

***EUREKA FIRE WEATHER  
ANNUAL REPORT 2010  
For  
NORTHWEST CALIFORNIA***



**Buckeye Fire near Petrolia, CA**

**September 7, 2010**

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# I. INCIDENT REVIEW

## National / Regional Fire Activity

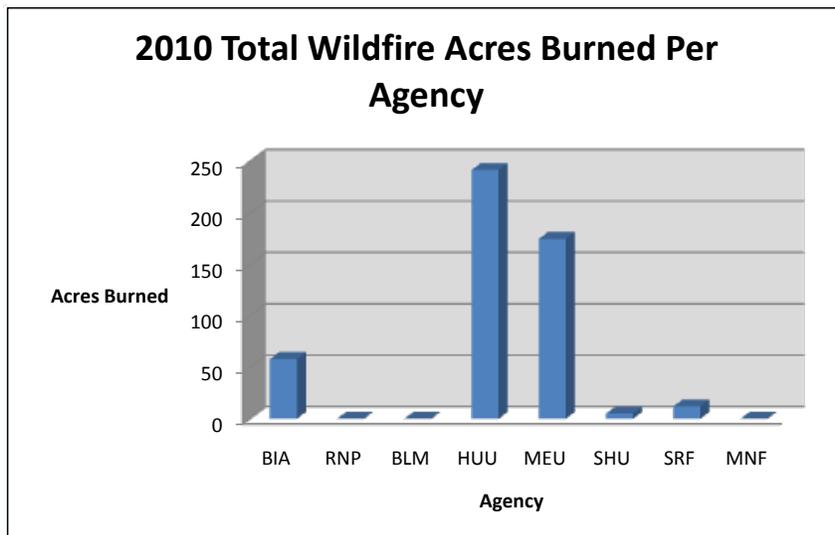
It was another very quiet year in terms of wildfire activity both regionally and nationally. Northwest California totaled less than 1000 acres during 2010 and ironically, the three national forests (MNF, SHF and SRF) located within the Eureka County Warning Area (CWA) totaled well under 100 acres. The largest fire, Buckeye, occurred in Humboldt County during early September. Initially a structural fire that spread into adjacent fuels, the fire was fanned by strong north winds along the coast. The fire

was managed by CALFIRE Team 2 and was eventually aided by a late fall storm which supplied approximately a 0.25 inches of rain and 2 consecutive days of very high relative humidity values.

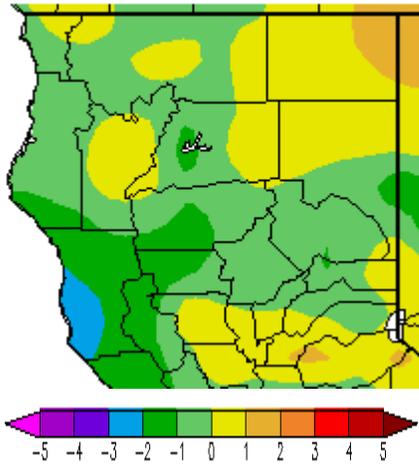
Although 2010 was moderately active in regards to national fire activity (right), northern California has now experienced 2 straight years of below average acres burned due to wildfire.

The graph below depicts the total acres burned by wildfires during 2010 delineated by agency responsibility. Some direct protection areas such as MNF and SHU overlap into the Sacramento CWA, thus not all of the acres shown above were solely within the Eureka CWA.

Year-To-Date Totals as of January 29 <sup>th</sup>	Nationwide Number of Fires	Nationwide Number of Acres Burned
2010	66,013	3,305,227
2009	77,044	5,835,801
2008	75,786	5,131,089
2007	79,129	8,900,885
2006	89,792	9,508,251
2005	60,678	8,433,600
2004	64,220	8,063,941
2003	57,637	3,815,952
2002	71,345	7,117,812
2001	79,513	3,355,138
5 yr Ave 05 - '10	76,486	7,656,854



## II. WEATHER REVIEW



The fire season of 2010 proved to be one of the mildest within the last 15 years across northern California and specifically northwest California. The main reason was the fact that fuel moisture levels both heavy and light were historically moist through late June. For the year...precipitation was well above normal (**Fig 2.1 a,b**) and temperatures were slightly below normal (left). Near normal precipitation totals were recorded during the 2009-2010 winter but beginning in March, northern California experienced an incredibly wet spring that persisted into early summer. February 2010 was very dry and cool with temperatures slightly cooler than normal but precipitation amounts generally fell about an inch below normal as high pressure resided across the

