

**UNITED STATES DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE  
PHOENIX, ARIZONA**

***Fire Weather Annual Report  
2008***

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## A. Fire Weather Overview

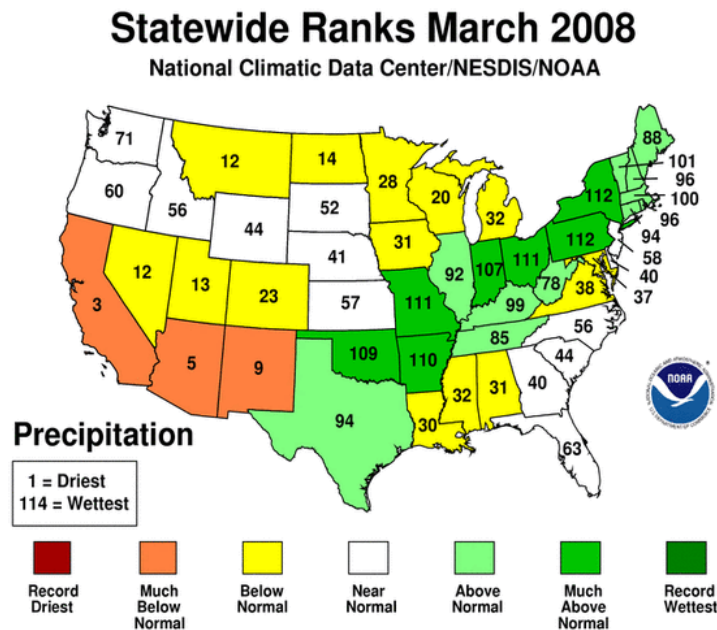
### Summary of Seasonal Weather Highlights:

#### JANUARY-MARCH:

In December, much needed precipitation fell over the Southwest United States and temperatures were much colder than normal for the month. By the end of December, the snow pack across the West was near to above normal, with very heavy amounts reported over portions of Colorado, eastern Arizona and northwest New Mexico. January was a wetter than average month for much of the drought-plagued West, with heavy rainfall in areas that included southern California and above average snow conditions in the Sierras, Cascades, and southern Rocky Mountains.

The wetter conditions continued through February and led to some improvement in drought conditions throughout the Southwest. The Basin Outlook Report prepared by the Natural Resources Conservation Services (NRCS) reported that the mountain snowpack exceeded 150 percent of average in parts of Colorado, New Mexico, Arizona, and Oregon. Cumulative precipitation totals were also above average in key river basins.

Strong high pressure developed over the desert Southwest in March and kept the storm track well over the northern tier states. This allowed for conditions to remain extremely dry across the southwest United States and did little to alleviate the drought. The Sacramento Airport in California tied the record for the month of March as the driest in 68 years with only 0.05 inches of precipitation that measured 2.75 inches below normal.

