



Will El Niño Make a Difference?

December 2015

- ◆ Making seasonal forecasts of precipitation – the ability to predict now if 2016 will be wet or dry (and how wet or dry) – is scientifically difficult, and the accuracy of such predictions is very low, much less than that of a seven-day weather forecast.
- ◆ Scientists consider teleconnections (recurring and persistent, large-scale patterns of pressure and circulation anomalies over important regions of the globe that correlate with climate at a site of interest) when attempting to make seasonal climate forecasts.
- ◆ The El Niño-Southern Oscillation (ENSO) is one of the most studied climate phenomena, and one that can provide some predictive guidance in parts of the United States under certain conditions. ENSO is characterized by year-to-year fluctuations in sea surface temperatures along the equator in the Pacific Ocean between Peru and the International Date Line, and concomitant fluctuations in sea level air pressures between Tahiti and Darwin, Australia. The ENSO cycle is expressed as three states: neutral conditions, El Niño (warm ocean phase), and La Niña (cold ocean phase).
- ◆ The National Oceanic and Atmospheric Administration's Climate Prediction Center classifies present ENSO conditions as a strong El Niño, one which is expected to peak during the winter of 2015-16 with a transition to ENSO-neutral conditions expected during the late spring or early summer of 2016.
- ◆ The graphics on the reverse show the relationship over an 80-year period between measured precipitation in each of California's climate divisions (see indicator map) and ENSO conditions, expressed as the Southern Oscillation Index, a measure of air pressure fluctuations between Tahiti and Darwin, Australia. The strongest El Niño and La Niña events plot on the far left and far right sides of the graphics, respectively.
- ◆ ENSO's strongest signal in California is for Southern California to be drier than average in La Niña years. With respect to El Niño, there have been only five strong El Niño events since 1950 – events with an Ocean Niño Index value greater than 1.5 for the winter months of December through February. Those events occurred during water years 1958, 1973, 1983, 1992, and 1998. The Northern Sierra 8-station precipitation index can be used to illustrate how precipitation varied in important Northern California watersheds during those times. The index's water year precipitation totals for those strong El Niño years ranged from 72% of average in 1992 to 177% of average in 1983, with 1973 coming in at a near-average amount of 103%.
- ◆ Historically, strong El Niño years have tended to favor wetter than average conditions in Southern California. The two strongest El Niño winter seasons (1982-83 and 1997-98) were particularly known for coastal flooding impacts, when winter storms coincided with higher tides during periods of elevated sea levels. However, major floods have occurred in La Niña and neutral years as well.
- ◆ A strong El Niño does not guarantee an end to four years of drought conditions. Every winter season, Californians should both conserve water and prepare for floods.

Years 1933/34 through 2013/14 • October - March (winter) precipitation by Climate Division versus Southern Oscillation Index for immediately preceding June - November