Eastern Pacific. In early March the ridge of high pressure gave way to a series of strong low pressure systems that provided several back to back Pacific fronts which entrained tropical moisture and copious amounts of rain and snow into the region. The net effect resulted in precipitation running about 5 inches above normal for the month. Not nearly as wet as March, April still served to be wetter than normal as the storms continued to pass through. May and June also saw additional storms with both months each ending about 1-2 inches above normal for precipitation. Finally in July the rains ceased but by then fuels were very moist, pro-longing the necessity of a very hot and dry summer...which, in effect turned out to be normal in terms of temperature. Coincidentally the convective season, typically June through August, was also very benign. WFO Eureka targeted only 3 potential lightning events during the summer which warranted a total of 16 Red Flag Watches for Dry Lightning. Of those 16, six watches were upgraded to warnings but none verified; meaning that there were no significant lightning events that would have sparked wildfires had the fuels been receptive.

Summer of 2010 marks the second year in a row of a very quiet fire season. Interestingly it also marks the second year in a row where a moderate to strong El Nino was observed. The winter prior to the summer of 2008, was considered a strong La Nina and was then followed by one of the most active wildfire seasons in history across northwest California. The correlation between the different phases of ENSO and wildfire activity deserves more attention...but a study performed by one of the forecasters in Eureka showed a clear relationship between heavier rainfall lasting late into the spring and El Nino (2009,2010). While during episodes of La Nina there were lower precipitation rates ending earlier in the winter...very similar to what occurred during 2008. The idea is that if rain and snow ends earlier...it gives the fuels more time to cure, increasing the receptiveness to fire earlier, while extending the fire season. Current ENSO analysis suggests that we are currently shifting back into a very strong La Nina, thus it will be interesting to see the state of the fuels in June.

Fig. 2.1 a

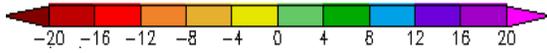
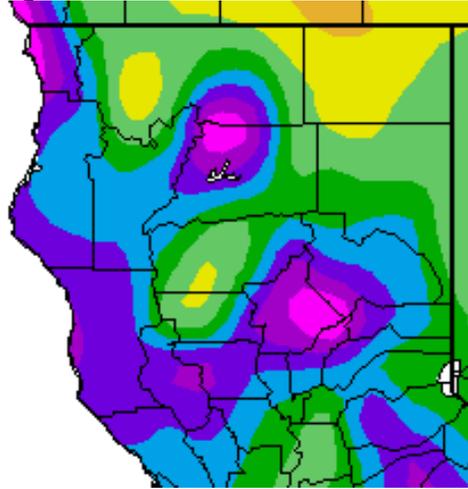
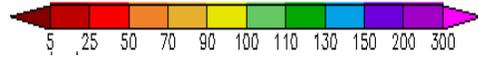
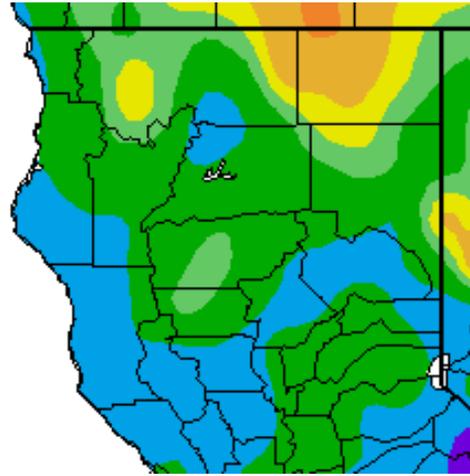


Fig. 2.1 b



- a) Departure from average precipitation in inches for the period Jan 1, 2010 through December 31, 2010.
- b) Departure from average precipitation in percent for the period Jan 1, 2010 through December 31, 2010.

### III. RED FLAG WARNING VERIFICATION

Eureka Fire Weather issued 6 individual zone Red Flag Warnings during the 2010 fire season. Of the 6 warnings all were for Dry Lightning and none of the 6 verified. All warnings were preceded by a watch. There were no events that were considered missed.

