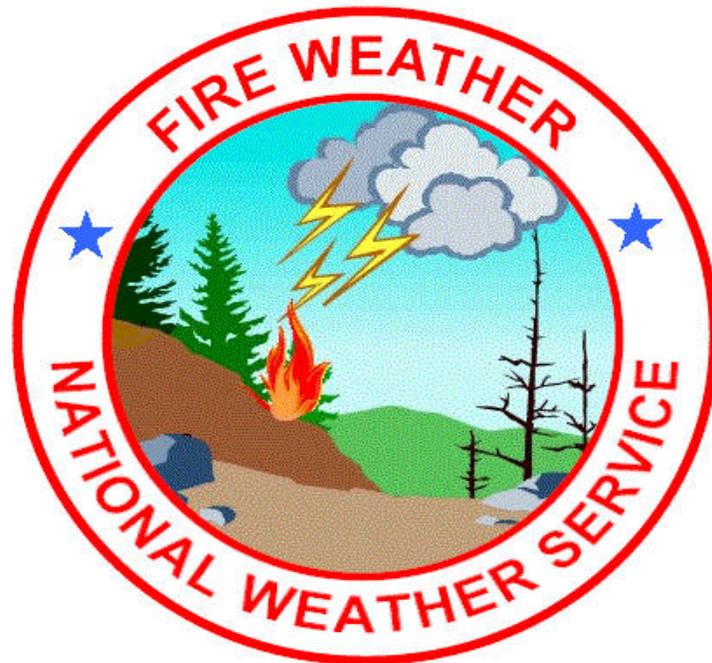


2008 Fire Weather Annual Summary



**San Joaquin Valley Fire Weather District
Hanford, CA**

Table of Contents

I.	Summation of 2008 Fire Weather Season	pg. 3
II.	Spot Forecasts	pg. 7
III.	ATMU Dispatches	pg. 8
IV.	Teaching Assignments	pg. 9
V.	Training	pg. 9
VI.	Red Flag Warning Verification	pg. 10

I. Summation of the 2008 San Joaquin Valley Fire/Hanford Weather Season

The National Weather Service in Hanford began its fire season activities on May 14th. Before this date, one narrative forecast was issued each weekday afternoon and one forecast issued on Monday mornings or the day after a holiday. Warnings, watches, and spot forecasts were issued on an as needed basis. After May 17th, Hanford Fire Weather began its full fire season activities, preparing two narrative forecasts and zone trend forecasts seven days a week. This continued through December 6th.

January and February

January 2008 was wetter than normal. Storms combined to dump 9 feet of snow over the higher elevations of the Sierra between the 3rd and the 6th with up to 2 inches of rain in the San Joaquin Valley. Another weaker storm brought another foot of snow to the higher elevations north of Kings Canyon. After a short dry period at mid-month, the pattern once again became wet. From the January 22nd through early February, several feet of new snow accumulated over the mountains, including the higher elevations of the Tehachapi Mountains. Dry weather took hold from the 5th through the 19th of February. During this time, a dry cold front moved through and brought strong winds across the mountains, especially through and below the passes in Kern County. A series of storm systems moved through from February 20th to the 25th, bringing as much as 5 feet of snow to the higher elevations of the Sierra Nevada and generous amounts of rain to the lower elevations.

At the end of February, snowpack in the Sierra averaged about 120 percent of normal and reservoirs were at about 70 percent of normal.

March

Precipitation in March was well below normal as high pressure dominated the weather pattern over central California. An upper level trough of low pressure moved through on March 13th and 14th, followed by another trough on the 15th. Precipitation with the first trough was light, with rainfall amounts ranging from less than a tenth of an inch in the San Joaquin Valley to just under an inch in the wettest areas of the high Sierra. The second system brought scattered thunderstorms to the San Joaquin Valley and measurable snow down to 3500 feet near the Grapevine. Four inches of snow fell near Frazier Park in Kern County. Winds gusted 45 to 60 mph across the Kern County Mountains and Desert and to around 35 mph in the San Joaquin Valley.

