miles of lazy sloughs and channels of the Delta.⁹⁵



Vince King

The Sacramento National Wildlife Refuge includes seasonal marshes, permanent ponds, and riparian habitats for waterfowl.

Many of the Delta's habitats are at risk from changes in precipitation patterns due to global warming. Increased winter flooding and reduced inflows of Sierra Nevada snowmelt from the Sacramento and San Joaquin Rivers in spring and summer will stress the Delta's delicate food web. Decreasing freshwater flows in summer will also increase the Delta's salinity in that critical period of the year.⁹⁶ Diving ducks such as canvasbacks and ruddy ducks, which have already lost habitat from dredging, levees, and other development, will be hit especially hard by these changes in salinity.⁹⁷

Sea-level rise threatens to further constrict habitat for fish and waterfowl in the Delta. Higher sea levels will inundate waterfowl habitat with saltwater, making these waters unsuitable for the invertebrates, marsh grasses, and other food that

waterfowl need, while urbanization at the Delta's edge will prevent wetlands from shifting upland.⁹⁸ The extensive habitat maintenance efforts by hunting clubs and other organizations⁹⁹ could be undermined by such saltwater inundation.

In addition, rising waters increase the potential for floodwaters to damage or flow over the tops of the Delta's 1,100 miles of fragile earthen levees.¹⁰⁰ A 2005 study estimated a 64 percent chance of catastrophic failure of multiple delta levees by 2050 due to earthquakes and extreme flood events.¹⁰¹ The chance of such a catastrophe is even higher when factoring in the effects of global warming.

Warmer water will also stress coldwater fish that pass through the Delta to spawn. For instance, reduced levels of dissolved oxygen will be increasingly common as water

temperatures rise. In the lower San Joaquin River at the eastern edge of the Delta, low levels of dissolved oxygen have caused salmon and steelhead kills, created barriers to salmon migration, and interfered with striped bass, sturgeon and shad migration and spawning.¹⁰² As conditions in the Delta worsen, the ability of fish to shift their habitat to cooler locations will be impaired by dams and other diversions that block upstream access.