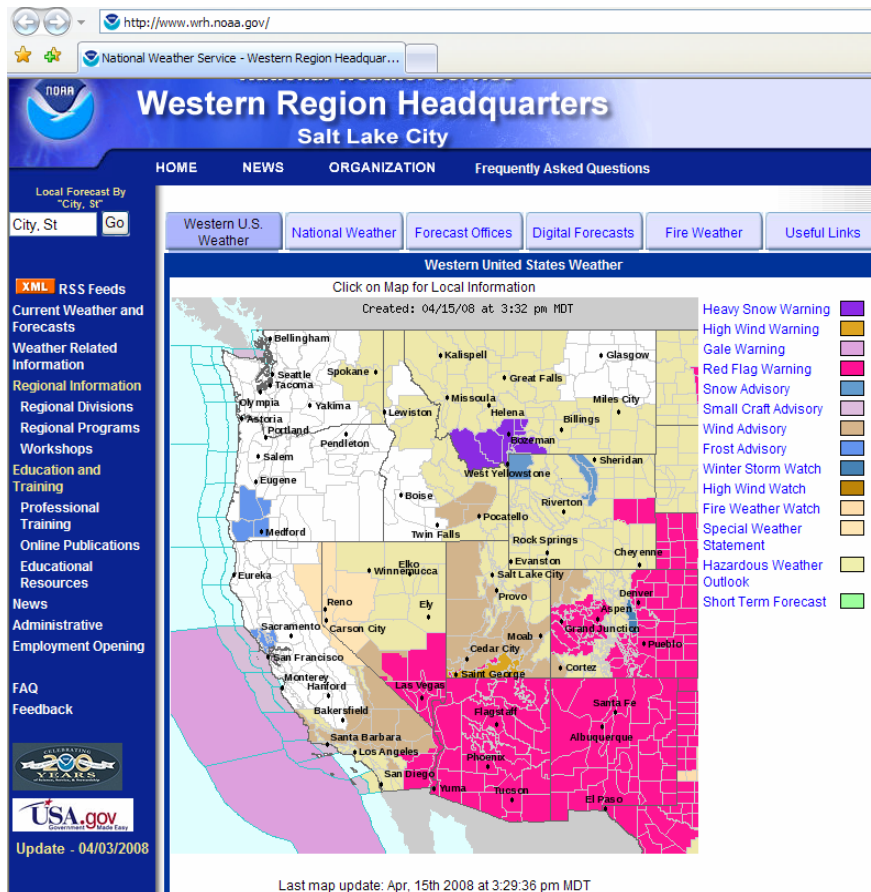


As temperatures warmed up in March, the snowpack conditions quickly declined in many parts of the intermountain west. However, the heavy winter snowfall did improve the health of the snow pack from what it had been in more than a decade.

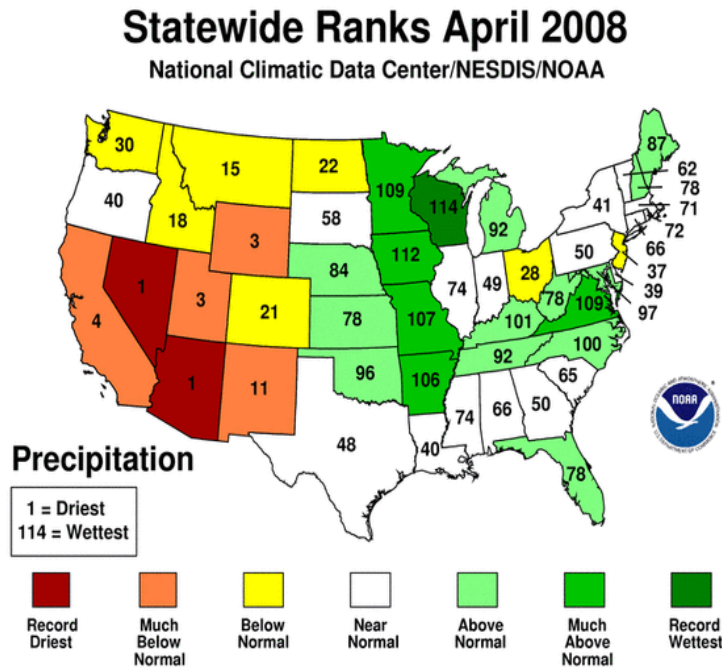
Although moderate La Nina conditions were present in the equatorial Pacific, above average rain and snow fell across the southwest United States in the early winter. This was anomalously “El Nino-like”, since the Southwest is generally prone to drier-than-average conditions under a La Nina influence. Overall, the March weather pattern bore a greater resemblance to La Niña, with drier conditions across Utah, Arizona, Nevada, and California.

### APRIL-JUNE:

The influence of a strong La Nina continued into the spring months. Snow packs finally dipped to below normal readings across southern portions of Arizona and New Mexico, and above normal temperatures and drier conditions took hold across California and Arizona. However, a series of anomalously strong low pressure systems brought cold temperatures and increased precipitation to far northern California and Oregon. The dry tail-end of these systems helped generate strong gusty winds across southern California and the desert Southwest, and led to widespread Red Flag Warnings across the region.

