

# 2014 Fire Weather Annual Summary



**San Joaquin Valley Fire Weather District**  
**Hanford, CA**  
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## **I. Summation of the 2013 San Joaquin Valley/Hanford Fire Weather Season**

The National Weather Service in Hanford, due to lack of precipitation in December and January, resumed issuing NFDRS trend forecasts on January 18<sup>th</sup>. One narrative forecast was issued each afternoon and warnings, watches, and spot forecasts were issued on an as needed basis. After April 20<sup>th</sup>, Hanford Fire Weather began its full fire season activities, preparing two narrative forecasts and zone trend forecasts seven days a week. This continued through the end of December.

### **January/February**

January 2014 was much drier and much warmer than normal as a strong, high amplitude ridge of high pressure along the west coast dominated the weather pattern for most of the month. The ridge kept storm systems from moving into central California, and the few that did make it produced very little precipitation. From January 14-17, very dry air settled over the region dropping humidity into the single digits in many areas of the Sierra Nevada and in the mountains of Kern County. These dry conditions along with continued very dry fuels led to the issuance of Red Flag Warnings for 4 days for all of the mountain areas. This was unprecedented for January. On January 23-24, an unusual weather pattern set up a strong southeasterly flow across Kern County. This led to strong winds over the ridges (gusting 60-70 mph) and down the slopes of the Tehachapi and San Emigdio mountains (gusting 40-60 mph) and into the south end of the San Joaquin Valley (gusting 30-40 mph). The strong downsloping winds lowered humidities into the single digits and lower teens, which lasted 24-48 hours in many places. Red Flag Warnings were issued for the Kern county mountains and the southern end of the San Joaquin Valley.

It was not until January 30<sup>th</sup> and 31<sup>st</sup> that a significant storm system moved into central California producing 12 to 19 inches of snow above 7000 feet in the Sierra. Then next significant storm was on February 6<sup>th</sup>, with up to 2 feet of snow in the Sierra. Much of the middle of February was dominated by the ridge of high pressure, with only a few weak storms and light precipitation and above normal temperatures. However, the last 3 days of February ended up being very wet, with up to an inch of rain in parts of the San Joaquin Valley, 2 to 4 inches of rain in the Kern County Mountains and Sierra Foothills, and 1 to 4 feet of new snow over the higher elevations of the Sierra. Despite this snow, by the end of February, snowpack was only at 36 percent of normal for the season.

### **March**

March 2014 continued to be drier than normal with much above normal temperatures. A storm system moved through on March 6<sup>th</sup>, with most of the precipitation across Merced, Mariposa and Madera counties. Dry and warm weather occurred from the 8<sup>th</sup> to the 25<sup>th</sup>, before a change in the weather pattern finally brought a series of storm systems on the 26<sup>th</sup> through the 31<sup>st</sup>. Nearly 90 percent of the month's precipitation fell in the last 5 days of the month. But by April 1<sup>st</sup>, the snowpack was only at 31 percent of normal.

## **April**

The very dry weather continued in April 2014 with only two significant weather systems, one on the 1<sup>st</sup> and 2<sup>nd</sup> and another on the 25<sup>th</sup>. The weather pattern continued to be dominated by a strong ridge of high pressure with above normal temperatures. The monthly average temperature ended up about 4 degrees above normal at most locations. By the end of April, the snowpack in the Sierra was only 18 percent of normal.

## **May and June**

High pressure continued to dominate the overall weather pattern in May and June 2014 with above normal temperatures and below normal precipitation. It was the 6<sup>th</sup> warmest May and 4<sup>th</sup> warmest June on record for Fresno and the 10<sup>th</sup> warmest June on record for Bakersfield. Lengthy periods of very low humidity (less than 10%) along with the well above normal temperatures and very dry fuels resulted in Red Flag conditions across the mountains of Kern County on May 1<sup>st</sup> and 2<sup>nd</sup> and also May 13<sup>th</sup> to the 16<sup>th</sup>.

The drought continued to worsen during May and June with lakes and reservoirs remaining at historically low levels. The 2013-2014 rainfall season (July 1-June 30) ended with Fresno being the 2<sup>nd</sup> driest season on record with 4.81 inches of rain (normal 11.5 inches). Bakersfield was the 3<sup>rd</sup> driest on record with 2.41 inches of rain (normal 6.47 inches).

