2013
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 began its fire season activities on May 6th. Before this date, one narrative forecast was issued each afternoon. Warnings, watches, and spot forecasts were issued on an as needed basis. After May 6th, 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 25th.

January/February

January and February 2013 were much drier than normal with temperatures slightly below normal as a ridge of high pressure dominated the weather pattern for much of the period. There were only 4 systems in January that brought precipitation to the district and only 2 significant storms in February. Although some snow did fall during January and February, there was considerably less than normal. Thus, the snowpack that was above normal at the end of December was only at 67 percent of normal by the end of February.

March

March 2013 continued to be much drier than normal with above normal temperatures. Two significant storms moved through the region. The first was on the 6th to the 8th with a strong upper low that moved south along the California coast and into the Los Angeles Basin. Although this system was too far west to bring appreciable snow to the Sierra Nevada, it did bring up to 7 inches of snow to the higher elevations of Kern County and up to three-quarters of an inch of rain in the San Joaquin Valley. The next storm system did not arrive until the end of the month. Up to an inch and a half of rain fell in the Sierra Nevada and foothills. However, due to the warm nature of the storm, snow levels remained above 8000 feet. The lack of additional snow and above normal temperatures during the month depleted the snowpack over the southern Sierra to about 48 percent of normal by the end of the month.

April

The very dry weather continued in April 2013 with only 2 weather systems bringing anything more than isolated showers. From the 19th to the 30th of April the weather pattern was dominated by a strong ridge of high pressure centered over the eastern Pacific. During this period, dry weather prevailed with several days of well above normal temperatures. By April 24th, the snowpack below 9000 feet had melted. Above 9000 feet, snowpack was only 17 percent of normal. Rainfall for the season at Fresno and Bakersfield was only 50 percent of normal. Fresno had its warmest April ever with records dating back to 1887.

May

May 2013 began warm and very dry. An offshore flow brought gusty southeast winds across Kern and Tulare counties on the 1st through the 3rd prompting Red Flag Warnings and bringing an early start to the fire season. Relative humidity dropped below 10 percent in the mountains of Kern and Tulare counties and remained below 10 percent for as much as 58 hours at many

locations. Winds were also gusting 25 to 35 mph at times. The dry air extended into the southern end of the San Joaquin Valley on May 2nd with temperatures climbing into the mid 90s and humidity dropping below 10 percent for 12 hours in Bakersfield.

A low pressure system approached the California coast on the 4th, bringing gusty winds to the San Joaquin Valley and through the mountain passes in Kern County. This system slowly moved across the region on the 5th through the 8th bringing scattered showers and thunderstorms. As sub-tropical moisture was drawn into this system, some of the thunderstorms produced heavy rain and small hail. Another storm system moved through the region on the 16th bringing only light showers, mainly north of Fresno County. An onshore flow once again brought gusty winds to the west side of the San Joaquin Valley and through and below the mountain passes in Kern County on the 22nd through the 28th.

Overall, temperatures averaged above normal. The Sierra snowpack was nearly depleted and the reservoirs were only at 43 percent of normal capacity.

June

June 2013 was typically dry with isolated thunderstorms over the mountains. The most active thunderstorm days occurred on the 27th and 28th as a tropical moisture surged northward. Temperatures averaged warmer than normal. A southwesterly flow aloft brought very dry air into Kern County on June 9th, resulting in Red Flag conditions as humidity dropped below 10 percent for 10 to 14 hours.

The 2012-2013 rainfall year (July 1st to June 30th) ended up much drier than normal. Fresno had the 5th driest rain season on record while Bakersfield was the 6th driest on record.

July

July 2013 began very hot as a strong ridge of high pressure dominated the area. For the first 10 days of the month, temperatures were in the triple digits across the San Joaquin Valley, Sierra foothills, and the desert areas of Kern County. For the remainder of the month, central California found itself in between a ridge of high pressure over the Four Corners region and a trough of low pressure off the California coast. When the ridge of high pressure would shift westward, it brought pushes of monsoonal moisture with thunderstorms over the mountains and desert. A few of these thunderstorms produced locally heavy rain while others sparked fires.

August

August was characteristically dry, although occasional northward influxes of monsoonal moisture produced thunderstorms over the mountains and desert, and even a few in the San Joaquin Valley and adjacent foothills. Otherwise, a dry southwesterly flow aloft prevailed over the region for most of August as central California remained situated between a high pressure ridge centered over Texas and an upper level low pressure system anchored off the Pacific Northwest coast. For a week long period which began on the 13th and ended on the 20th, the high pressure ridge dominated the pattern and brought triple digit heat to much of the San Joaquin

Valley, lower foothills and the Kern county desert.

