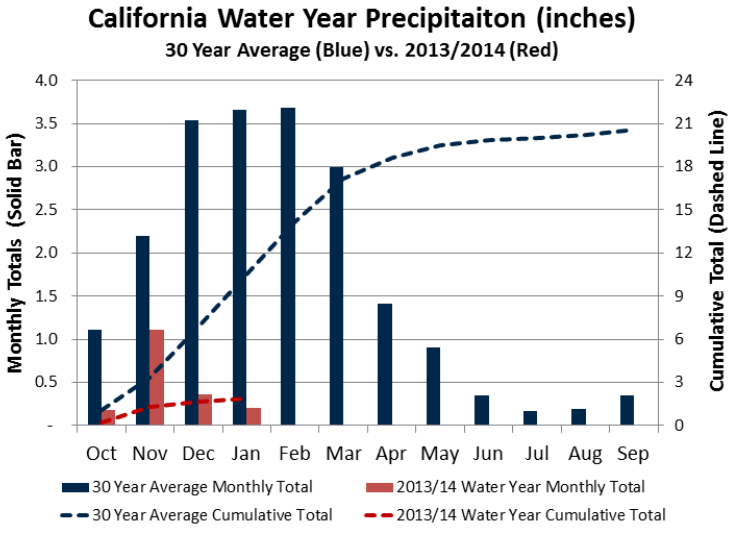
# CATASTROPHE MANAGEMENT SNIPPETS: California Wildfire Preview

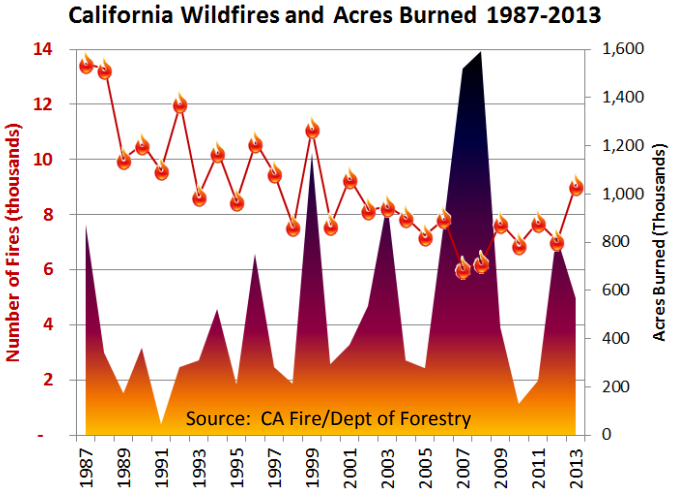
*One of the key items on the catastrophe watch list starting off 2014 is the excessive dryness across the Intermountain West, particularly in California. Drought conditions in January 2014 have expanded and intensified as exceptionally warm and dry conditions have prevailed across the western U.S. If dryness persists for the rest of the rainy season in February/March, prospects of an active 2014 California wildfire season increase based on historical analogs. This report summarizes the ongoing drought, provides a look back at several comparable California drought situations in recent history, highlights the impact on water resource issues and lists historically significant wildfires in the Golden State.*

## California Drought Severity

California's total precipitation of 7.4" in 2013 shattered the prior record driest year of 1898 when 9.8" was recorded. Total precipitation in 2013 was roughly a third of the annual average of 21.7". The drought has further intensified in January 2014 as preliminary data suggests one of the driest start to the year on record. 67% of California is under Extreme Drought, the highest drought extent of this century. From a longer term perspective, the three year period of 2011-2013 is the fourth driest three year stretch on record, trailing only 1988-90, 2007-09 and 1948-50.

Intensifying drought at this time of year is problematic as winter is climatologically the wettest time of the year in California. The chart below highlights average California precipitation by month (blue bars) and cumulatively (dashed blue line) across the water year which begins in October and ends in September. California's wet season spans from December through March while the dry season occurs from June through September. With 2" seen in the first four months of this water year, California is over 8" behind the normal water year to date total of 10.5" and is nearly a full inch below the prior record low start to the water year seen in 1990/91.