## **July**

July 2014 had a ridge of high pressure that was centered near the Four Corners region for much of the month. Southeast flow aloft brought several surges of monsoonal moisture into the Sierra Nevada with thunderstorms developing on numerous days. Some of the thunderstorms produced heavy downpours. On the 15<sup>th</sup>, one particularly strong thunderstorm brought nearly an inch of rain near Tuolumne Meadows in Yosemite National Park. Other strong thunderstorms on the 20<sup>th</sup> and 21<sup>st</sup> produced nearly 1.5 inches of rain over the Rim Fire burn scar along with localized flooding and power outages in Yosemite Park. Despite the spotty rain in the mountains and a few showers making into the San Joaquin Valley during July, extreme drought conditions persisted across central California. Temperatures continued to average above normal for the month. Fresno had the 5<sup>th</sup> warmest July on record and Bakersfield was the 9<sup>th</sup> warmest on record.

## **August and September**

August and September 2014 were characteristically dry, with influxes of monsoonal moisture about every 7 days. There were 3 intrusions of moisture from the remnants of tropical systems in the eastern Pacific. These were remnants of Hurricane Hernan on August 3<sup>rd</sup> and 4<sup>th</sup>, Hurricane Marie on August 29<sup>th</sup> (which produced only clouds), and remnants of Hurricane Norbert on September 7<sup>th</sup>. These intrusions produced thunderstorms over the mountains and desert, and even a few showers in the San Joaquin Valley and adjacent foothills. Otherwise, a dry weather and well above normal temperatures persisted across the region due to a ridge of high pressure.

Temperatures continued to average above normal in August and September. Fresno had the 2<sup>nd</sup> warmest August and the 3<sup>rd</sup> warmest September on record. In Bakersfield it was the 8<sup>th</sup> warmest August and tied as the 7<sup>th</sup> warmest September on record.

The final weekend of September heralded an Autumnal change in the weather. A cold front that ran well ahead of a storm system over the Gulf of Alaska, ended up stalling over Merced county and Mariposa county on the 25<sup>th</sup> bringing cooler temperatures. The higher elevations experienced an increase in clouds and showers as the storm system tracked southeastward on the 26<sup>th</sup> and 27<sup>th</sup>. By the time this storm system moved into the Great Basin on the 29<sup>th</sup>, it left a dusting to locally 2 inches of snow over the highest elevations of the Sierra (above 9000 feet) with enough rain to settle the dust on the east side of the San Joaquin Valley. Showers and thunderstorms brought generally a half inch to an inch of rain to the foothills and higher elevations of the Sierra. The heaviest precipitation fell in and around Yosemite National Park with places like Crane Flat and Coulterville measuring 1.33 inches and 1.40 inches respectively. Unfortunately, the storm near the end of the month was hardly enough to put even a small dent in the extremely large rainfall deficit over the southern Sierra. Water levels on area lakes and reservoirs remained phenomenally low, averaging only about 12 percent of their normal capacity as of October 1<sup>st</sup>.

## October

In the wake of the weather system that moved through at the end of September, an offshore flow developed as surface high pressure moved into the Great Basin as an upper level ridge of high pressure built over the region. This resulted in a Red Flag Conditions on October 3<sup>rd</sup> to the 5<sup>th</sup> with very dry southeasterly flow over the mountains helping humidities lower into the single digits for 10 hours or more. There was very poor overnight humidity recovery across much of the Kern County Mountains and the southern portion of Sequoia National Forest.

Temperatures in the first 2 weeks of October were quite warm, with highs in the 90s in the San Joaquin Valley, the foothills, and the desert areas of Kern County. Overall temperatures for October averaged about 5 degrees above normal, with Fresno having the warmest October on record.

During the second half of October, the high pressure ridge was occasionally flattened over central California by storm systems that moved inland through the Pacific Northwest. Trailing cold fronts associated with these storms were generally moisture starved. The first of these fronts moved southward across central California on the evening of the 14<sup>th</sup> with no precipitation, but brought strong winds to the west side of the San Joaquin Valley along Interstate 5. The next cold frontal passage occurred on the afternoon of the 20<sup>th</sup> and produced little more than some sprinkles. The third cold frontal passage on the 25<sup>th</sup> did bring isolated showers to the San Joaquin Valley north of Fresno county and fairly light precipitation to the adjacent foothills and higher elevations of the Sierra. Rain amounts were generally less than a few hundredths of an inch in the northern part of the San Joaquin Valley. The higher elevations fared a little better with up to two tenths of an inch of rain falling in the Sierra. Temperatures cooled to near normal behind each cold front, but rebounded to unseasonably warm levels when the upper level ridge of high pressure built back over the central California interior.