One of the monsoonal surges produced slow moving thunderstorms with very heavy rain on the 18th through the 20th across the Kern county mountains and desert. This resulted in flash flooding as well as mud and debris flows across highway 178 near Democrat. Strong winds with these thunderstorms, knocking down trees and power poles in the communities of Woodlake, Lemon Cove and Springville. The second northward influx of monsoonal moisture occurred from the 26th and produced isolated thunderstorms over the Kern county desert and in the mountains as far north as Kings Canyon National Park. Although a few of these thunderstorms produced heavy downpours, there were no reported incidents of flooding. Another push of monsoonal moisture produced mud and debris flows in the hills surrounding Frazier Park on the 31st.

September

September, 2013 ended up slightly warmer than normal as an upper level ridge of high pressure centered over west Texas dominated the weather pattern. The first 3 weeks of September the area of monsoonal moisture remained over the Desert Southwest. Whenever the upper level ridge shifted westward to the Four Corners region, some of this monsoonal moisture moved into the mountains and desert and brought isolated showers and thunderstorms to the mountains and desert.

A major change in the weather pattern occurred on the 21st and 22nd as an unusually deep low pressure system moved into California. Showers associated with this upper level trough brought about a quarter of an inch of rain in the San Joaquin Valley near Madera and nearly a half inch of rain at Bass Lake. Parts of Mariposa County received up to 1.75 inches of rain. Higher elevations received the first snowfall of the season as the storm system departed into the Great Basin and much colder air moved in behind. By the morning of the 22nd, a dusting of snow had fallen at elevations as low as 5500 feet. Up to 5 inches of snow fell above 8,000 feet in Yosemite National Park. However, the cooler early fall weather did not last long as a weak ridge of high pressure aloft brought dry weather and a return of warmer than normal temperatures during the final 3 days of the month.

October

A very dry weather pattern continued over California for most of October as a strong ridge of high pressure anchored near the west coast effectively blocked storms from moving into the region. Storms were forced to move north into Canada before dropping south into the Great Basin. One of these cold and dry systems dropped into the Great Basin on the 2nd and 3rd bringing strong west to northwest winds in the San Joaquin Valley and across the Mountains and Desert of Kern County. As Surface high pressure dropped into the Great Basin, the winds became strong offshore creating Red Flag conditions with gusty winds and very low humidity across Tulare and Kern Counties. Red Flag conditions persisted from the 4th through the 7th, with many locations seeing humidity less than 10 percent for 24 to 36 hours and a few locations as long as 54 hours.

There were only two storm systems that brought precipitation to Central California in October. The first storm moved through on the 9th, with precipitation amounts ranging from nearly four tenths of an inch in Tehachapi to nearly three-quarters of an inch in the southern Sierra. The storm produced a light dusting of snow at elevations as low as 5000 feet in the Kern county mountains to as much as 8 inches over the highest elevations of the Sierra. The second system moved through on the 28th. Precipitation from this storm fell as rain below 5000 feet with amounts ranging from a tenth of an inch or less in the San Joaquin Valley to about six tenths of an inch in the Sierra foothills. A few foothill localities received more than an inch of rain from this storm. The storm also brought generous rain to the Kern County Mountains where local amounts of up to 0.85 inches were reported. This storm also brought up to 10 inches of snow to the higher elevations of the Sierra. Despite these two storm systems, precipitation for the month ended up well below normal.

November

A strong blocking upper level ridge of high pressure over the eastern Pacific dominated the weather pattern during the first 11 days of November 2013 keeping the weather dry. Retrogression of this ridge allowed room for cold fronts to move southward across California thereafter. Most of the cold fronts were dry and brought little more than mid and high clouds.

Most of the month's precipitation fell from one storm and during a 3-day period from the evening hours of the 19th into the evening hours of the 22nd. Subtropical moisture entrained in the storm kept snow levels above 8000 feet. By the time colder air arrived at the tail end of the storm, the heaviest precipitation was over and little more than a dusting of snow fell down to the 5000 foot elevation. Otherwise, the storm brought generous rainfall to the district with Kern County getting the lion's share of it. It was indeed the first wetting rain of the season in the San Joaquin Valley with 3 day totals ranging from a quarter of an inch to just over an inch at the south end. Bakersfield broke their daily rainfall record on the 22nd with 0.65 inches of rain. The storm brought rain totals of nearly seven tenths of an inch in the Kern County Desert to as much as 1.5 inches in the Sierra foothills and higher elevations.

