

# 2012 Fire Weather Annual Summary



**San Joaquin Valley Fire Weather District**  
**Hanford, CA**  
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## **I. Summation of the 2012 San Joaquin Valley/Hanford Fire Weather Season**

The National Weather Service in Hanford began its fire season activities on May 13<sup>th</sup>. Before this date, one narrative forecast was issued each afternoon. Warnings, watches, and spot forecasts were issued on an as needed basis. After May 13<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 November 18<sup>th</sup>.

### **January/February**

January and February 2012 were very dry with above normal temperatures as a ridge of high pressure dominated the weather pattern for much of the period. No precipitation occurred in January until the 20<sup>th</sup>-23<sup>rd</sup> when a series of storms brought a soaking rain to the lower elevations with up to 3 feet of snow in the higher elevations of the Sierra Nevada. Some spotty light precipitation fell in the first 2 weeks of February, but the next significant precipitation waited until the 12<sup>th</sup> to the 15<sup>th</sup>. During a 3 day period, rainfall in the San Joaquin Valley ranged from 0.15 inches to 0.6 inches and the foothills and Kern county mountains received nearly an inch of rain. Snow levels lowered to near 2500 feet and produced 2-8 inches of snow in the foothills and the Tehachapi mountains with a foot or more in the higher elevations of the Sierra. The next notable system did not arrive until February 27<sup>th</sup>, with most of the precipitation falling over the mountains of Kern county. This was followed by another system on the 29<sup>th</sup> that brought 4-6 inches of snow to the lower elevations of the Sierra Nevada and nearly a foot of snow in the higher elevations. At the end of February, the snowpack in the Sierra only averaged 29 percent of normal.

### **March**

The first half of March 2012 continued to be dry as high pressure centered over southern California continued to dominate the weather pattern. That changed on the 17<sup>th</sup> as a strong and cold storm system moved through the region. This storm produced 1 to 3 inches of rain across the northern and eastern parts of the San Joaquin Valley and 2 to 5 inches of rain in the Sierra Foothills below 2000 feet. Above 2000 feet, the precipitation fell as snow with accumulations ranging from 3 to 6 inches at 2500 feet to as much as 3.5 feet over the highest elevations of the Sierra. In Kern county, a small accumulation of snow fell down to 4000 feet with up to 8 inches at and above 5000 feet. Another storm system moved through on the 24<sup>th</sup> and 25<sup>th</sup>, dropping another 8-16 inches of snow in the Sierra above 6500 feet with up to a foot of snow in the Kern county mountains above 5000 feet. In the lower elevations, rainfall amounts ranged from about a third of an inch in the San Joaquin Valley to as much as 1.5 inches in the foothills. Yet another system moved through at the end of the month, producing 6 to 12 inches of snow in the Sierra above 7000 feet. The month ended with snowpack over the southern Sierra Nevada near 55% of normal. In the San Joaquin Valley, rainfall for the season continued to average only 50 to 60 percent of normal.

### **April**

April 2012 was wetter and warmer than normal. The most significant storm system was a series of three storms that moved through the region on April 11<sup>th</sup> to the 13<sup>th</sup>. These storms combined

to bring severe thunderstorms with hail and 1-3 inches of rain to the San Joaquin Valley, and as much as 3 feet of snow to the higher elevations of the Sierra Nevada. The third storm in the series was cold, lowering snow levels to 2500 feet. This storm also brought 2 feet of snow to Pine Mountain Club in Kern county. The storm track shifted northward after the 15<sup>th</sup> as a ridge of high pressure once again took control. Temperatures climbed well above normal on the 20<sup>th</sup>-23<sup>rd</sup>, bringing rapid melting of the snowpack. Temperatures cooled again by the 25<sup>th</sup> with additional storms bringing precipitation on the 25<sup>th</sup> and 26<sup>th</sup> with snow levels above 9000 feet. Despite having above normal precipitation for the month of April, the seasonal totals were still only 65-75 percent of normal. The snow pack over the southern Sierra Nevada averaged about 35 percent of normal. Most reservoirs were holding only 67 percent of their normal water capacity.