The first significant storm of the season moved into the region on Halloween and delivered a soaking rain to the San Joaquin Valley, foothills and the mountains below 5500 feet. Above this elevation, 4 to as much as 17 inches of snow fell in the Sierra. Rain amounts ranged from a tenth to two tenths of an inch in the Kern county desert to as much as an inch in the San Joaquin Valley. The foothills and higher elevations received one to two inches of precipitation. Despite this wet storm, precipitation for the month ended up below normal.

## **November**

November, 2014 ended up being a hydrologic disappointment for drought stricken CA. Had it not been for a moisture laden storm that continued into the 1<sup>st</sup>, much of the San Joaquin Valley would have ended up with no measurable precipitation for the month. The storm that began on October 31<sup>st</sup> continued into the morning of November 1<sup>st</sup> before ending. For much of the rest of the month, the storm track resided over the Pacific Northwest. Three storm systems, one on the 13th, another on the 19th and 20th and the last one on the 30th, brought beneficial precipitation to the mountains but barely enough rain to settle the dust in the San Joaquin Valley from Fresno County southward. Even in the mountains, precipitation amounts dwindled significantly from north to south with each storm, ranging from less than a tenth of an inch in the Tehachapi mountains to two tenths to a half inch in the southern Sierra. Precipitation averaged well below normal for the month and further exacerbated the seasonal deficit. (The rain season traditionally begins July 1<sup>st</sup>.)

Other weather highlights for the month included a Red Flag event that began during the midday hours November 16<sup>th</sup> and persisted through the 18<sup>th</sup>. A very dry polar air mass that was brought into the Kern county mountains and desert on brisk easterly winds behind a backdoor cold front quickly raised the wildfire threat in this region where relative humidities were in the single digits for 20 to 40 hours at numerous stations (longer in a few locations). These low humidities were also accompanied with wind gusts over 30 mph for several hours.

Temperatures averaged much warmer than normal for the month. In Bakersfield and Fresno, November, 2014 was the 9th and 10th warmest on record, respectively.

## **December**

December 2014 began wet as several wet storms moved through central California. The first one on December 2<sup>nd</sup> and 3<sup>rd</sup> brought up to 10 inches of snow over the highest elevations of the Sierra with nearly two feet of snow over the high country within Yosemite National Park. Rain soaked the lower elevations with a third of an inch to three quarters of an inch in the San Joaquin Valley and adjacent foothills and 1 to 2 inches of rain along the west slopes of the Sierra below the snow line, which was generally above 8,000 feet for the duration of the storm. The next big storm system brought an atmospheric river of subtropical moisture directly into central California on the 11<sup>th</sup> and 12<sup>th</sup>. Heavy snow fell in the Sierra above 6000 feet with general accumulations of 10 to 20 inches in most areas. The San Joaquin Valley picked up an inch or more of rain and the foothills received two inches or more of rain. Even the Kern County Desert areas received a half inch to as much as 1.5 inches of rain. Strong winds also accompanied this storm, especially along Interstate 5 through the Grapevine where gusts nearly reached 90 mph.

Even Bakersfield reported 55 mph gusts from the southeast late in the evening on the 11<sup>th</sup>. Strong and gusty winds also blew through the passes along the west side of the San Joaquin Valley during the afternoon and evening hours, and gusts reached over 50 mph in some locations. Two more back to back storms brought additional water into central California between the 15<sup>th</sup> and the 19<sup>th</sup> before the pattern changed.

A ridge of high pressure along the California coast dominated the weather pattern after the 22<sup>nd</sup> of December. This was a significant change in the pattern that allowed colder storm systems to track southward out of western Canada and eventually opened the door to the infiltration of Polar air masses into California. A cold frontal passage on Christmas Eve was accompanied by showers and brisk winds but relatively light precipitation.