Another storm over the eastern Pacific initially held promise of bringing more precipitation into the central California interior during the Thanksgiving holiday. Unfortunately the storm remained too far offshore and tracked too far south to bring measurable precipitation any farther north than the Tehachapi Mountains on the 28th and 29th, and even that was only a few hundredths of an inch. Monthly precipitation in Kern County ended up just above normal while the remainder of the district ended up drier than normal for the month. Temperatures averaged slightly above normal.

December

December 2013 continued to be very dry. In fact, only three storms moved the region with only one storm producing significant precipitation. Very cold air moved into the region in early December, and as a storm system moved through on the 7th, snow levels lowered to near 1500 feet. While rainfall amounts in the San Joaquin Valley ranged from only a few hundredths of an inch to as much as a quarter inch, snowfall amounts ranged from around an inch at 1500 feet to

as much as a 12 inches at the higher elevations of the Sierra Nevada. This weather system, along with the system that moved through on the 3rd, brought strong gusty winds across the mountains and desert areas of Kern County. Wind gusts of 45 to 55 mph were widespread with a few areas receiving gusts of 65 to 82 mph.

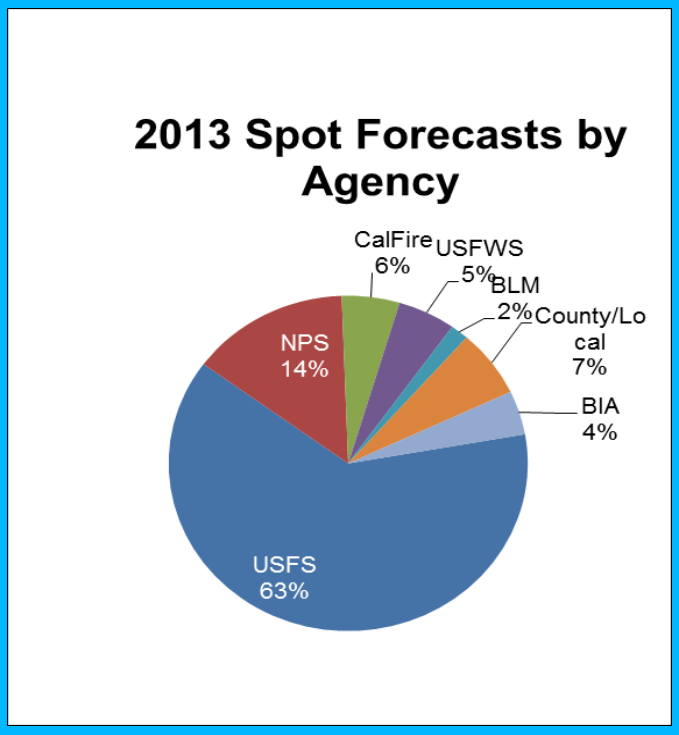
A strong ridge of high pressure dominated the weather pattern for the remainder of the month with generally light offshore flow across the region, punctuated by moderate easterly winds across Kern County and the crest of the Sierra. This led to above normal temperatures and periods of very low humidity across the mountains with humidity less than 10 percent for long durations from the 25th to the 31st. The lack of precipitation along with the low humidity created Red Flag Conditions across the mountains during this time.

Fresno ended up with only 3.01 inches of rain in 2013, making it the driest year on record with 26% of normal precipitation. Bakersfield had 3.43 inches of rain, making it the 9th driest year on record with 53% or normal. It was also a warmer than normal year. The average temperature for the year was 66.9 degrees at Fresno, making it the warmest year on record. At Bakersfield, the average temperature for the year was 66.5 degrees, which was the 14th warmest on record.