- Correct Warnings (Verified) = 0      POD = Probability of Detection
- Incorrect Warnings (not verified) = 6      FAR = False Alarm Ratio
- Missed Events = 0      CSI = Critical Success Index

2010 EKA Verification Summary				
	POD	FAR	CSI	LEAD TIME (HOURS)
EKA Wind/Rh	N/A	N/A	N/A	N/A
Regional Goal	0.93	0.24	0.70	11.5
EKA Dry Lightning	0.00	1.00	0.00	N/A
Regional Goal	0.74	0.50	0.53	7.0
EKA Combined	0.00	1.00	0.00	N/A
Regional Goal	0.85	0.37	0.64	10.0
Highest Possible Accuracy	1.00	0.00	1.00	

2010 WARNING VERIFICATION BY ZONE								
ZONE	# RFW	Correct RFW	Incorrect RFW	Missed Event	POD	FAR	CSI	# Watch
201	0.0	0.0	0.0	0.0				1.0
202	0.0	0.0	0.0	0.0				0.0
203	1.0	0.0	1.0	0.0	0.0	1.0	0.0	2.0
204	1.0	0.0	1.0	0.0	0.0	1.0	0.0	2.0
211	1.0	0.0	1.0	0.0	0.0	1.0	0.0	2.0
212	1.0	0.0	1.0	0.0	0.0	1.0	0.0	2.0
276	0.0	0.0	0.0	0.0				2.0
277	1.0	0.0	1.0	0.0	0.0	1.0	0.0	2.0
283	1.0	0.0	1.0	0.0	0.0	1.0	0.0	3.0
<b>TOTALS</b>	<b>6.0</b>	<b>0.0</b>	<b>6.0</b>	<b>0.0</b>	<b>0.0</b>	<b>1.0</b>	<b>0</b>	<b>16.0</b>

## IV. NFDRS FORECAST VERIFICATION

Verification was performed by comparing forecasted values for each zone then compared against the zone averaged observation at 1300 PDT the following day. The absolute mean difference is then compared to persistence. Persistence is defined as the absolute mean difference between the observation at 1300 PDT the day the forecast was issued and the observation at 1300 PDT the following day. Each zone is comprised of several RAWS observations that are used to calculate the zone averaged values. The zones and RAWS locations are depicted in the map below.