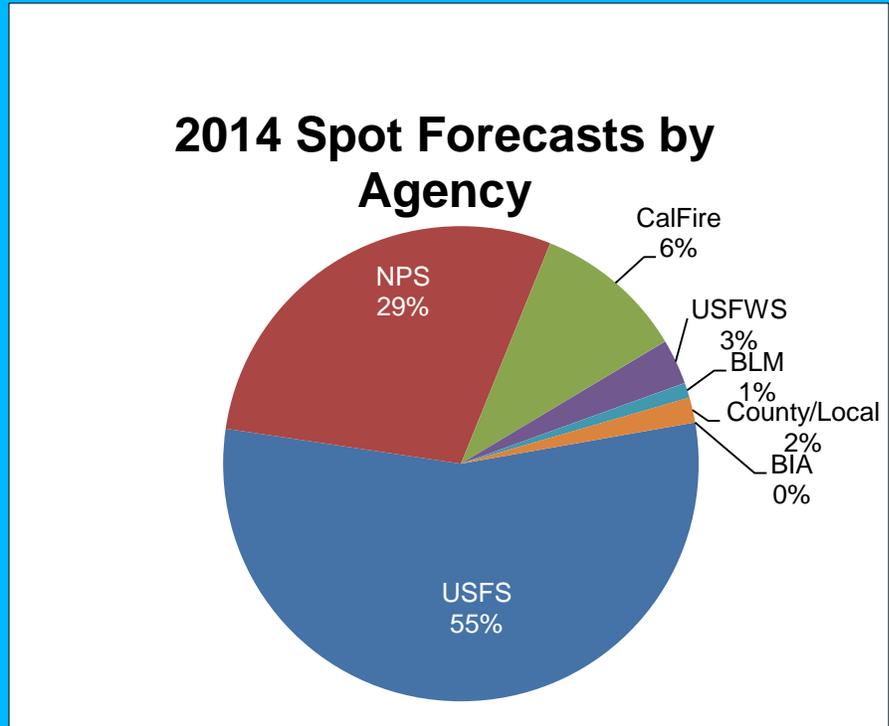
A deepening upper level low pressure system over the Great Basin combined with a storm system that moved inland from the Pacific into southern California on the 30<sup>th</sup>. This storm system brushed Kern County with generally light precipitation from December 30<sup>th</sup> into December 31<sup>st</sup> while north to northeast winds were bringing an Arctic air mass into the region. A dusting to locally two inches of snow fell in the Kern County Mountains as low as 2500 feet by the morning of December 31<sup>st</sup> while portions of the southern San Joaquin Valley received trace amounts of rain to as much as eleven hundredths in Bakersfield. Meanwhile, brisk northeast winds gusted to 50 mph or higher over the higher elevations of the Sierra north of Fresno County. The winds were strong enough to down trees and power lines over the higher elevations of the Sierra and close roads leading into Yosemite National Park on the morning of the 31<sup>st</sup>.

December 2014 was the wettest month in Bakersfield since December, 2010 and the wettest month in Fresno since March, 2012. However, for the calendar year, Bakersfield (4.02 inches) was 12<sup>th</sup> driest on record and Fresno (7.46 inches) was the 33<sup>rd</sup> driest on record. These amounts were 62-64% of normal. 2014 also ended up being the warmest calendar year on record in both Fresno and Bakersfield. Although most of the storms that brought water into California during the month were warm storms, there was a noticeable increase in snow cover along the Sierra crest which, as of January 1<sup>st</sup>, averaged 41 percent of normal.