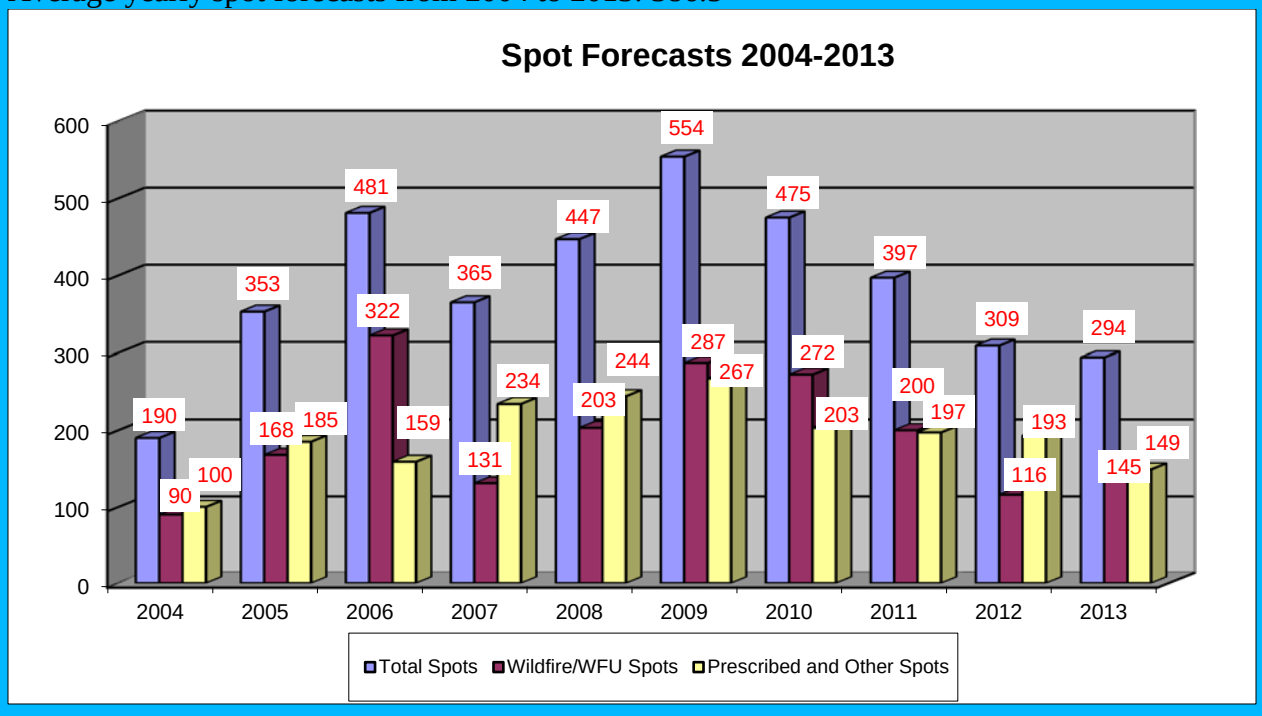
II. Spot Forecasts

The following Spot Forecasts were prepared by the National Weather Service San Joaquin Valley Office in 2013:

Total Spots: 294
RX spots: 141
Wildfire spots: 145
Hazmat/SAR spots: 8
Monthly average: 24.5



Average yearly spot forecasts from 2004 to 2013: 386.5



III. ATMU Dispatches

The San Joaquin Valley Office responded to the following Incident Meteorologist (IMET) requests during 2013:

Incident Name	IMET	Dispatch Dates	Fire Weather District
Springs Fire Ventura County, CA	Dan Harty	5/3/13 – 5/6/13	Oxnard, CA
Carstens Fire Sierra NF	Cindy Bean	6/16/13 -6/23/13	Hanford, CA
Bison Fire Western NV BIA	Dan Harty	7/6/13 – 7/15/13	Reno, NV
Chestnut Fire Humboldt-Toiyabe NF	Dan Harty	8/20/13 – 8/24/13	Reno, NV
Elk Complex Boise NF	Jim Dudley(T)	8/13/13 – 8/23/13	Boise, ID

Total IMET days out of the office: 38

IV. Teaching Assignments

The San Joaquin Valley Office participated as instructors at the following Courses in 2013:

Course Name	Location	Agency Served	Instructor
S-390	Merced, CA February 19	CalFire MMU	Cindy Bean
S-290	Tehachapi, CA April 8-9	Kern County Fire	Cindy Bean
S-290	Bakersfield, CA May 28-29	Kern County Fire	Cindy Bean
S-290	Trimmer, CA September 30	Sierra NF	Cindy Bean
S-290	Bakersfield December 16-17	Bakersfield City Fire Academy	Cindy Bean
RT-130 Presentations			
	Prather, CA March 12	Sierra NF	Cindy Bean
	Springville, CA April 10	Sequoia NF	Dan Harty
	Clovis, CA April 12	Sierra NF Fire Module Meeting	Cindy Bean

V. Training

The following training was completed by the San Joaquin Valley office in 2013:

Virtual IMET Workshop, March 2013	Cindy Bean Dan Harty
IMET Training in Boise, April 2013	Jim Dudley (T)
RT-130	Cindy Bean Dan Harty Jim Dudley (T)

VI. 2013 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:	18
Number of Red Flag Warnings verified:	13
Number of missed events:	5

Warnings preceded by a Fire Weather Watch:	5
Watches not followed by a Warning:	0

Probability of Detection (POD):	72.2%
False Alarm Ratio (FAR):	27.8%
Critical Success Index (CSI):	56.5%
Average Lead Time for Warnings:	14.3 hrs (one warning had 54.8 hrs lead time)
Watches:	58.25 hrs