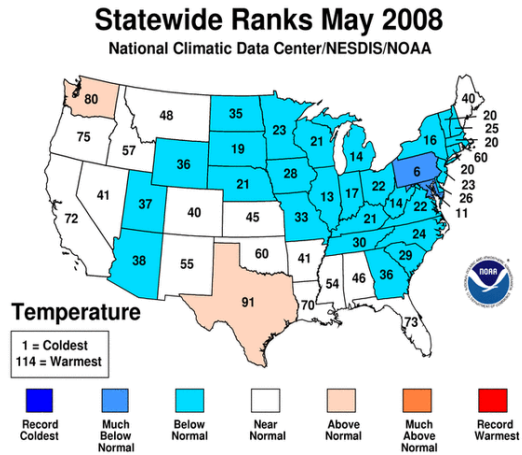
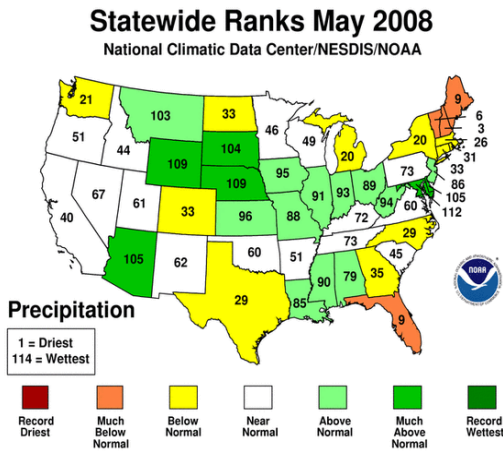


By the end of April, Utah, Nevada, California and Arizona were much drier than average, with Arizona having the third driest April on record and California ranking the fifth driest. The advent of warmer and drier conditions facilitated rapid curing of abundant shrubs and fine grass fuels across the desert elevations and resulted in above normal fire potential during the three month period. Although no large fires occurred during this time period, a myriad of smaller fires such as the *Alamo* and *Beehive Fire* that burned along the international border in southern Arizona, and the *Indian Wells* and *Amos Ranch* fires charred acreage in northern Arizona.

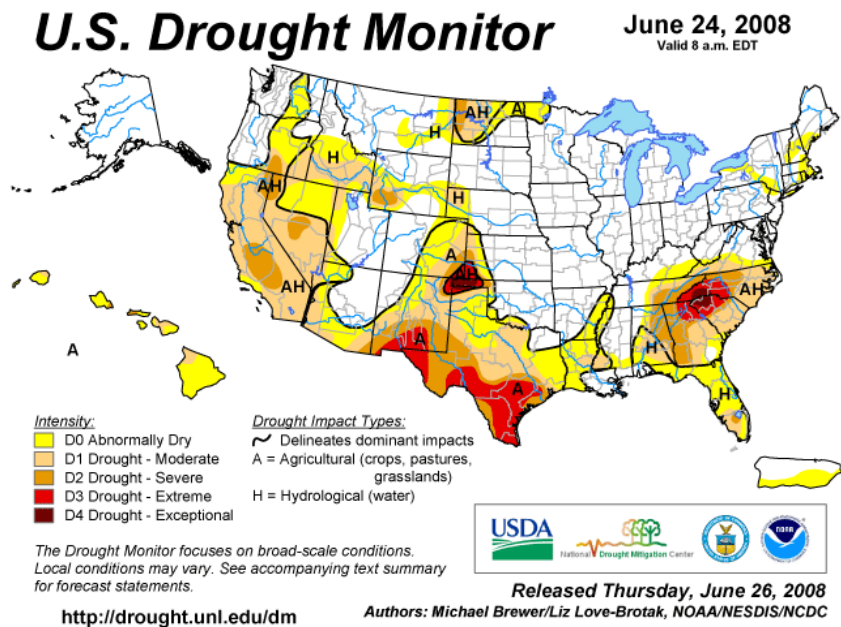


The first half of May was noted for unusually hot conditions. High temperatures across the lower deserts ranged 10 to 20 degrees above normal and set records in many locations. The warmth was generated by a strong area of high pressure that moved over the western United States. Strong gusty winds, hot temperatures and dry conditions contributed to a rash of wildfires such as the *Solano*, *Loafer*, *Willow* and *Frye Mesa*. Although fires were scattered throughout the state, the highest wildfire activity was noted in southeastern Arizona.

