



California Washed Away

The Great Flood of 1862

by Jan Null and Joelle Hulbert

When the first storms of the winter season arrived in California in December 2005, they were initially a welcome sign that the state's long dry season was finally over. But as 2006 began, rivers were pushed over their banks as heavy rains prevailed across the northern third of the Golden State. For many Californians, the localized flooding that occurred in the towns of Healdsburg, Guerneville, and Sacramento seemed near Biblical proportions, and there was a great gnashing of teeth and fear for the California levee system. Although the 2005-2006 season was alarming, many people likely would have been surprised to know that their Civil War-era ancestors faced a much larger crisis in 1862, as a record-setting rainy season prompted the construction of that same levee system and threatened to rain destruction on the many budding communities in the young state.

To put the issue in context, the December 2005 rainfall event in San Francisco recorded a little more than 11 inches, followed by 3.5 more inches in January 2006. Compare this to nearly 10 inches for San Francisco in December 1861, followed by an unprecedented 24 inches in

January 1862. And unlike the winter 2005-2006 storms, the 1861-1862 storms caused record or near-record flooding events across the state, from Eureka and Humboldt counties in the northwest, all the way to Orange and San Diego counties in the south.



An artist's view of K Street in Sacramento during the 1862 flood.



Another view of K Street from 4th Street looking east during the 1862 flood.

A State Dependent on Its Rivers

To better understand the concern over river flooding and the levee system in California, one must first understand the geography of California's Central Valley. Composed of the Sacramento Valley from Redding to Sacramento, and the San Joaquin Valley from Modesto to Bakersfield, the terrain is generally flat and surrounded on all sides by mountains. The Coast Ranges lie to the west and the Sierra Nevada mountains to the east. When rain falls on these mountains, it runs into creeks that flow down the mountains into streams and rivers

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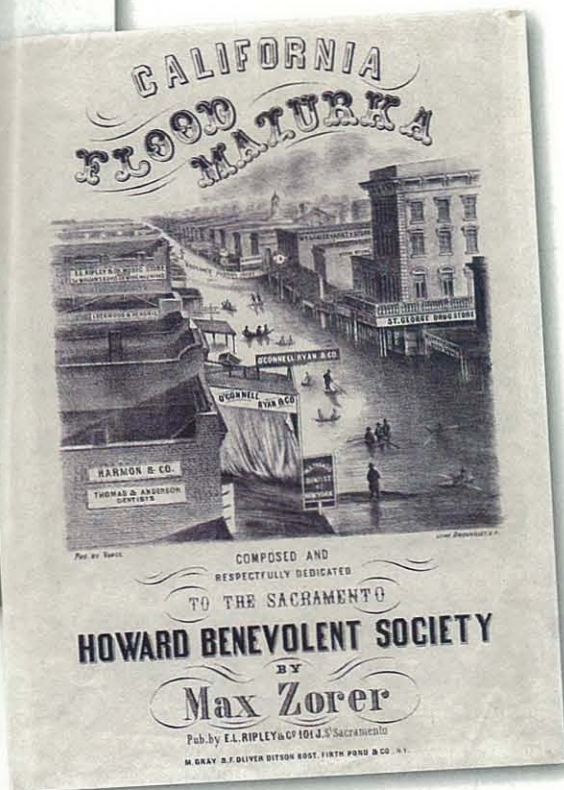
and into the Central Valley. From there it flows toward the only sea-level outlet to the ocean, the Sacramento-San Joaquin River Delta, and on out through the San Francisco Bay. In the Sacramento Valley, the American, Feather, and Sacramento rivers all rush through the Sacramento area and then toward the delta. In the San Joaquin Valley, the San Joaquin, Kern, Stanislaus, and Merced rivers also flow to the delta before heading out into the San Francisco Bay and into the Pacific Ocean.

In the mid-1800s there were no interstate highways crisscrossing the state. The major highways of that era were the rivers, so life in California developed along its banks. The Gold Rush in the 1850s had resulted in an impressive influx of people whose livelihoods were tied to the rivers of California as commerce flowed along their waters. Meanwhile, scores of farmers had settled along the banks of the rivers, where the most fertile farmland could be found in the low-lying, flood-prone areas.