Although a few weak storm systems moved through the region through the last half of March, only one produced precipitation, and it was mainly limited to 4-6 inches of snow in the Sierra. The month ended up as the 2nd driest on record for Bakersfield and the 5th driest at Fresno. Temperatures were slightly above normal at most locations. By the end of the month, the snow pack over the southern Sierra Nevada was 107 percent of normal for the season.

April

Like March, April 2008 was exceptionally dry through out the central California Interior. Although cold fronts moved through rather frequently, most of them brought very little precipitation, but instead brought gusty winds. Most of the San Joaquin Valley reported no rain, making it one of the driest Aprils on record. Even over the higher elevations, monthly

precipitation was meager, with much greater snow lost than gained because of melting and sublimation. By the end of the month the snowpack was only about 60 percent of normal for the season.

May

May was a month of extremes. New records were established for heat during mid month, followed by unseasonably cool weather from the 21st to the 29th. Although the month was drier than normal, more precipitation fell in May than the months of March and April combined in most areas.

During the first twelve days of the month a series of upper level troughs that originated in the Gulf of Alaska moved through the Pacific Northwest to the Great Basin, keeping California in a cool northwest flow aloft. A major change in the pattern occurred on the 14th and persisted for nearly a week as a strong upper level ridge of high pressure anchored itself along the West coast. During this time, temperatures averaged well above normal across the central California interior.

By the 21st, the pattern reverted back to what it was earlier in the month. An unusually deep upper level trough dropped southward from the Gulf of Alaska, broke down the high pressure ridge over California and brought the first measurable rain in months to the San Joaquin Valley from the 23rd to the 27th in addition to unseasonably cool temperatures. During this period, temperatures averaged well below normal throughout the region and snow showers frequented the southern Sierra Nevada above 7000 feet. While the precipitation was beneficial, it was not enough to replenish the seasonal deficit.

June

A prevailing onshore flow kept temperatures slightly below normal for the first 11 days of June as a series of dry upper level troughs moved across the state. These systems brought strong, gusty winds on June 3rd, 7th and 10th, with gusts of 35-40 mph in the San Joaquin Valley and gusts of 50-70 mph through and below the passes in the Kern County Mountains and Desert. A strong upper level ridge over the Four Corners Region dominated the weather pattern from the 13th through the 22nd and brought well above normal temperatures.

On June 21st, a weak upper level disturbance off the central California coast moved northeastward and produced thunderstorms with dry lightning across northern California and as far south as Fresno County. This sparked numerous wildfires, with several large fires in the Sierra National Forest and the CalFire MMU district, as well as hundreds of fires across northern California. High pressure brought a stable air mass to the region from the 23rd through the 29th. The strong inversion kept smoke from the fires trapped in the San Joaquin Valley with very poor air quality.

At the climate stations: The rainfall season (July 1 to June 30) ended up with only 37 percent of normal precipitation at Bakersfield and 75 percent of normal precipitation at Fresno.

July

For much of July, central California was a battleground between an upper level trough over the

eastern Pacific and a ridge of high pressure centered over the Four Corners Region. In most cases, the upper level trough had greater influence on the weather pattern and produced a moderate onshore flow accompanied by shallow marine intrusions into the San Joaquin Valley. From the 7th through the 11th, however, the Four Corners ridge dominated, resulting in very hot weather. During this time, high temperatures of 105-112 were common in the San Joaquin Valley, the foothills, and Kern County Desert, with highs in the 90s as high as 7000 feet. These temperatures were 10-15 degrees above normal.

Monsoonal moisture moved into the region and produced isolated thunderstorms with very heavy rain over the mountains and desert beginning on July 12th. One of these thunderstorms was over the Piute fire area and resulted in flash flooding and mud and debris flows in the vicinity of Lake Isabella. Additional thunderstorms over the Tulare and Kern County Mountains produced additional flash flooding from the 13th through the 16th. High pressure on the 17th through the 19th brought a brief break from the thunderstorms, then monsoonal moisture returned by the 20th. Strong thunderstorms occurred in the Kern desert with flash flooding near Ridgecrest.