The warmth was short lived though as an unusually strong, cold low pressure system moved into the region during the latter part of the month. High temperatures plunged into the 70s, and lows into the 50s for several days, establishing one of the largest temperature changes recorded for Phoenix and other locations in the state during the month of May. The storm system also brought significant amounts of precipitation to north-central and eastern Arizona during a normally dry month (refer to statewide rankings on the follow page). After the storm system moved out, temperatures rebounded back into the 90s and above 100 degrees by the first week of June.

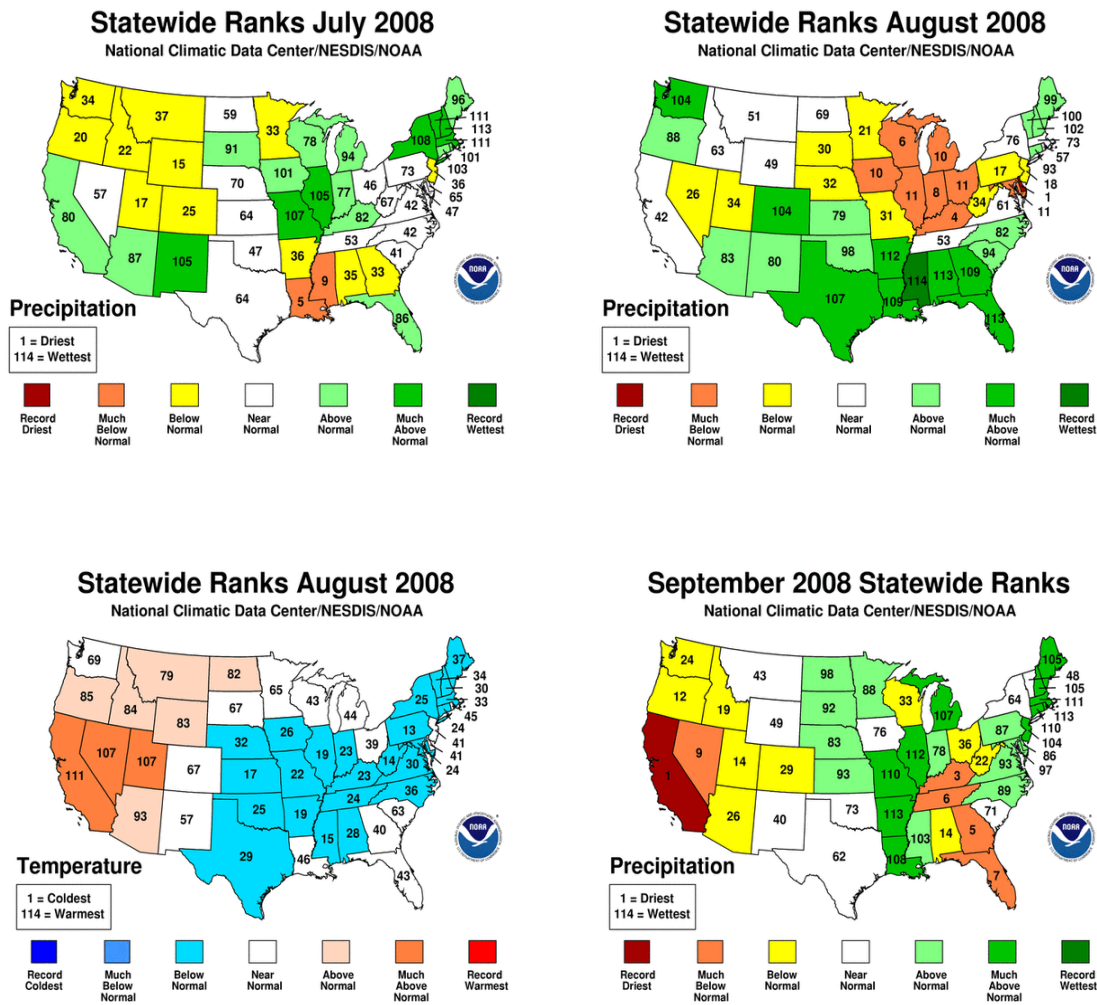


The convective potential slowly increased during the month of June as the summertime high pressure regime shifted moisture boundaries across the region. By the end of June, many wildfires were raging in northern California and Arizona, largely due to lightning strikes from dry thunderstorms. Two of the largest fires in Arizona – the *Ethan Fire* burned south of the Phoenix Metropolitan area, and the *Lane 2 Fire* charred approximately 10,000 acres near the community of Crown King. The unusually dry conditions further amplified the moderate to severe drought conditions in place across the desert Southwest and California.