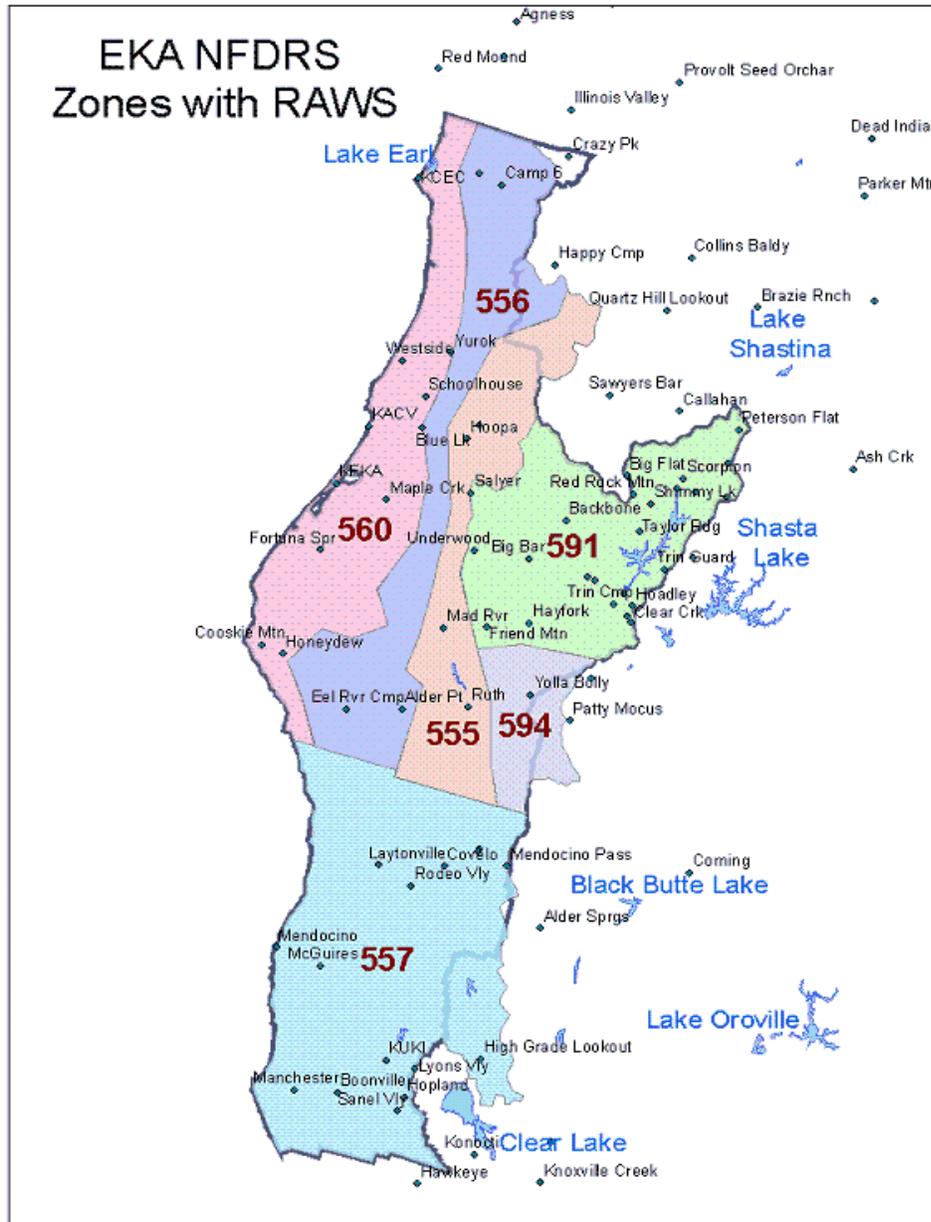


Fig. 4.2 shows that an improvement in temperature forecasts over persistence ranged from 25-40% for all zones last summer, while relative humidity forecasts showed a general improvement of 15 to 25% over persistence. Although wind speed forecasts remain generally poor compare to persistence, there was significant improvement during 2010 compare to 2009 across all zones...especially zone 591 where nearly an 8% improvement was seen. In addition, forecasters beat persistence in wind forecasts for Zone 560, the coastal zone. Persistence beat the forecasted wind speeds...for the remaining zones while a strong negative bias still resides across zone 591...but compare to 2009 it also improved about 5%.

Fig. 4.2

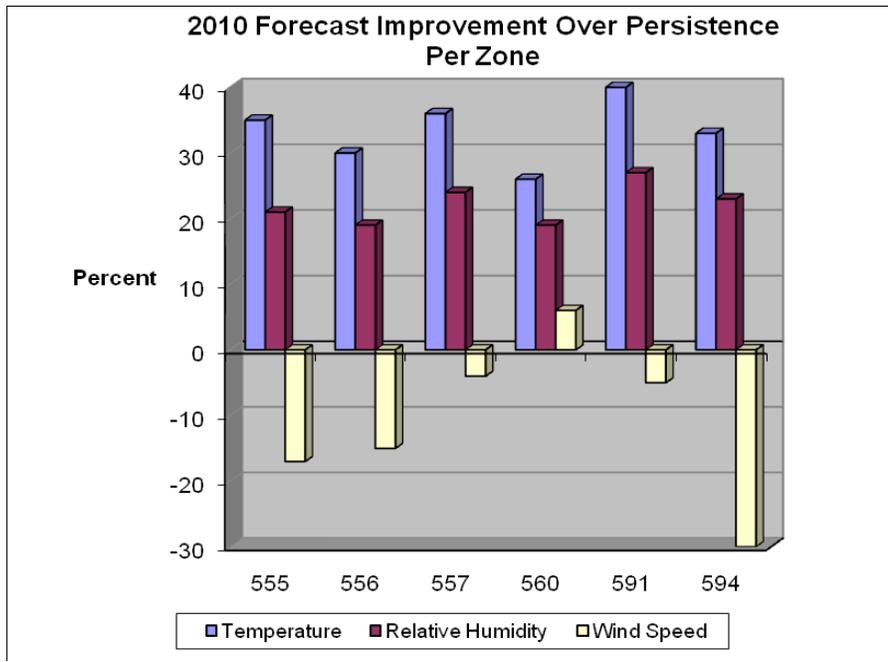
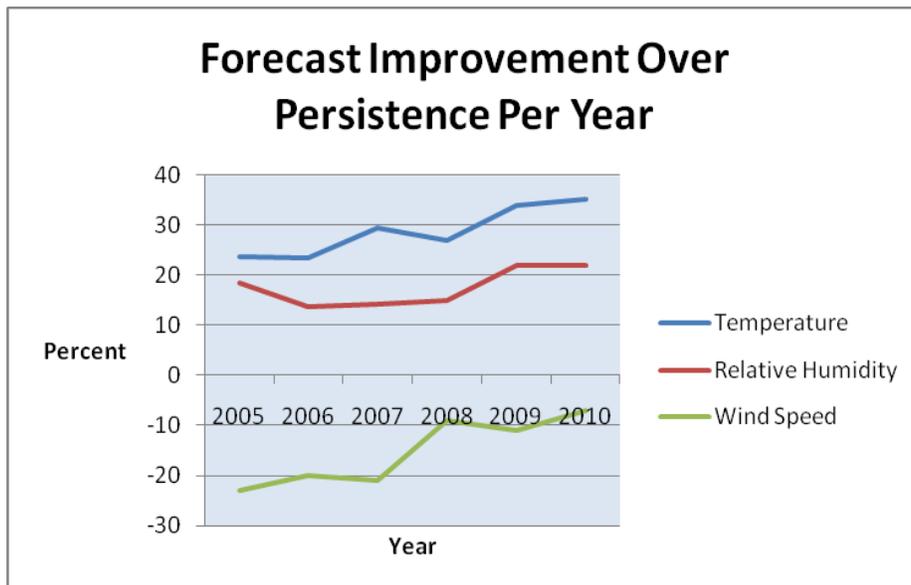