## **May**

May 2012 was much drier than normal across central California. A ridge of high pressure centered over the Southwestern U.S. dominated the overall pattern, keeping the storm track well to the north. The only significant storm system moved through on the 25<sup>th</sup>. This system brought 2 to 4 inches of snow in the Sierra above 6500 feet along with isolated showers and thunderstorms to the San Joaquin Valley and foothills. Overall, temperatures averaged above normal. The Sierra snowpack was nearly depleted by month's end.

## **June**

June 2012 was typically dry with precipitation only occurring on 3 days during the month – the 4<sup>th</sup>, 5<sup>th</sup>, and 16<sup>th</sup>. The storm system that moved through on the 4<sup>th</sup> and 5<sup>th</sup> brought wind gusts to 40 mph in the San Joaquin Valley and gusts to 50 mph across the Kern county mountains and desert. Similar wind speeds occurred again with a dry frontal passage on the 9<sup>th</sup>. June was also a month of significant temperature changes. June 1<sup>st</sup> saw temperatures as much as 15 degrees above normal, then colder air moved in on June 5<sup>th</sup>, dropping temperatures to near 15 degrees below normal for a few days. Temperatures began warming on the 10<sup>th</sup>, reaching record or near record temperatures by the 17<sup>th</sup>. At the same time very dry air was over the area, prompting Red Flag Warnings for the Kern county mountains and desert on the 17<sup>th</sup> and 18<sup>th</sup>. Humidities dropped into the single digits for 10 hours or more with west winds 15 to 25 mph. Temperatures remained above normal through the 21<sup>st</sup>. Then a dry cold front moving through on the 22<sup>nd</sup> once again dropped temperatures several degrees below normal for 5 days.

The 2011-2012 rainfall year (July 1<sup>st</sup> to June 30<sup>th</sup>) ended up drier than normal. Fresno rainfall was only 59 percent of normal, while Bakersfield was 76 percent of normal. At the end of June, reservoirs were holding 62 percent of their normal water capacity.

## **July**

A dry southwesterly flow aloft prevailed over central California for much of July 2012. Temperatures averaged close to normal for the month, however there were a few periods of hot weather from the 7<sup>th</sup> to the 13<sup>th</sup> on the 21<sup>st</sup> to the 23<sup>rd</sup>, and again on the 30<sup>th</sup> and 31<sup>st</sup>. Monsoonal moisture began to move into the region on July 4<sup>th</sup>, making as far as the Kern county desert. Another push of monsoonal moisture arrived on the 18<sup>th</sup> and 19<sup>th</sup> and was the remnants of what was once tropical storm Fabio. Yet rainfall

amounts in the mountains were generally less than a tenth of an inch. A third push of monsoonal moisture brought another round of thunderstorms to the Sierra Nevada on the 22<sup>nd</sup> and 23<sup>rd</sup>.

Red Flag Warnings were issued for the mountains of Tulare and Kern counties on July 8<sup>th</sup> and again on the 9<sup>th</sup> for long durations of single digit humidity and poor overnight humidity recovery. Red Flag Warnings were issued again for these same areas for July 12<sup>th</sup>. Although it was dry, humidity did not stay below 10 percent for more than a few hours.

Very dry conditions continued across parts of Kern and Tulare counties, once again prompting Red Flag Warnings for the mountains on July 25<sup>th</sup> and 26<sup>th</sup>. On July 25<sup>th</sup>, humidity dropped below 10 percent for 10 hours or more at numerous places in Kern county and a few locations in Tulare county where they also had winds gusting to 20 mph. Humidity recovery was poor on the night of the 25<sup>th</sup>, but conditions improved on the 26<sup>th</sup> prompting the warning to be cancelled on the morning of the 26<sup>th</sup>.