## JULY-SEPTEMBER:

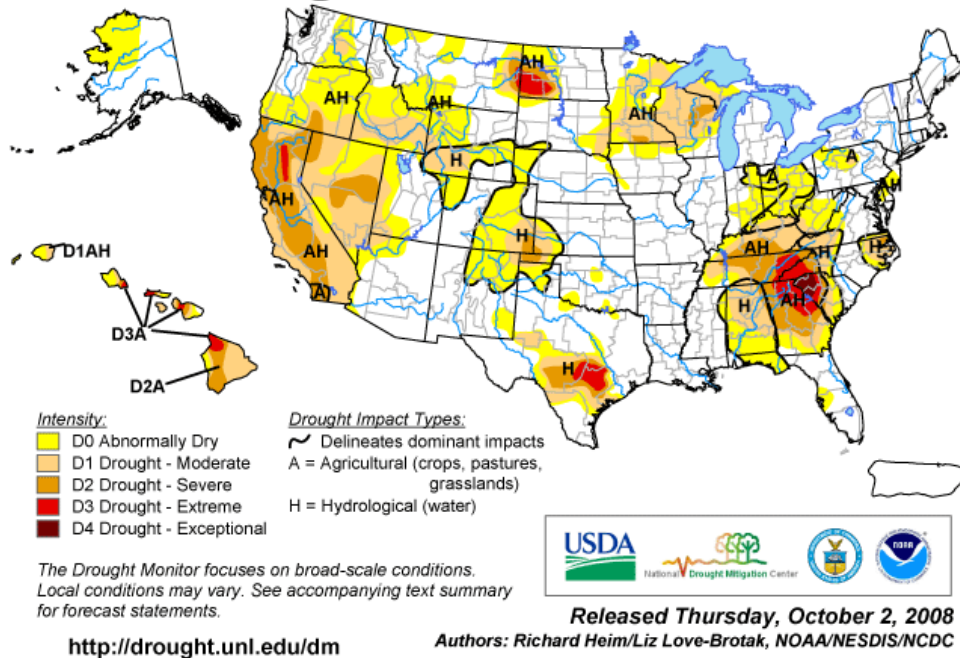
The Arizona Monsoon returned the desert Southwest the first week of July, bringing a seasonal influx of moisture and precipitation that diminished the fire danger and supplied closure to the fire season. For a second year, the summer thunderstorm season displayed a good deal of variability and delivered average to above-average precipitation to most of Arizona and New Mexico. Extremely hot and dry conditions were ubiquitous across northern and central California, thus hindering efforts to contain a number of large wildfires. California also had one of the driest months of September on record, with an average of just 0.01 inch of precipitation — well below average!



Yet, summer thunderstorms brought much needed moisture to southern New Mexico and Arizona with 30-day totals supporting rainfall that measured 200 to 800 percent of the average precipitation. The wetter than normal summer greatly improved drought conditions for many areas in Arizona and New Mexico as illustrated by the following graphic.