Fig 4.3



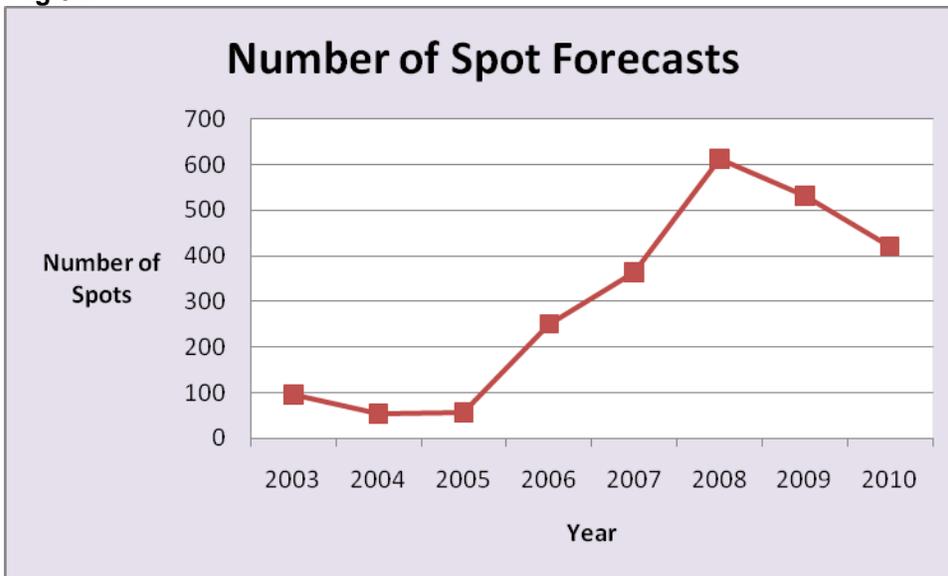
## V. SPOT FORECASTS

The National Weather Service Office in Eureka issued a total of 421 site specific or spot forecasts during the calendar year 2010. This presents a decrease of 111 spot forecasts from last year and the first time in the last three years that the number of spots produced from the office has fallen. Given the very benign wildfire season across the CWA it is understandable that only 22 spots were issued for wildfires which represents less than 5%. However the nearly 400 spots for prescription burns continues a strong trend of requests from the agencies that has been seen the during last five years.

**Table 5.1**

Spots for Wildfires	<b>22</b>
Spots for Project Burns	<b>399</b>
Spots for Hazmat	<b>0</b>
Misc. / Training Spots	<b>0</b>
Average Turnaround Time For All Spots	<b>27 minutes</b>
Total Spots	<b>421</b>

**Fig 5.2**



During 2010 WFO Eureka ranked 16<sup>th</sup> out of 122 NWS offices in terms of overall spot forecast production but ranks 4<sup>th</sup> in the nation regarding the issuance of prescription burn related spot forecasts. The average “turn-around-time” for all spot forecasts was 27 minutes. The turn-around time showed a decrease of 2 minutes from 2009.