## **August**

A strong ridge of high pressure dominated the weather pattern for much of August, resulting in persistent hot weather over the region. In the San Joaquin Valley, temperatures climbed over 100 degrees for 23 days, with Fresno recording a 19 day stretch of 100 degrees or warmer from the 6<sup>th</sup> to the 24<sup>th</sup>. On a few occasions, the ridge weakened enough to allow monsoonal moisture to move into the region, bringing mainly dry thunderstorms to the mountains. Lightning started a large wildfire in Kern county near Piutes during a monsoonal push early on August 4<sup>th</sup>. Another push of monsoonal moisture arrived on the 13<sup>th</sup> and 14<sup>th</sup>, triggering numerous thunderstorms in Kern county in the vicinity of Lake Isabella and Tehachapi. These storms started several fires, most of which were quickly contained. However, one fire started near Jawbone and became large. A deeper push of monsoonal moisture arrived on the 17<sup>th</sup> and 18<sup>th</sup>, producing mostly dry thunderstorms in the Kern county desert, the San Joaquin Valley and the Sierra Foothills. Thunderstorms were more numerous and mainly wet over the mountains.

On August 21<sup>st</sup> and 22<sup>nd</sup>, a weak upper low that originated off the central California coast briefly tapped into some subtropical moisture. A thunderstorm outbreak with over 300 lightning strikes developed over the higher elevations of the Sierra Nevada with isolated thunderstorms over northeastern Kern county. The last push of monsoonal moisture occurred on the 29<sup>th</sup> to the 31<sup>st</sup>, once again bringing thunderstorms to the Sierra Nevada.

## **September**

A rather persistent upper level ridge of high pressure that extended from northern Baja to the Four Corners region brought warmer than normal temperatures for much of September 2012. In fact, temperatures were 3 to 5 degrees above normal for the month. Bakersfield had the 6<sup>th</sup> hottest September on record with Fresno recording the hottest September on record.

Although the month was predominantly dry, there were two occasions, September 3<sup>rd</sup> and 4<sup>th</sup> and the 8<sup>th</sup> to the 10<sup>th</sup>, when mid and high level moisture from the remnants of tropical storms became embedded in the southwesterly flow. Thunderstorms occurred over the Sierra Nevada and the Tehachapi mountains, and the Kern county desert areas during this time. Thunderstorms

also occurred on the Sierra crest on the 11<sup>th</sup> and 12<sup>th</sup>. Other than isolated thunderstorms over the Sierra crest on the 28<sup>th</sup>, dry weather prevailed for the rest of the month.

## **October**

Aside from two short periods of storminess, much of the month was dry and tranquil as an upper level ridge of high pressure dominated the weather pattern. October 1st through the 3rd was exceptionally warm with highs close to the century mark in the San Joaquin Valley, lower foothills and the Kern county desert. At the same time, humidity dropped to less than 10 percent across portions of the Kern county mountains for as much as 11 hours, prompting a Red Flag Warning on October 1<sup>st</sup> and 2<sup>nd</sup>.

There were only two storm systems that brought measurable precipitation into the central California interior in October 2012. The first storm developed over the eastern Pacific and tracked inland across southern California on the 10th and 11th. Up to a half inch of rain fell from this storm in the Sierra foothills and in the Kern county mountains with upwards of nearly an inch in the higher elevations of the Sierra. In the San Joaquin Valley, the storm spawned isolated thunderstorms with very heavy rain on the 11th. Although the bulk of precipitation fell as rain in the mountains, the storm did leave a dusting of snow in its wake over the highest peaks of the Sierra by the morning hours of the 12th.

The second storm to impact the central California interior was much colder. Although this storm system tracked north of the state, a dip in the jet stream swept its associated cold front eastward across the central California interior on the 22nd. While much of the west side and south end of the San Joaquin Valley were caught in the rain shadow of this system with at most only a hundredth of an inch of rain, the central and east side of the San Joaquin Valley from Hanford and Visalia northward received significantly higher rainfall with amounts ranging from a tenth to nearly a quarter of an inch. Meanwhile, the storm produced generous precipitation in the orographically enhanced upslope regions of the Sierra Nevada. Up to 1.25 inches of rain fell along the west slopes of the Sierra below 6000 feet. Above this elevation, snowfall totals from this storm ranged from 4-7 inches in the mountains of Tulare county to as much as a foot from Yosemite National Park to Kings Canyon.