# U.S. Drought Monitor

September 30, 2008  
Valid 8 a.m. EDT



## OCTOBER-DECEMBER:

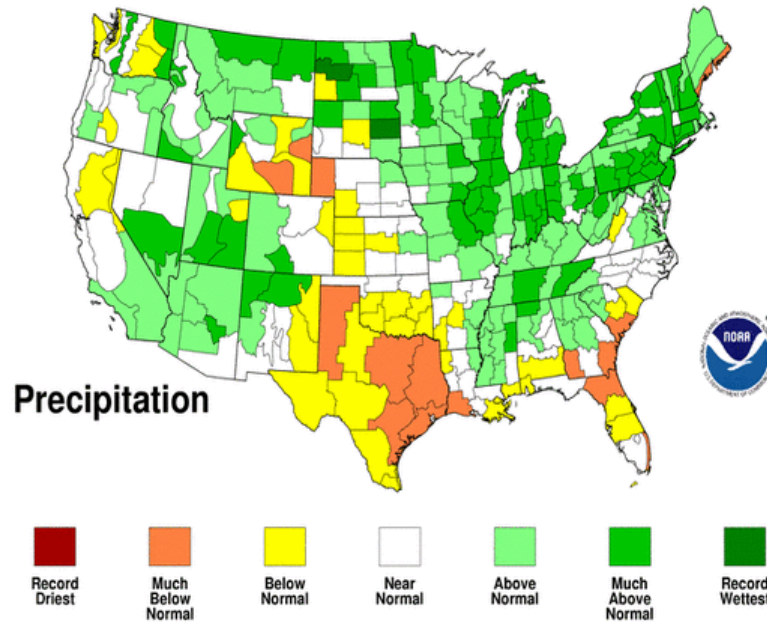
Large wildfires burned in California through October into November. Fueled by strong Santa Ana winds, three separate wildfires were responsible for the destruction of numerous homes and led to mandatory evacuations place from Santa Barbara to San Diego. Strong wind gusts over 70 mph, combined with hot temperatures and very low humidity values produced devastating results. In the aftermath of the fires, a total of over 41,000 acres were burned, over 1000 homes destroyed, and up to 15,000 people were evacuated during the wind events.

Arizona received little in the way of precipitation and temperatures remained above normal throughout most of the western United States until the end of November. However, two storms – one during the Thanksgiving holiday at the end of November and a second in mid December, finally brought cooler temperatures, plentiful rain and record snowfalls to some areas of the region.

On November 26<sup>th</sup>, an intense storm produced locally heavy rain and flash flooding in parts of southern California. Yuma International Airport reported 2.22 inches of rain during the course of the storm. This amount of precipitation totaled more rain than what fell during the first 10 months of the year at Yuma, making the event the wettest November on record. The most recent storm system that passed through the desert Southwest from December 16<sup>th</sup> to December 18<sup>th</sup> brought colder-than-average temperatures and more precipitation to Arizona and northern New Mexico that was well above normal in some basins.

# Dec 2008 Divisional Ranks

National Climatic Data Center/NESDIS/NOAA



Year-end snowpack and precipitation reports provided from the Western Region Climate Center indicate Arizona watersheds and measurement sites currently range from 116 to 191 percent of average in accumulated precipitation. The highest amounts are credited to the Verde River Basin and Central Mogollon Rim. The San Francisco and Upper Gila River Basins in eastern Arizona and western New Mexico rank at the low end of the range, as well as most of the Navajo Nation lands in northeast Arizona. The Chiricahua Mountains and other areas in far southeast portions of the state have even lower percentages and are drier (<http://www.wrcc.dri.edu>).

According to the National Weather Service Climate Prediction Center, atmospheric and oceanic conditions are transitioning into a La Nina pattern and are expected to continue the pattern into the early spring of 2009. This is similar to 2008 in which the La Nina pattern resulted in dry conditions across California. Above normal temperatures are anticipated for most of Arizona and extreme southeast California through February 2009, along with equal chances of above/below/normal precipitation for the same areas and time frame.

Based on this seasonal climate prediction, the National Interagency Fire Center (NIFC) Predictive Services project a normal significant fire potential for Arizona and western New Mexico. The storm track in the early spring will favor the Four Corners region with northern areas of Arizona and New Mexico expected to be moist and areas further to the south and east more on the dry side. Significant fire potential will remain normal in most areas, but will begin transitioning to above normal by March as drier and warmer weather expand north and west.