Turn-around time is defined as the elapsed time between a spot forecast request receipt (or notification) and forecast transmission.

The majority of Rx spot forecast requests were for small burns or pile burns associated with the Forest Service. Similar to previous years, the majority of spot forecast requests originated from the USFS and CAL Fire with less than 5% distributed between the national and state parks and BIA.

Fig. 5.3

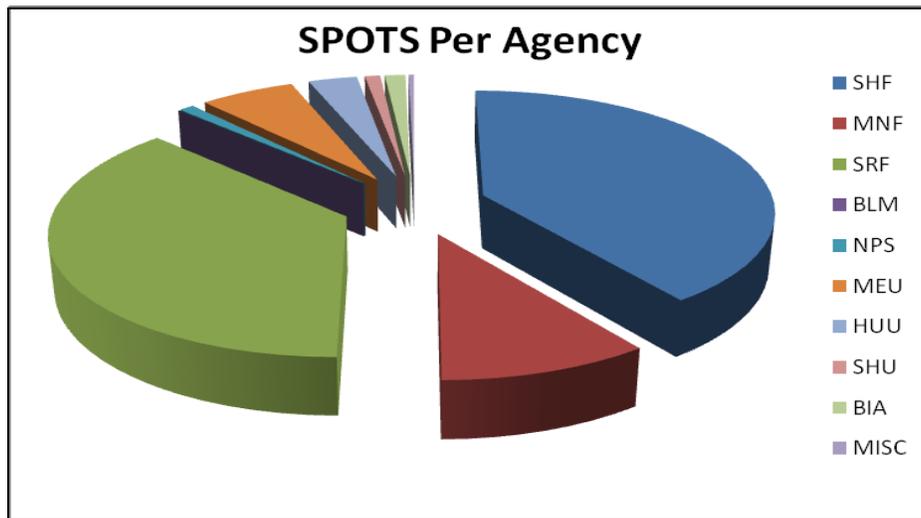
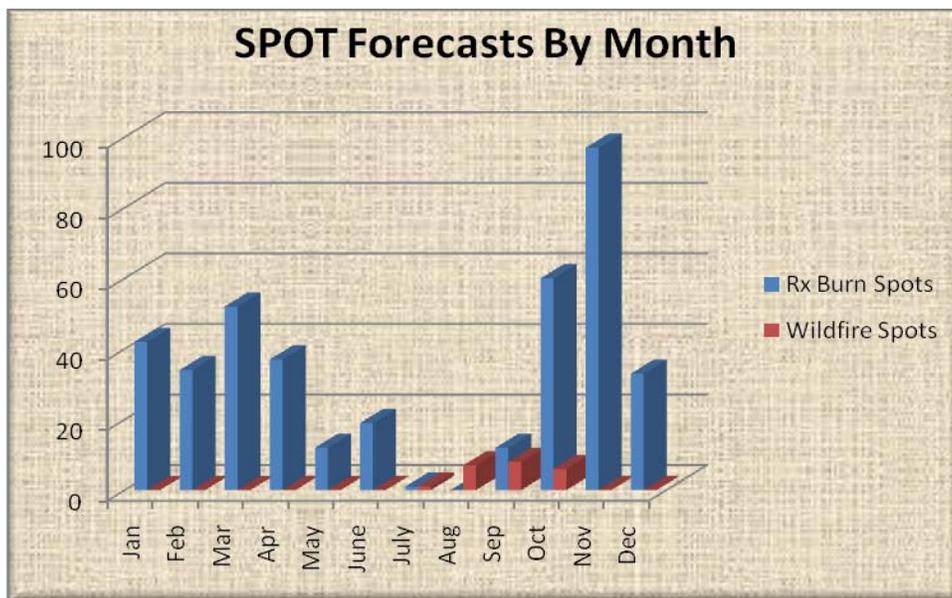


Fig. 5.4



## VI. ON-SITE METEOROLOGICAL SUPPORT

Incident Meteorologist (IMET) support from WFO Eureka totaled 21 days. Eureka currently has two certified IMET's, Jeff Tonkin and Mark Burger. IMET Jeff Tonkin was dispatched to 2 separate incidents and Mark Burger was assigned to one incident. (Fig.6.1). There were no IMETs from other National Weather Service WFO's dispatched to fires within the Eureka CWA during 2010.