August

August was typically dry and averaged a few degrees warmer than normal as an upper level ridge of high pressure centered over the Four Corners region dominated the weather pattern. On only three occasions, this ridge was displaced eastward by the passage of upper level troughs that brought cooler than normal air masses into the central California interior. Specifically on the 9th, 18th, and the 31st, dry cold frontal passages were accompanied by locally strong and gusty winds over the higher elevations as well as the Kern County desert. There were two very brief surges of monsoonal moisture that produced isolated thunderstorms from the Kern County mountains and desert northward into the high Sierra. The first influx occurred between the 4th and the 6th, with another surge between the 14th and the 16th. The hottest weather occurred between the 12th and the 17th and the 23rd and the 30th. During these periods, triple digit heat was common in the San Joaquin Valley, lower foothills and the Kern County desert.

September

A dry cold front moved through the region on September 1st, giving a break from the heat at the end of August. However, it was not long after Labor Day that hot weather returned as an upper level ridge built over the region. A low pressure system dropped south along the coast on the 9th, bringing isolated thunderstorms to the Sierra Nevada. From the 12th through the 16th, daytime relative humidities were very low with poor nighttime recovery. Red Flag warnings were issued for the Sierra Nevada and Kern County mountains on the 15th as humidities dropped into the single digits for 10 or more hours. This occurred in advance of an upper level trough that moved through on the 16th and produced scattered and mostly dry thunderstorms over the Sierra. High pressure once again dominated from the 22nd to the 28th with dry weather and temperatures averaging several degrees above normal. A weak upper level disturbance off the California coast brought a northward flux of moisture into the state for scattered thunderstorms for the last few days of the month.

October

The first storm of the season brought 1 to 2 inches of rain to the Sierra Nevada north of Kings Canyon National Park on October 3rd and 4th. In the San Joaquin Valley, rainfall was generally a

tenth of an inch or less, while the foothills saw ½ inch to an inch of rain. Another low dropped into the Great Basin on the 9th. It did not bring any precipitation, but did bring an unseasonably cool and dry air mass into central California. A ridge of high pressure returned on the 13th, with a rapid warm up. Temperatures reached the 80s and lower 90s in the San Joaquin Valley, with highs in the mid 60s to mid 70s in the high elevations. The weather remained unseasonably warm and dry until the 30th. Red Flag warnings were issued for the Kern County Mountains from the 22nd through the 27th due to extended periods of humidities below 10 percent. As October drew to a close, another storm system arrived and brought ½ to 2 inches of rain to the Sierra foothills with as much as 2 to 5 inches of rain over the higher elevations north of Kern County. Mild air associated with this system kept snow levels around 9000 feet. In the San Joaquin Valley, rainfall amounts were less than 0.15 inches. Overall, precipitation amounts remained well below normal with temperatures averaging slightly above normal for the month.

November

November overall was warmer than normal with near to slightly above normal precipitation. A storm system that tapped into some tropical moisture during the first two days of the month brought 1 to 3 inches of rain in the mountains, with very heavy rain and flooding in the Kern desert. Another storm system brought showers and thunderstorms to the region on the 8th. From the 10th through the 24th, high pressure once again dominated the weather pattern with dry weather and warmer than normal temperatures. During this time, humidities remained low over the higher terrain and kept fire danger high. A storm system moved inland from the Pacific on the 25th and 26th and tracked into southern California Thanksgiving Day. Generous amounts of rain fell with this system as it tapped into subtropical moisture. In its wake, low stratus and fog filled the San Joaquin Valley during the remainder of the month, while mainly clear skies and dry weather continued in the mountains.

December

The dry pattern continued through the first 12 days of December as an upper level ridge of high pressure continued over the region. A weak storm system that moved through southern California on the 7th and 8th brought showers as far north as the Kern County mountains and desert, but the rest of the central California interior remained precipitation free. Temperatures averaged much above normal over the higher terrain for the first 13 days of the month while low clouds and fog kept the San Joaquin Valley with significantly cooler weather.