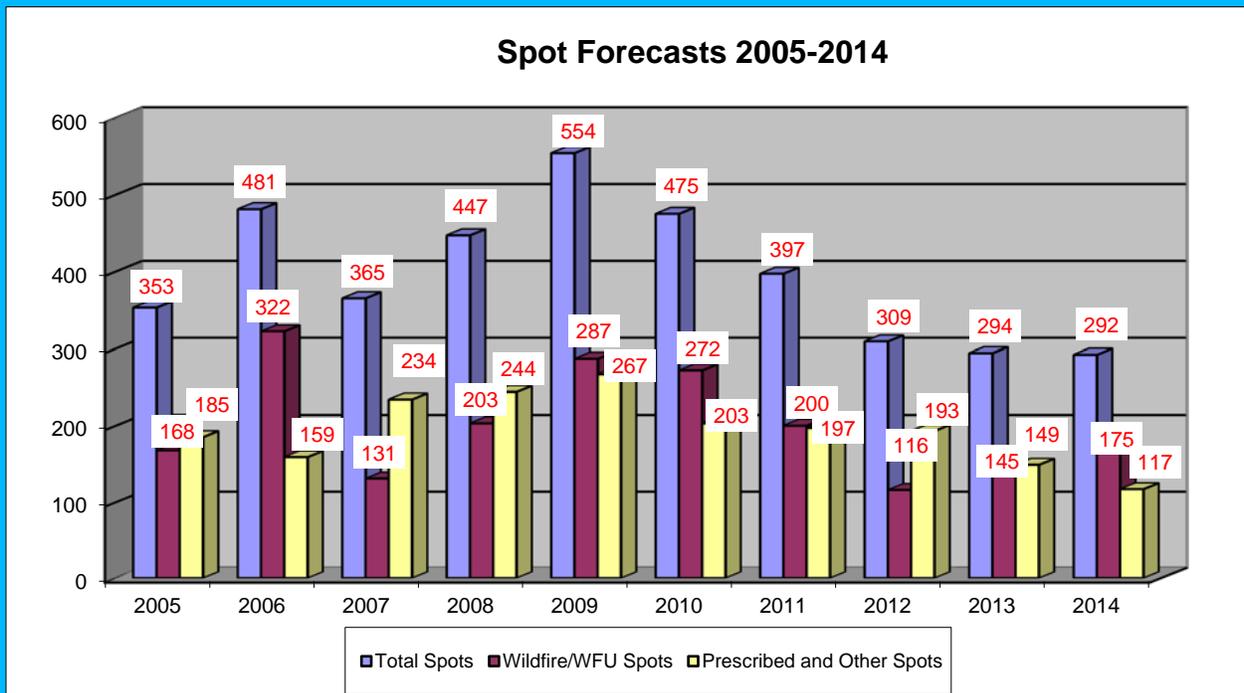
## II. Spot Forecasts

The following Spot Forecasts were prepared by the National Weather Service San Joaquin Valley Office in 2014:

Total Spots: 292  
 RX spots: 110  
 Wildfire spots: 175  
 Hazmat/SAR spots: 7  
 Monthly average: 24.3



Average yearly spot forecasts from 2005 to 2014: 396.7



### III. ATMU Dispatches

The San Joaquin Valley Office responded to the following Incident Meteorologist (IMET) requests during 2014:

<u>Incident Name</u>	<u>IMET</u>	<u>Dispatch Dates</u>	<u>Fire Weather District</u>
Ranch Fire Sequoia NF	Dan Harty	7/2/14 – 7/9/14	Hanford, CA
Nicolls Fire Sequoia NF	Dan Harty	7/12/14 – 7/17/14	Hanford, CA
Bridge 99 Complex Deschutes NF	Jim Dudley (T)	7/20/14 – 7/28/14	Pendelton, OR
French Fire Sierra NF	Jim Dudley (T)	8/6/14 – 8/10/14	Hanford, CA
Lodge Complex Mendocino Unit, Cal Fire	Jim Dudley (T)	8/10/14 – 8/18/14	Eureka, CA

Total IMET days out of the office: 36

## IV. Teaching Assignments

The San Joaquin Valley Office participated as instructors at the following Courses in 2014:

<u>Course Name</u>	<u>Location</u>	<u>Agency Served</u>	<u>Instructor</u>
S-290	Bakersfield, CA March 11-12	BLM	Cindy Bean
S-290	Bakersfield, CA April 22-23	Kern County Fire Academy	Cindy Bean
S-290 Review	Mariposa, CA April 3	CalFire	Cindy Bean
S-290 Review	Mariposa, CA May 9	CalFire	Dan Harty
RT-130 Presentations			
	Prather, CA February 18	Sierra NF	Cindy Bean
	Springville, CA April 10	Sequoia NF	Dan Harty
	Oakhurst, CA May 21	Sierra NF	Cindy Bean
	Clovis, CA April 1	Sierra NF Fire Module Meeting	Steve Mendenhall

## V. Training

The following training was completed by the San Joaquin Valley office in 2014:

Virtual IMET Workshop, March 2014	Dan Harty Jim Dudley (T)
RT-130	Dan Harty Jim Dudley (T)

## VI. 2014 Red Flag Warning Verification

*Note: warnings are issued for individual forecast zones.  
e.g., a Red Flag Warning issued for 3 zones will count as 3 warnings.*

### Total Events

Number of Red Flag Warnings issued:	22
Number of Red Flag Warnings verified:	19
Number of missed events:	0

Warnings preceded by a Fire Weather Watch:	4
Watches not followed by a Warning:	0

Probability of Detection (POD):	100%
False Alarm Ratio (FAR):	13.6%
Critical Success Index (CSI):	86.4%
Average Lead Time for Warnings:	7.94 hrs
Watches:	33.23 hrs