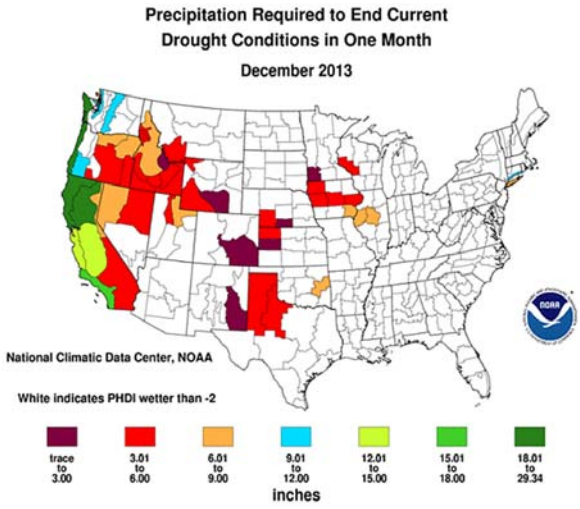

## California Wildfire History

Accurate California wildfire data combining both state and federal sources are available since the late 1980s. The chart above highlights the annual number of wildfires and acres burned since 1987. Over the past several decades, the number of wildfires in California has exhibited a meaningful downward trend. The impact of the two most severe multi-year droughts, discussed in the column to the left, are reflected in the California wildfire history chart above. The most intense three year drought from 1988-1990 featured the two years with the largest number of fires in the period of record. Conversely, the second most intense drought from 2007-09 includes the two highest years of acres burned in 2007 and 2008.

Four of the five largest acre burned years featured a La Nina event in the equatorial Pacific Ocean. La Nina events have cooler than normal water temperatures in the Pacific and tend to promote drier than normal conditions across California. Conversely, an El Nino event (warmer than normal waters in the equatorial Pacific) aids in shifting odds toward above normal precipitation in the winter months for California. This winter, water conditions in the Pacific are near normal and thus not in either category. Hence, this winter's dryness is linked to other factors than La Nina. There are no signs of a La Nina emerging late this winter or spring based on computer model projections but remains an item to watch.

## Second Half Rainy Season Importance for Drought Relief & Wildfire Season

Many months of above normal precipitation, particularly during the rainy season, will be needed to end the California drought. How much rain is needed to end the drought? The map to the right highlights areas of drought in the U.S. at the beginning of 2014. Shaded areas depict how much rainfall is required in one month to end drought conditions. Across much of California, 12-24" of rainfall is needed, which compares to California's annual average of 20". With January also excessively dry, these totals will increase in the next monthly update from the National Drought Monitor program.




From a historical perspective, an exceptionally dry start to the winter rainy season is not always followed by a severe wildfire season. February/March precipitation is more important than the first half of the wet season for assessing wildfire season potential. For example, the start of the 1990/91 rainy season is noted on page 1 as the record driest start to the water year prior to 2013/14. During the second half of the 1990/91 wet season, rainfall shifted into a well above normal mode as California received 8.5" of rainfall in March 1991, the third wettest March on record. The 1991 California wildfire season went on to feature the least amount of acres burned of any year since 1987, yet featured the most damaging fire in state history with 2,900 structures destroyed in the Tunnel/Oakland Hills Fire of October 1991 (see chart below right).

In contrast to the excessively wet end to the 1990/91 wet season, both 2007 and 2008 only featured one month of slightly above normal precipitation to start off the calendar year. The slightly wetter than normal month was not enough to turn the tables of well below average precipitation in the rest of the wet season months. The 2007 and 2008 wildfire seasons featured more acres burned than any other year since 1987. **Thus, precipitation trends over the next several months will be critical for assessing the odds of a potentially active 2014 wildfire season.**

Top Five Largest California Wildfires

| Fire Name | Date | County | Acres | Structures |
|---|---|---|---|---|
| 1) Cedar | Oct 2003 | San Diego | 273,246 | 2,820 |
| 2) Rush | Aug 2012 | Lassen | 271,911 | 0 |
| 3) Rim | Aug 2013 | Tuolumne | 257,314 | 112 |
| 4) Zaca | July 2007 | Santa Barbara | 240,207 | 1 |
| 5) Matilda | Sept 1932 | Ventura | 220,000 | 0 |

Top Five Damaging California Wildfires

| Fire Name | Date | County | Acres | Structures |
|---|---|---|---|---|
| 1) Tunnel | Oct 1991 | Alameda | 1,600 | 2,900 |
| 2) Cedar | Oct 2003 | San Diego | 273,246 | 2,820 |
| 3) Witch | Oct 2007 | San Diego | 197,990 | 1,650 |
| 4) Old | Oct 2003 | San Bernardino | 91,281 | 1,003 |
| 5) Jones | Oct 1999 | Shasta | 26,200 | 954 |

Source: California Department of Forestry and Fire Protection

## Water Resource Issues

Another impact of the California drought is the limited amount of snowpack and water availability for the upcoming California growing season. The graphic to the right is a satellite image comparing snow cover across California and eastern Nevada in mid January 2013 (left) compared to the same date this year. The sparse nature of the snowpack is exceptional. Not surprisingly, water content of the snowpack is at record low levels ending the month of January. Reservoirs across California and the Intermountain West are fed by spring snow melt for use in irrigation, drinking water, and power generation. Nine of California's eleven major reservoirs are at less than 50% of capacity. Of note, 15% of U.S. crop production and 7% of all crop revenue is generated from California with the majority of the crop irrigated during the summer dry season.