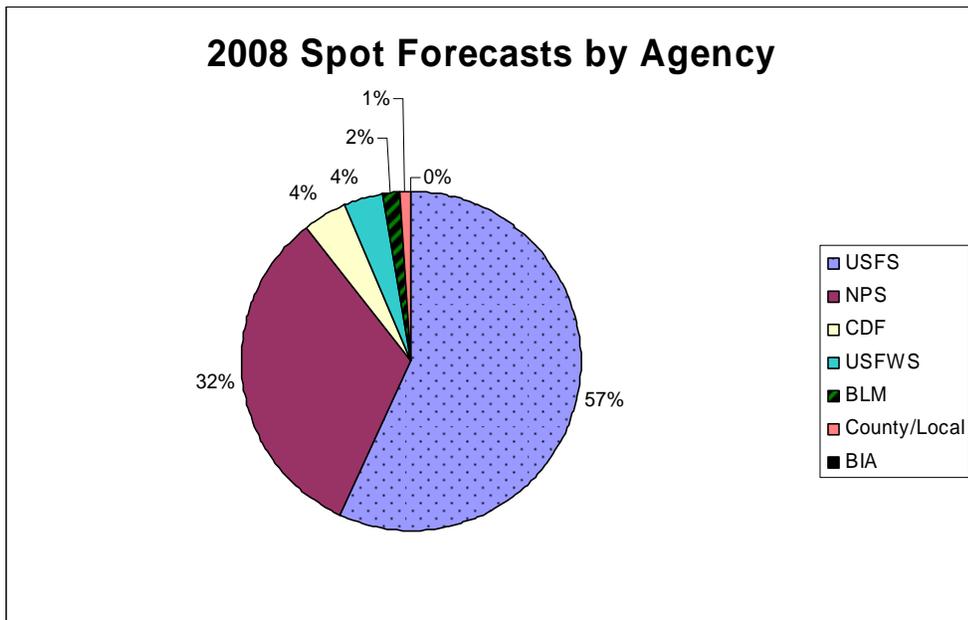
The pattern changed abruptly on the 14th as a series of upper level troughs moved across the state. The first of these systems brought heavy snow to the mountains and generous amounts of rain to the lower elevations. Cold air that accompanied this system brought snow down to 1500 feet. Snow accumulations ranged from about a foot in the Kern County mountains to as much as 4 feet over the high Sierra. Another strong system moved through between the 21st and 25th with a few inches of snow down as low as 2000 feet. Another foot of snow fell in the Kern County mountains with another 2-3 feet over the high Sierra. The month ended with the snow pack averaging about 76 percent of normal for the season.

The Hanford National Weather Service office reverted to an offseason forecast schedule effective December 6th.