Precipitation for the month ended up slightly below normal in the northern parts of the district to much below normal across Kern county.

## **November**

November, 2012, just like the past 3 months, averaged much warmer than normal. In Fresno, it was one of the top ten warmest Novembers on record...and the records date back to 1887. All in all, there were at least 23 days in the month when daily temperatures averaged above normal. During the first week alone, when a strong upper level ridge of high pressure dominated the pattern, high temperatures warmed into the low to mid 80s in the San Joaquin Valley, lower foothills and the Kern county desert. The spell of unseasonable warmth came to an abrupt end on the 8<sup>th</sup> as a storm charged into the state from the Gulf of Alaska. The storm produced meager precipitation in the lowest elevations with several inches of snow in the Sierra Nevada above

6000 feet. It was the season's first snowfall on the floor of Yosemite Valley where up to two inches fell.

A developing storm system off the central California coast brought mild air and moisture back into the district by the 15<sup>th</sup>. The southwesterly flow aloft associated with this storm brought a fetch of subtropical moisture from the 16<sup>th</sup> through the 18<sup>th</sup>; raised snow levels in the southern Sierra above 9000 feet, and drenched the higher elevations with 1 to 3 inches of rain. In the southern San Joaquin Valley, an influx of warm air from the south brought high temperatures into the 70s during this period along with isolated afternoon thunderstorms on the 17<sup>th</sup>. Unfortunately, much of the district south of Fresno county was robbed of significant precipitation from this storm with rain totals generally under two tenths of an inch.

For much of the rest of November, the storm track became established well to the north and a strong upper level ridge of high pressure anchored itself over southern California and the desert southwest. The weather pattern remained dry with mild afternoon temperatures through the 27<sup>th</sup>.

The final three days of the month brought a significant change in the overall pattern; one that brought a succession of storms in from the Pacific and ultimately beneficial precipitation, especially in the foothills and higher elevations of the Sierra. The first of these storms basically opened the door to wet weather on the 28<sup>th</sup>, the bulk of which fell north of Kern county. The storm that followed was much wetter, especially from Fresno county north, as it moved through on the 30<sup>th</sup>. A few locations in the San Joaquin Valley north of Kern county set new records for daily rainfall on the 30<sup>th</sup>, including Fresno with 0.62 inches. Snow levels stayed above 9000 feet where up to 18 inches fell. Precipitation for the month ranged from well below normal over Kern county to slightly above normal in Merced county and Mariposa county. Water levels in area reservoirs remained extremely low - averaging only 24 percent of normal capacity.