## B. Red Flag Warning Verification

The National Weather Service in Phoenix issued a total of **64** Red Flag Warnings (RFW) all due to strong winds and low relative humidity. At this time, NWS Phoenix does not issue watches, or warnings for dry thunderstorms in Arizona per the Region 3 AOP. Per Region 5 AOP, criteria for a dry lightning RFW apply only to fire weather zones 230 and 232 in southeast California. There were **no** Red Flag Warnings issued for dry thunderstorm events in 2008.\*\*

- Number of RFWs Issued (by zone)
- Probability of Detection (POD) (Highest Skill = 1.0)
- Far Alarm Ratio (FAR) (Highest Skill = 0.0)
- Critical Success Index (CSI) (Highest Skill = 1.0)
- Average Lead Time of the Warning

<u>Zone</u>	<u># Issued</u>	<u>POD</u>	<u>FAR</u>	<u>CSI</u>	<u>Avg. Lead Time</u>
131/232	19	1.00	0.11	0.89	11.62 hours
132	15	1.00	0.13	0.87	7.62 hours
133	8	1.00	0.25	0.75	12.00 hours
230	8**	1.00	0.63	0.38	14.25 hours
232	14**	1.00	0.21	0.79	12.15 hours
<b>Total</b>	<b>64</b>	<b>1.00</b>	<b>0.22</b>	<b>0.78</b>	<b>10.50 hours</b>

## C. Fire Weather Watch Verification

The National Weather Service in Phoenix issued a total of **41** Fire Weather Watches in 2008, all due to strong winds and low relative humidity.

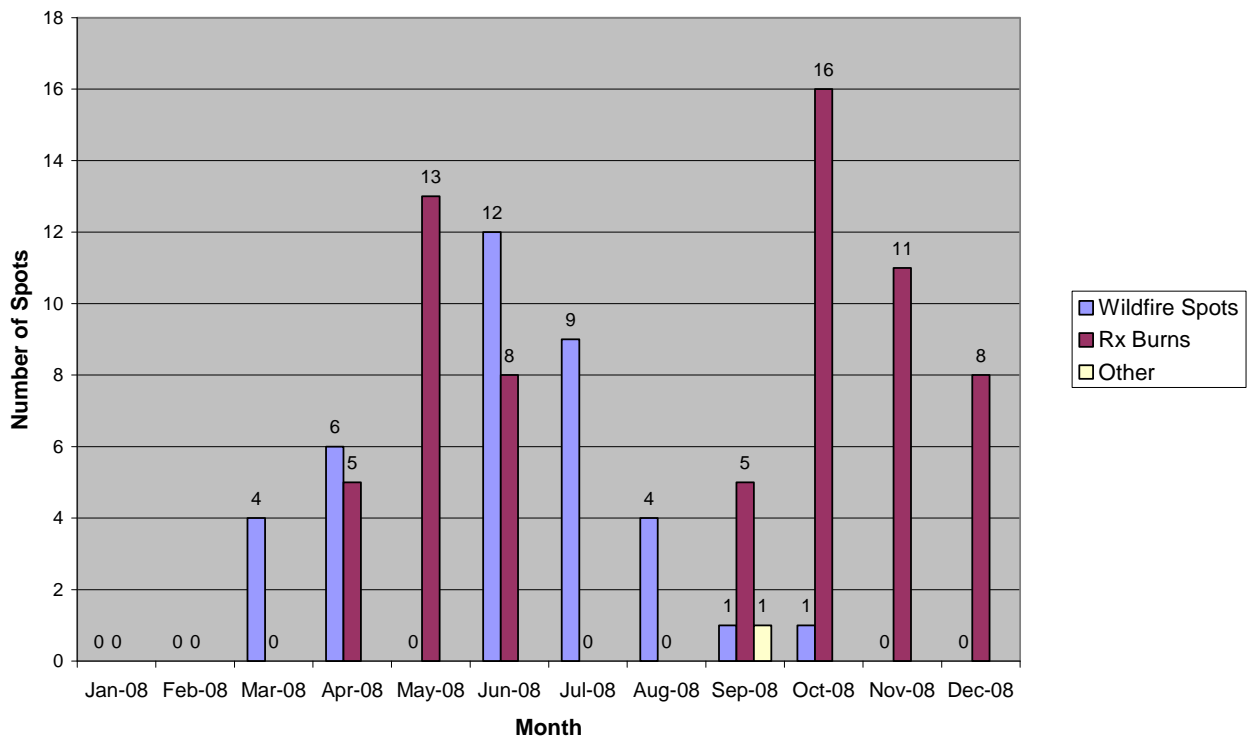
<u>Zone</u>	<u># Issued</u>	<u>Upgraded to RFW</u>	<u>Verified</u>	<u>Avg. Lead Time</u>
131/231	13	10	8	36.08 hours
132	8	7	5	36.25 hours
133	6	6	5	37.25 hours
230	8	3	2	48.00 hours
232	11	9	7	33.65 hours
<b>Total</b>	<b>46</b>	<b>35</b>	<b>27</b>	<b>36.13 hours</b>

