



This photograph, taken during the Great Flood of 1862, shows people rowing boats in the flooded streets of Sacramento. Sacramento is the capital of California.

Disaster in California!

In 1862, a natural disaster in California caused thousands of deaths and destroyed the state's economy. This disaster wasn't an earthquake or a fire—it was an enormous flood that hit huge sections of the state. The Great Flood of 1862 was caused by a series of storms that brought more than double the normal amount of rain to California in a very short period of time.

Scientists and historians call the Great Flood of 1862 a “megaflood” because of the devastation it caused. Before the flood, there was an extensive period of time with little rain, and California farmers were struggling because there wasn't enough rain to water their crops. However, they probably weren't expecting what came next! During December 1861 and January 1862, so

much rain fell that many of the dry, flat farms in the center of California were completely covered in water—the whole valley looked like a large inland sea. Rivers and streams all over the state swelled up and over their banks, causing dangerous water flow that destroyed homes and killed animals and people in its path.

Using sources such as newspaper reports, data collected by scientists, and diaries and letters from people living in California at the time, people have reconstructed the kinds of damage done in this two-month period. Because of the massive rainfall and flooding, entire towns were destroyed. In some places, the water from the flood was 30 feet deep, covering the telephone poles that had just been put in place. Farmers and ranchers all across the state reported that they lost their homes, barns, farm equipment, and most of their animals. The devastation was so great and affected so many people that the state of California went bankrupt trying to support the people who were affected by the flood.

What Caused the Great Flood of 1862?

The Great Flood of 1862 was caused by a series of powerful storms that began over the Pacific Ocean. These storms were so strong because local temperatures were higher than normal—the winter of 1862 was unusually warm in California. Out in the ocean, both the ocean surface water and the air above it were also warmer than usual. The higher temperatures caused more ocean water to evaporate into the air. These warm air parcels full of water vapor rose high into the troposphere above California. In fact, because they were warmer than usual, they rose higher in the troposphere than the cooler air parcels that cause normal rain storms. As they traveled up through the colder parts of the troposphere, energy transferred from the parcels to the surrounding air, lowering the temperature of the air in the parcels. The parcels cooled until they had the same temperature as the surrounding air, causing the water vapor inside to condense into liquid water. The higher they rose, the more energy the parcels lost and the more water vapor condensed. The clouds that formed from these air parcels were full of liquid water that would soon fall as rain.

The same pattern of high temperatures leading to more water vapor in the air continued through the winter, causing multiple storms and record rainfall in many parts of California. Los Angeles received over 167 centimeters (66 inches) of rain in just two months—four times the amount of rain that normally falls there each winter. Rivers and streams were already full of water, so there was no place for the extra water from the rainfall to go. The water stayed above ground for weeks and caused flooding all across the state.

California



The darker brown areas of this map show the parts of California that were underwater during the Great Flood of 1862.

Could the conditions that caused the Great Flood of 1862 happen today? Meteorologists say that the perfect conditions for these kinds of storms—surface air temperatures that stay warm for several months and a constant source of water for evaporation—happen once every 100–200 years, so it's possible that California will see this kind of rainfall again. However, we now have a better understanding of the pattern that leads to these storm clusters and can predict when and where they might happen. We can't avoid storms, but we can figure out when they might happen and help people prepare when they do occur.