## **December**

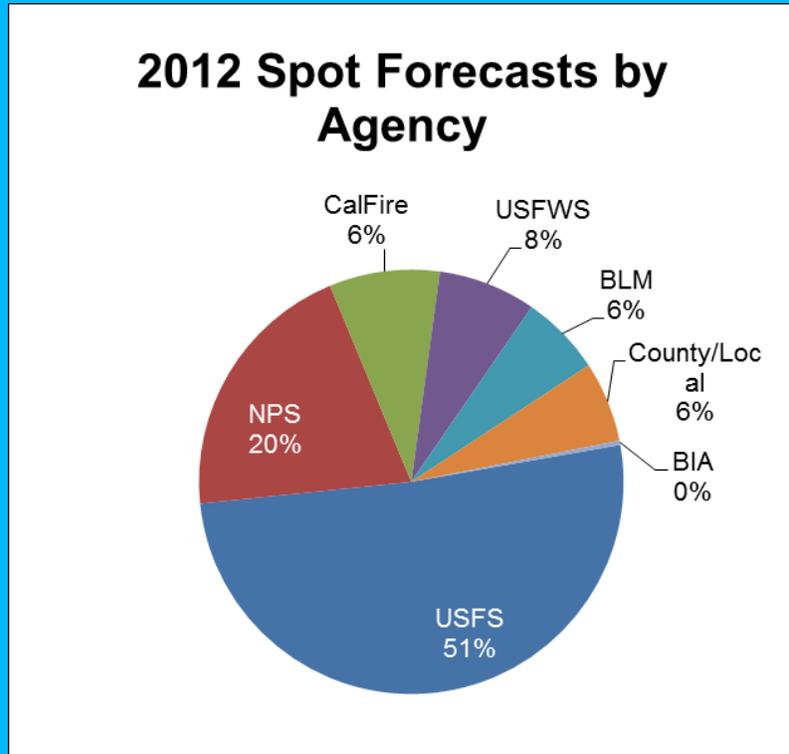
The storms of November continued into the first few days of December with locally heavy rainfall in the lower elevations and snow in the Sierra Nevada. A ridge of high pressure over the eastern Pacific then pushed the storm track northward until the 11<sup>th</sup>. This storm brought up to 15 inches of snow to the higher elevations of the Sierra Nevada, and 3 inches of snow as far south as Frazier Park in Kern county as snow levels fell to 3500 feet on the 12<sup>th</sup>. The next storm arrived on the 18<sup>th</sup>. This storm was relatively light on precipitation, but it brought strong winds with gusts of 60 to 70 mph across the mountains and desert of Kern county.

A strong storm moved through the region on December 22<sup>nd</sup> to 24<sup>th</sup>, bringing three day rainfall totals of a third to one and a third inches of rain in the San Joaquin Valley and as much as 4 inches of rain to the Sierra foothills. As much as 40 inches of snow fell in the high country of the Sierra Nevada. Another storm quickly followed on the 25<sup>th</sup> and 26<sup>th</sup>, leaving another 14 inches of snow in the Sierra Nevada and 4 to 7 inches of snow in the Kern county mountains.