But the promise of rich cropland along the banks of the rivers came at a high risk. Farmers gambled their life savings on crops and livestock, and residents of burgeoning urban areas near the rivers lived with the constant knowledge that it would take only a couple of days of rain to destroy their operations and bankrupt their finances. In a natural desire to protect their property, people who made their homes along California's rivers constructed earthen levees along many riverbanks in an effort to hold back the waters. From the early 1850s to 1861, more than \$1.5 million was spent on building and improving the levee system in and around Sacramento. Adjusted to today's dollars, that is almost \$30 million.

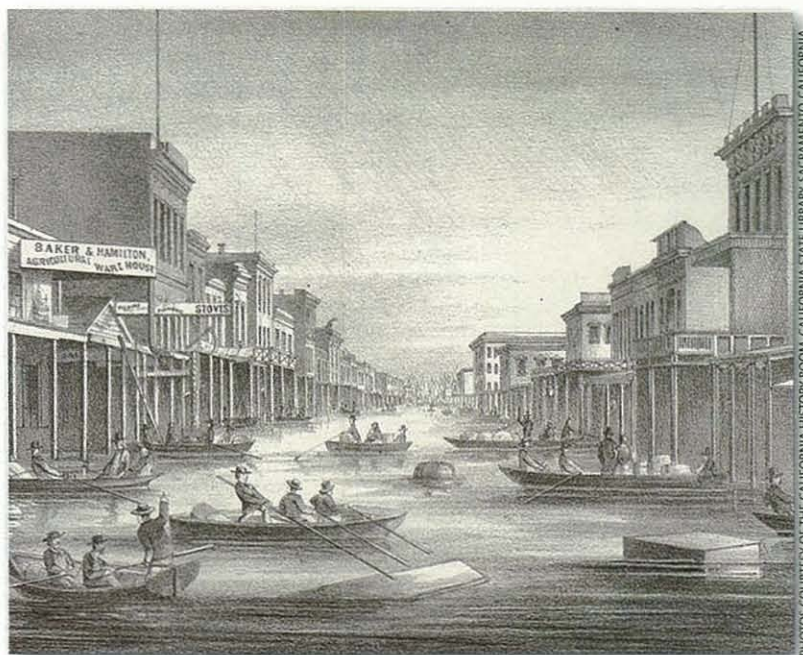
The Deluge

Although extremely wet weather in California is sometimes associated with an El-Niño weather pattern, the definitive paper on historic El Niños, written in 1992 by Oregon State Climatologist Victor Neal and William Quinn, an oceanographer at Oregon State University, determined that the synoptic weather pattern during the December 1861-January 1862 flooding event was non-El Niño.



The Signal Corps network of weather stations would not be established on the West Coast for another 10 years, but there were a number of Army observers and private weather observers in place when the 1862 floods occurred. According to these stations' records in December 1861, the polar jet stream was to the north as the Pacific Northwest experienced a mild rainy pattern for the first half of the month. The jet stream slid south, and on Christmas Day 1861 the Oregon stations reported freezing conditions. Heavy rainfall began falling in California as the longwave trough moved south over the state. This trough remained nearly stationary over California through the end of January 1862, allowing heavy rains to fall statewide just shy of the proverbial 40 days and 40 nights. Eventually, the polar jet slid even farther south, allowing several inches of snow to accumulate in the Central Valley and adjacent mountain ranges.

Daily rainfall was reported in the *Sacramento Union*, the *Los Angeles Star*, and the *Alta California*. During the period from December 24, 1861-January 21, 1862, rain occurred in the state on 28 out of the 30 days. San Francisco recorded nearly 34 inches of rain between December and January. Sacramento tallied over 37 inches for the 2 months, with a one-day maximum of 4 inches. Nevada City, in the lower reaches of the Sierra Nevada mountains reported snowfall equivalent to 115 inches of rain for the storm. At Red Dog, also in Nevada County,



An artist's view of J Street in Sacramento during the 1862 flood.

the 24-hour maximum rainfall was reported at 11 inches. Also in the Sierra Nevada foothills, the Tuolumne County mining town of Sonora reported over 102 inches of rainfall in December and January. In Southern California, flooding in Los Angeles was among the worst on record following nearly 35 inches of rainfall. San Diego also suffered the effects of the storms, recording over 7 inches of rain—300 percent of the January normal at the time! The San Diego River floodplain also suffered severe flooding as the tide backed its waters into the city, eventually cutting a new channel into the bay.

