

## **Runoff in 1906**

### **Revised July 16, 2017**

If the May 1 projections hold (that is a very big if), total runoff in the Tulare Lake Basin for water year 2017 will be about 6.8 maf. That would make this the fourth biggest runoff year since record-keeping began in 1894. Only water years 1906 (7.2 maf), 1969 (8.4 maf), and 1983 (8.7 maf) have seen greater runoff during the instrumented period.

Three water years during the early settlement period (1853, 1862, and 1868) had enormous runoffs that would have put them in this same category (the biggest of the big), but that is a story for another day.

This is a very abbreviated story about the largely forgotten winter of 1905-06 and the associated runoff. The winter of 1905–06 was a strong El Niño event. We have a fairly good record of what occurred on the valley floor during this very wet winter; there were cities like Visalia down there that had precipitation gauges, cameras, and newspapers. But we know a lot less about what occurred in the upper watersheds.

A massive snowpack accumulated in both the San Joaquin River and Tulare Lake Basins during the winter of 1905–06. There were only a limited number of weather stations in the snow country at that time to measure the snow directly. The California Cooperative Snow Surveys wouldn't begin until 1930.

There was no weather station in Sequoia and General Grant National Parks in 1906. Those parks were managed in the summer by the military based out of the Presidio in San Francisco. (The National Park Service would not be created until 1916.)The Fourth Cavalry detachment wouldn't arrive in the parks until June.

*However*, there were four civilian rangers employed year-round. Walter Fry was the chief of those rangers. One of the other rangers, Charlie Blossom, kept a diary, and his diary sheds some light on weather conditions in the parks during 1906.

Charlie's patrol district included the South Fork of the Kaweah. He noted many days of heavy rain from January into May. The El Niño conditions resulted in an unprecedented snowpack in the Southern Sierra. On June 26, 1906, Charlie traveled from Hockett Meadow to where the South Fork Campground is today. That was a 24-mile day, 6 miles of which were over packed snow still 6 to 8 feet deep.

Those were far from normal trail conditions for the end of June. Something truly aberrant had happened. It was almost as if the Southern Sierra had been thrown back into the Little Ice Age. That was just a hint of the phenomenal snowpack that had accumulated in the Southern Sierra that winter.

Walter Fry reported that the winter of 1905–06 brought the heaviest snowfall in the sequoia groves of both Sequoia and General Grant National Parks ever recorded to that date. The snow was 29 feet (equivalent to roughly 348 inches) on the level in Giant Forest on February 25, 1906. Even by June 25, the snowpack in Giant Forest had only melted down to about 12 feet on the level.

The winter of 1905–06 appears to be the snowpack of record in the Southern Sierra. That winter was particularly remarkable in the Kaweah River Basin. Total runoff in the Kaweah River Basin in water year 1906 was 28% greater than in 2011 (the second largest snowpack in that basin) and 34% greater than in 1952 (the third largest snowpack).

Walter Fry's is generally regarded as a very reliable source, and his report of 29 feet of snow in Giant Forest in February seems generally consistent with the USGS study of runoff in the Kaweah River Basin

in 1905–06 compared to 1951–52. Fry’s report also fits with Charlie Blossom’s diary and with the big snowmelt floods that occurred down in the valley in 1906.

There is some precedent for this much snow falling in the Sierra. Donner Summit received 298 inches (24.8 feet) of snowfall (that is snowfall, not snowpack) in April 1880.

The year after the Kaweah River Basin got its phenomenal snow dump, the winter of 1906–07 would bring 884 inches (74 feet) of snowfall (that is snowfall, not snowpack) to Tamarack, California. That station is located at 8,000 feet elevation, about 20 miles northeast of Calaveras Big Trees State Park.

But it is still difficult for us to comprehend the sheer magnitude of the snowpack that accumulated in the Kaweah River Basin in the winter of 1905–06. The depth of snow in Sequoia National Park that year (roughly 348 inches) was double any that has occurred since. The deepest the snow has ever been measured at Giant Forest (including snow surveys) was 151 inches on March 16, 1952.

From Fry’s report, we know that there was roughly 348 inches of snow in Giant Forest in the Southern Sierra in the winter of 1905–06. Usually there would be a greater — or at least a comparable — depth of snow in the Northern Sierra. As a comparison, the snow survey site at Lower Lassen Peak (which is easily, year after year, the deepest snow in California) has only exceeded 300 inches once (in March 1983). However, there was a complete disconnect between the Southern and Northern Sierra in the winter of 1905–06. And the storm systems that winter were focused particularly on the Kaweah River Basin.

The snowpack would have peaked in April 1906. Based on available information, the Southern Sierra has never seen a greater snowpack in historical times. The San Francisco Earthquake occurred on April 18. At what was very close to the moment of peak snowpack during this very exceptional year, the Sierra was shaken by a very powerful earthquake (magnitude 7.8). That event was centered north of San Francisco, but was strongly felt in the Tulare Lake Basin. The earthquake apparently triggered a very strong cycle of avalanches in our local mountains. Many of the buildings remaining in the Mineral King Valley from the 1870s silver rush, including the Smith Hotel, were destroyed by those avalanches.

All this precipitation in the winter of 1905–06 resulted in significant flooding on the valley floor. First came the rain floods from the storm events themselves. The January to March 1906 period might best be viewed as a more or less continuous series of flood events rather than as individual floods. Then after a one month break, there were snowmelt floods as all that snowpack came down onto the valley floor. The May to June 1906 period might also best be viewed as an extended snowmelt flood with multiple peaks. Eastman had just popularized the camera, so this was the best documented flooding yet in Visalia.

Tulare Lake was virtually dry in 1905, but the high runoff of 1906 brought it back. Orlando Barton was the superintendent of the Devil’s Den Oil Company and regularly traveled by bicycle some 60 miles on dirt roads between Devil’s Den (southwest of Kettleman City) and Visalia. He recorded a vivid and detailed account for Visalia newspapers of the flooding on the lower section of the Kern River and Tulare Lake. As Tulare Lake filled up, Orlando continued his observations like a field naturalist. Among his accounts was the following:

“Hay will float on water. Two stacks arrived at George Scherin’s ranch on the south shore of the lake last week. One of them has about 20 tons of barley hay in it. Neither of the stacks are much out of shape after their cruise from the north shore.”