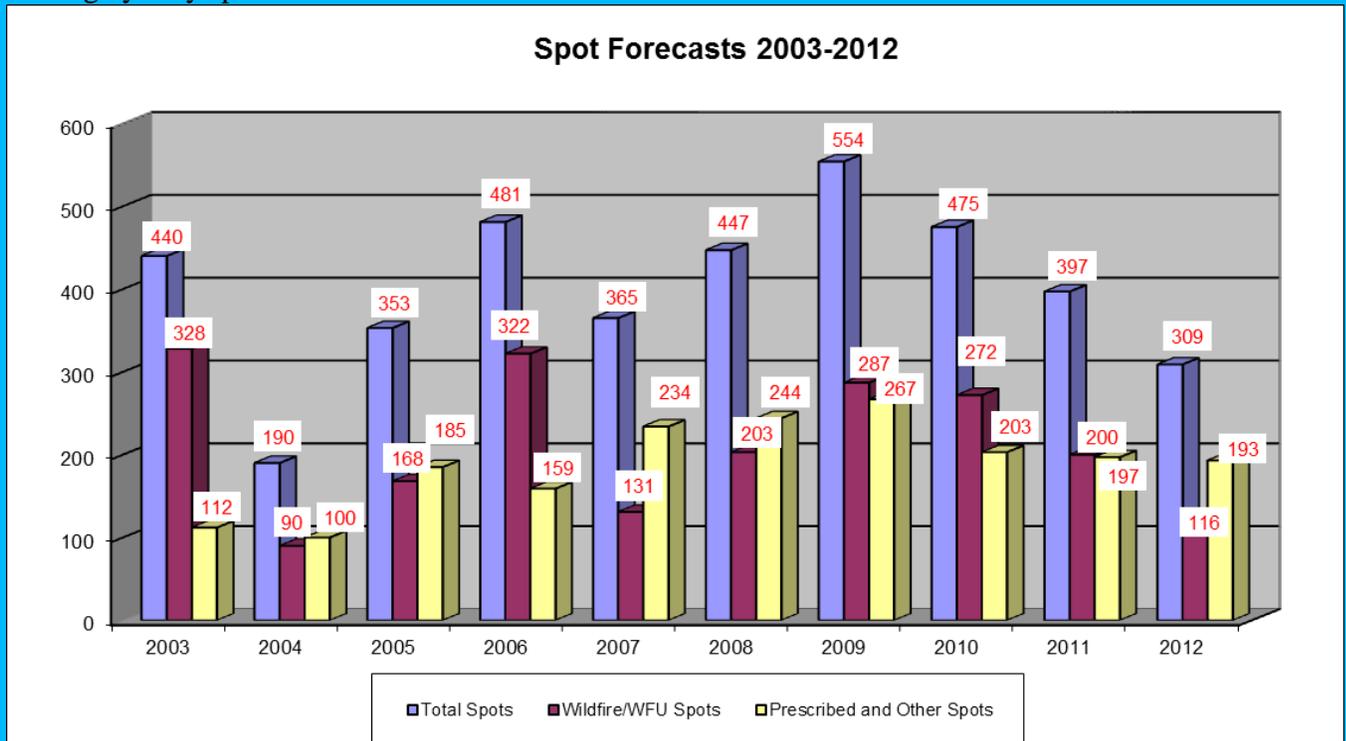
## II. Spot Forecasts

The following Spot Forecasts were prepared by the National Weather Service San Joaquin Valley Office in 2012:

Total Spots: 309  
 RX spots: 183  
 Wildfire spots: 116  
 Hazmat/SAR spots: 10  
 Monthly average: 25.75



Average yearly spot forecasts from 2003 to 2012: 401.1



### III. ATMU Dispatches

The San Joaquin Valley Office responded to the following Incident Meteorologist (IMET) requests during 2012:

<u>Incident Name</u>	<u>IMET</u>	<u>Dispatch Dates</u>	<u>Fire Weather District</u>
Piute Complex Sequoia NF	Cindy Bean	8/6/12 -8/12/12	Hanford, CA
Jawbone Complex BLM CND	Dan Harty	8/14/12 – 8/19/12	Hanford, CA
Rush Fire	Cindy Bean	8/14/12 – 8/29/12	Reno, NV

Total IMET days out of the office: 29

## IV. Teaching Assignments

The San Joaquin Valley Office participated as instructors at the following Courses in 2012:

<u>Course Name</u>	<u>Location</u>	<u>Agency Served</u>	<u>Instructor</u>
S-290	Concord, CA February 13-14	Contra Costa County	Dan Harty
S-290	Bakersfield, CA April 16-17	Kern County Fire	Cindy Bean
S-290	Bakersfield, CA May 2-3	BLM	Cindy Bean
S-290	Grant Grove, CA September 24-25	Sequoia/Kings Canyon NP	Cindy Bean & Dan Harty
S-290	Reedley, CA September 21, 28, Oct 5	Reedley College	Cindy Bean
S-290	Bakersfield, CA November 26-27	Kern County and Bakersfield City Fire Academies	Cindy Bean
RT-130 Presentations			
	Prather, CA March 28 and May 8	Sierra NF	Cindy Bean
	Clovis, CA April 26	Sierra NF	Cindy Bean
	Springville, CA April 11	Sequoia NF	Cindy Bean

## V. Training

The following training was completed by the San Joaquin Valley office in 2012:

Virtual IMET Workshop and RT-130 March 2012 - Cindy Bean  
Dan Harty

## VI. 2012 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:	19
Number of Red Flag Warnings verified:	8
Number of missed events:	0

Warnings preceded by a Fire Weather Watch:	7
Watches not followed by a Warning:	0

Probability of Detection (POD):	100%
False Alarm Ratio (FAR):	57.9%
Critical Success Index (CSI):	42.1%
Average Lead Time for Warnings:	7.2 hrs (one warning had 42 hrs lead time)
Watches:	65.8 hrs (only 1 watch was followed by a warning that verified.)