## D. Spot Forecasts

The National Weather Service in Phoenix issued a total of **104** spot forecasts during 2008. Of the total, **19 spots** were issued for the Lower Colorado River Valley (131/231), **2 spots** for the Southeast California deserts (232), and **none** for Joshua Tree National Park (230). The chart below breaks down the number and type of spot forecast issued per month.

<b><u>RX BURNS</u></b>	<b><u>WILDFIRES</u></b>	<b><u>OTHER</u></b>	<b><u>TOTAL</u></b>
<b>66</b>	<b>37</b>	<b>1</b>	<b>104</b>

**2008 Monthly Spot Forecasts**



### **Number of Spot Forecasts per Zone:**

AZ133 - 66   AZ132 - 17   AZ131/CA231 - 19   CA232 - 2   CA230 - none

### **Number of Spot Forecast Requests by Agency/Dispatch Center:**

PIDC – 42\*   AZ-AIDC – 33   San Carlos BIA – 27   CAL Fire – 2

\* (Note: Received feedback observations during the burning period from Tonto National Forest for 10 spot forecasts. Feedback produced a better forecast and helped with verification)

**Other Requests:** SEP through OCT: NWS received 5 phone requests from ADEQ and 1 phone request from Rural Metro (Florence) for wind-humidity trends near unknown structural/hay fires.

## **E. Incident Meteorologist (IMET) Dispatches**

The National Weather Service in Phoenix participated in **three** (3) dispatches in 2008. During those dispatches, IMET Valerie L. Meyers was deployed out to fires for a total of **21** days.

### **WFO PHOENIX:**

<b><u>Incident Name</u></b>	<b><u>Location</u></b>	<b><u>Dispatch Days</u></b>	<b><u>Dispatch Dates</u></b>
1) Alamo Fire	Nogales, AZ	5 Days	4/19 – 4/23/08
2) Lane 2 Fire	Crown King, AZ	8 Days	6/30 – 7/7/08
3) Craig Fire	Oroville, CA	8 Days	8/5 – 8/12/08

## **F. Fire Weather Training and Outreach Activities**

The National Weather Service in Phoenix continued to be active with fire weather training, meetings and outreach activities in 2008.

<b><u>Dates</u></b>	<b><u>Activity</u></b>	<b><u>Agency</u></b>	<b><u>Location</u></b>
January 15-16	Region 3 AOP Preseason Meeting	NWS and local land management agencies	Albuquerque, NM
January 18-20	Arizona Fire District Association Conference	Arizona Fire Districts	Laughlin, NV
February 12-13	Preseason Meetings	AIDC and PIDC dispatchers, BLM and TNF FMOs	Phoenix, AZ
February 14-15	Preseason Meetings	Rural Metro Fire, Imperial County-OES, BLM and BIA	El-Centro-Heber, CA Yuma, AZ
March 26-27	Region 5 AOP Preseason Meeting	NWS, predictive services and land management agencies	Redding, CA
April 16	State Wildland Fire Exercise	ADEM, Arizona State Forestry, County EMs	Phoenix, AZ
June 11-12	S290 Instruction	TNF – Mesa Ranger District	East Mesa, AZ
August 23	Arizona Fire District Association Conference	Arizona Fire Districts	Tucson, AZ
September 24	Outreach-Meeting	Blythe Fire- CAL Fire Riverside County	Blythe, CA
December 3	Mobile Tire Facility Assessment (IMET-ISS)	Arizona State Forestry	Mobile, AZ
December 10	PVNGS Drill (IMET-ISS)	ADEM, Maricopa County EM	Phoenix, AZ