Widespread Flooding

When considering buying property or insurance, many people use the 100-year flood line as a safe benchmark. However, California's 30 days of rain in December 1861 and January 1862 was the equivalent of at least a 30,000-year event. In San Francisco, the storms resulted in a 10,000-year event, while in Sacramento, the flooding was "only" a 2,300-year event.

Preceding the actual flood-producing rains in Sacramento, there was a levee break on December 9, 1861. The Sacramento River flooded to a stage of 22 feet, 6 inches. This prompted the California state Legislature to propose moving the Capitol to San Francisco until the floodwaters receded. While it is not clear how much time the Legislature actually spent in San Francisco, the California Supreme Court moved its operations to the city and remains in San Francisco to this day. Notes from the court that were stored at the California Historical Society state, "...it appears that weather, water, and whiskey had a lot to do with it."

The flooding was exacerbated by warm rains that caused an unusual December melting of the snow pack in the Sierra Nevadas. This prompted noted California naturalist and Sierra Club founder John Muir to comment, "The Sierra Rivers are flooded every spring by the melting of the snow as regularly as the famous old Nile. Strange to say, the greatest floods occur in winter, when one would suppose all the wild waters would be muffled and chained in frost and snow ... But at rare intervals, warm rains and warm winds invade the mountains and push back the snow line from 2,000 to 8,000, or even higher, and then come the big floods."

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The state Legislature returned from its winter recess in early January—several weeks into the heavy rainfall—and was in session on Inauguration Day, January 10, 1862, when another levee broke on the Sacramento River. The event raised the flood level to a full 24 feet. Newly elected Governor Leland Stanford, California's eighth governor, traveled to his own inauguration ceremony in a rowboat. Newspaper accounts of the day were dramatic, and on January 13, the *Sacramento Union* reported, "Continuous rains and melting snows in the mountains have brought disaster and destruction upon those valleys and cities of California which have been the chief pride of the state."

William Brewer, a geologist from Yale University, was in Sacramento during the start of the storms in December. On January 19, 1862, he reported, "The great Central Valley of the state is under water—the Sacramento and San Joaquin valleys—a region 250 to 300 miles long and an average of at least 20 miles wide, a district of 5,000 or 6,000 square miles, or probably three to three and a half million acres! Although much of it is not cultivated, yet a part of it is the garden of the state. Thousands of farms are entirely under water—cattle starving and drowning. Benevolent societies are active, boats have been sent up, and thousands are fleeing to [San Francisco]. There have been some of the most stupendous charities I have ever seen ... A week ago today news came down by steamer of a worse condition at Sacramento than was anticipated. The news came at 9 o'clock at night. Men went to work,

and before daylight tons of provisions were ready—11,000 pounds of ham alone were cooked. Before night two steamers, with over 30 tons of cooked and prepared provisions, 22 tons of clothing, several thousand dollars in money, and boats with crews, etc., were underway for the devastated city."

High Costs

Early American settlers in the Santa Ana Valley in modern-day Orange County laughed at the Spanish *rancheros* for building their homes in the hills, away from the valley and water. After 20 people drowned in the 1861-1862 flood, the settlers laughed no more.

Ruminating on the actual cost of the damage that resulted from the great flood of 1862, Brewer noted, "The floods have still more deranged finances and make some action imperative. The actual loss of taxable property will amount to probably ten or fifteen millions, some believe twice that, but I think not even the latter sum. I suppose the actual loss in all kinds of property, personal and real, will rank anywhere between fifty and a hundred million dollars, surely a calamity of no common magnitude!"

In today's dollars, the \$50 million to \$100 million figure translates into \$1 billion to \$2 billion. Taking into account the fact that the tax base was expected to be cut by over 30 percent, the losses would be considerably more tragic if the same storm were to occur today, given the massive influx of people into the state since the 1860s; the 1860 census counted 380,000 individuals in California, compared with a 2005 estimate of more 36 million. The statewide damage estimate of the flooding of December 2005-January 2006 exceeded \$500 million.

Although memories of this storm are all but lost to the history books, we continue to look to our past for knowledge. In light of the failure of the levees in New Orleans following Hurricane Katrina in August-September 2005, much scrutiny is being given to the aging levee system in California. Following the 2005-2006 flooding in California, Governor Arnold Schwarzenegger asked Congress for over \$1 billion in aid to shore up the levees in the state, an expenditure voters approved as part of a \$4 billion statewide initiative to address infrastructure problems in California. Even a rainfall event that saw totals only half of those recorded in January 1862 would inundate huge populated areas in the Golden State.

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