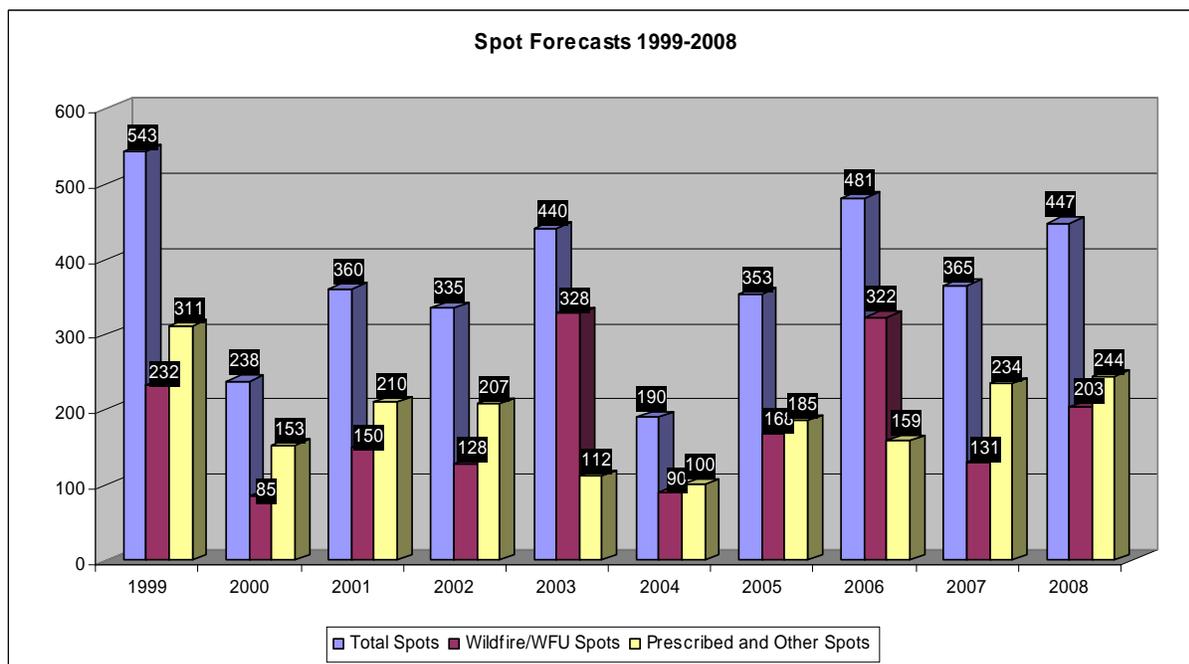
II. Spot Forecasts

The following Spot Forecasts were prepared by the National Weather Service San Joaquin Valley Office in 2008:

Total Spots: 447
 RX spots: 240
 Wildfire spots: 179
 WFU spots: 24
 Hazmat/Other spots: 4
 Monthly average: 37.25



Average yearly spot forecasts from 1999 to 2008: 375.2



III. ATMU Dispatches

The San Joaquin Valley Office responded to the following Incident Meteorologist (IMET) requests during 2008:

<u>Incident Name</u>	<u>IMET</u>	<u>Dispatch Dates</u>	<u>Fire Weather District</u>
Indians Fire Los Padres NF	Cindy Bean	6/19/08 - 7/3/08	Monterey, CA
Cub Complex Lassen NF	Cindy Bean	7/8/08 – 7/22/08	Sacramento, CA
Panther Fire Klamath NF	Dan Harty	7/29/08 – 8/13/08	Medford, OR
Jack Fire Lava Beds NM	Cindy Bean	8/19/08 – 8/21/08	Medford, OR
Bear Wallow Complex Klamath NF	Dan Harty	8/28/08 – 9/12/08	Medford, OR
Hidden Fire Sequoia NP	Cindy Bean	9/16/08 – 9/24/08	Hanford, CA

Total IMET days out of the office: 74

IV. Teaching Assignments

The San Joaquin Valley Office participated as instructors at the following Courses in 2008:

<u>Course Name</u>	<u>Location</u>	<u>Agency Served</u>	<u>Instructor</u>
S-390	Bakersfield, CA February 5	Kern County Fire	Cindy Bean
S-290	Clovis, CA April 22-23	Cal Fire	Cindy Bean Dan Harty (T)
S-290	Bakersfield, CA May 19-21	Kern County Fire	Cindy Bean
S-290	Prather, CA October 14-15	Sierra National Forest	Cindy Bean
S-290	Merced, CA November 10-11	Merced Fire/CalFire	Cindy Bean

V. Training

The following training was completed by the San Joaquin Valley office in 2008:

IMET Workshop, Boise, ID, March 2008 - Cindy Bean
Dan Harty

S-290 Intermediate Fire Behavior Course - Brian Ochs

VI. 2008 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:	8
Number of Red Flag Warnings verified:	6
Number of missed events:	0

Warnings preceded by a Fire Weather Watch:	3
Watches not followed by a Warning:	2

Probability of Detection (POD):	100%
False Alarm Ratio (FAR):	25%
Critical Success Index (CSI):	75%
Average Lead Time for Warnings:	4 hrs
Watches:	30.25 hrs

The Red Flag events can be further broken down into events issued for Dry Thunderstorms and events issued for winds and low relative humidity.

Dry Thunderstorm Events

Number of Red Flag Warnings issued:	1
Number of Red Flag Warnings verified:	0
Number of missed events:	0

Probability of Detection (POD):	0%
False Alarm Ratio (FAR):	100%
Critical Success Index (CSI):	0%

Wind and Low Humidity Events

Number of Red Flag Warnings issued:	7
Number of Red Flag Warnings verified:	6
Number of missed events:	0

Probability of Detection (POD):	100%
False Alarm Ratio (FAR):	14%
Critical Success Index (CSI):	86%
Average Lead Time:	4 hrs