**Fig. 6.1**

<u>IMET</u>	<u>Incident Name</u>	<u>Location</u>	<u>Dates</u>	<u>Local WFO</u>
Jeff Tonkin	Eagle Trail Complex	Tok, AK	Jul 6 - Jul 20	FAI
Mark Burger	Modoc Complex	Alturas, CA	Jul 27 – Jul 30	MFR
Jeff Tonkin	Buckeye Fire	Petrolia, CA	Sep 6 –Sep 10	EKA

## VII. TRAINING, EDUCATIONAL, OUTREACH AND FIELD ACTIVITIES

The following table (Fig. 7.1) summarizes various fire weather activities the Eureka fire weather staff participated in during the 2010 calendar year.

**Fig. 7.1**

<u>Dates</u>	<u>Activity</u>	<u>Agency/User/Audience</u>	<u>Representative</u>	<u>Location</u>
Mar 1	Fire Weather Class	College of Redwoods	Jeff	Eureka, CA
Mar 4	Smoke Manage. Meet	Multiple Agency	Nancy	Eureka, CA
Mar 9-10	CA AOP	NWS	Nancy	Sacramento, CA
Mar 10	Audit S 290	CALFIRE	Jeff	Redding, CA
Mar 11	User Meeting	SHF Weaverville	Jeff	Weaverville, CA
Mar 22-26	IMET Workshop	NWS	Jeff , Mark	Boise, ID
Mar 24	Rx Class	CA State Parks	Nancy	Eureka, CA
Mar 25	User Meeting	SHF	Jeff	Redding, CA
May 6	Familiarization Trip	Redding GACC	EKA Staff	Redding, CA
Apr 20-21	User Meeting	Howards Forest / MNF	Mark	Mendocino County
Apr 28	Taught S290	CALFIRE	Jeff	Eureka, CA
May 29	IMET Dispatch	Eagle Trail Fire	Jeff	Tok, AK
May 30	Begin Fire Season	EKA	Staff	Eureka, CA
June 24	Taught S290	Redwood NP	Jeff	Orick, CA
July 27	IMET Dispatch	Modoc Complex	Mark	Alturas, CA
Sep 6	IMET Dispatch	Buckeye Fire	Jeff	Petrolia, CA
Oct 25	End Fire Season	EKA	EKA Staff	Eureka, CA

## VIII. EUREKA FIRE WEATHER PROGRAM SUMMARY

The following table illustrates a comparison of activity and performance for the period 2003 through 2010.

ANNUAL COMPARISON TABLE											
	2003	2004	2005	2006	2007	2008	2009	2010	Total 03-10	Ave. 03-10	Ave. 08-10
Red Flag Warnings Issued:	14	5	3	16	2	32	13	6	91	11.4	17
Dry Lightning:	1	0	0	3	2	19	8	6	39	4.9	11
Wind/RH:	13	5	3	13	0	13	5	0	52	6.5	6
Average Lead Time (hr):	13	16.1	9	13.6	0	17	N/A	N/A	68.7	8.5	17
Fire Wx Watch	5	4	4	10	2	36	4	15	80	10	18.3
Dry Lightning:	4	0	0	0	2	19	4	15	44	5.5	12.7
Wind/RH:	1	4	4	10	0	17	0	0	36	4.5	5.6
Average Lead Time (hr):	16	33.5	14.5	29.5	0	59.5	N/A	N/A	153	25.5	59.5
POD	1.0	1.0	1.0	1.0	0.0	1.0	0.0	0.0	5.0	0.63	0.33
CSI	0.71	1.0	1.0	0.86	0.0	0.63	0.0	0.0	4.20	0.53	0.21
FAR	0.29	0.0	0.0	0.14	1.0	0.38	1.0	1.0	3.81	0.47	0.93
Spots Issued	95	53	56	250	363	612	532	421	2382	297	521
Wildfire Spots	85	17	14	91	57	316	82	22	684	86	140
Rx Spots	10	34	39	158	306	296	450	399	1692	211	382
Turn-Around Time (min.)	70	56	37	52	35	31	29	27	337	42	29
Total EKA IMET Days	33	28	23	106	63	48	31	21	353	44	33
Mark				53	28	14	0	3	98	19	5.6
Jeff	33	28	23	53	35	34	31	18	255	32	27
Total IMET Days in CWA	11	6	0	127	7	317	17	4	489	61	112

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