

1/05/09

MEMORANDUM FOR: Roger Lamoni
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SUBJECT: 2008 Annual Fire Weather Report

The following report is an evaluation of fire weather products and services provided by Seattle WFO to Western Washington land management agencies during the 2008 fire season and the remainder of the year. This report includes verification statistics for Fire Weather Watches, Red Flag Warnings, and NFDRS zone trend forecasts; the number of spot forecasts issued; the number of IMET dispatches with the number of days out of the office; and detailed information on fire weather teaching assignments and liaison activities.

Weather Synopsis:

Weather conditions at times during the 2008 fire season were at times extremely conducive to high fire danger in Western Washington especially late in the season and at others very wet as in mid August. After a wet and blustery winter with well above average snow pack levels in the Olympics and Cascades, conditions began to finally turn dry mid May and again in late June into early July with the Cascades and Olympics gradually climbing into cured conditions. This continued through much of July and into mid-August, when a surge of tropical moisture produced upwards of 3 to 5 inches of precipitation over western Washington. While the fire season tried to return throughout the remainder of the summer, it finally recovered in late September to Red Flag conditions for dry fuels and high level Haines Indexes at the Mid and High levels. Our fall rains arrived in late September and early October, bringing an end to Fire Season 2008.

Fire Weather Watch/Red Flag Warning Verification:

Red Flag Warnings are verified using lightning data, RAWS data, NFDRS observations, and other local observational networks. Red Flag events in the Seattle fire weather district west of the Cascade crest consist of scattered lightning or strong east winds combined with low relative humidity. Newly established criteria for 2008 also include a certain combination of dry and unstable conditions. East of the Cascade crest in Fire Weather Zone 662, Red Flag events consist of scattered lightning, or strong westerly winds combined with low relative humidity. Watches and warnings for these events are issued when the observed fire danger, as described by the Energy Release Component (ERC), is equal to or above the 90th percentile in the historical distribution of ERC's.

During the 2008 fire season, there were 13 Red Flag Warnings (RFWs) and 6 Fire Weather Watches (FWWs) issued for the Seattle fire weather district. The first RFW of the season used the new "dry and unstable" criteria to warn Zone 659 on August 15.

Eight additional RFWs were issued to cover a lightning event on August 17-18. Two zones experienced unwarned lightning in this event.

The last 4 warnings of the season again used this year's new criteria to cover dry and unstable conditions over the mountain zones on September 15-16. Six of this year's 13 RFWs were preceded by FWWs.

Other isolated lightning occurrences and significant events falling short of Red Flag criteria were headlined in the Fire Weather Planning Forecast.

Fire Weather Watch for Thunderstorms -	1 issued
Fire Weather Watch for Wind/Instability and Low RH -	5 issued
Average lead-time on Fire Weather Watches -	27 hours
Red Flag Warnings for Scattered Lightning -	8 issued 6 verified 2 missed
Red Flag Warnings for Wind/Instability and Low RH -	5 issued 5 verified 0 missed
All Red Flag Warnings -	13 issued 11 verified 2 missed
Average lead-time on Red Flag Warnings -	13 hours

Of Red Flag Warnings issued = $a + c = 13$
Of Red Flag Warnings that verified = $a = 11$

Of Red Flag Warnings that did not verify = $c = 2$
Of Red Flag events with no warning issued = $b = 2$

Probability of Detection (POD) = $a/(a+b) = 11/(11+2) = 0.85$
False Alarm Rate (FAR) = $1 - (a/(a+c)) = 1 - (11/(11+2)) = 0.15$
Critical Success Index (CSI) = $a/(a+b+c) = 11/(11+2+2) = 0.73$

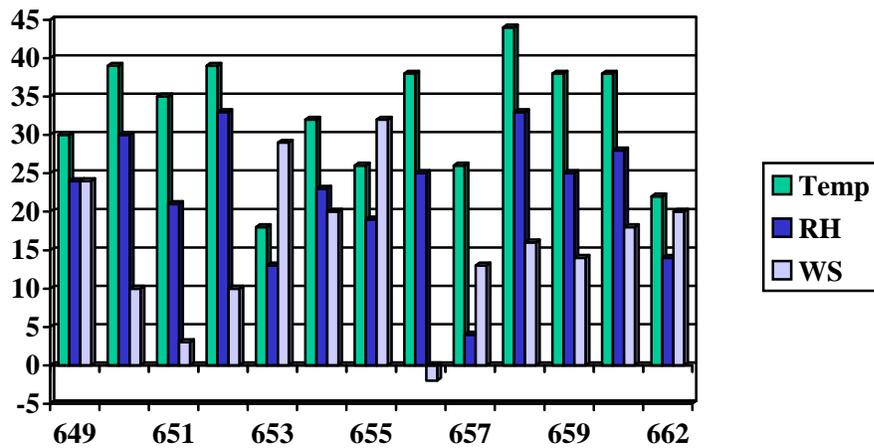
The values for POD, FAR, and CSI all equaled or surpassed Western Region's 2008 goals for Red Flag Warning verification.

NFDRS Trend Forecast Verification:

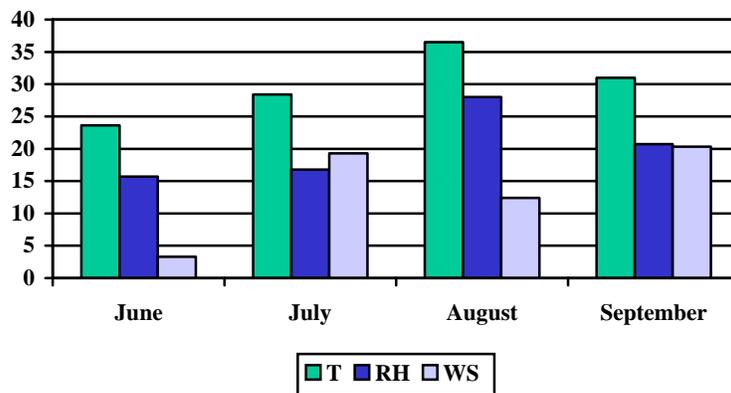
NFDRS Trend Forecast verification was accomplished by comparing the zone average forecast values derived from the 2 p.m. Zone Tend Forecasts with the 2 p.m. NFDRS Fire Weather Zone observation averages for the following day. While not the most accurate method of verifying NFDRS forecasts, it is the best method available at the present time, and it provides a consistent way to track year-to-year changes in skill. Verification statistics were calculated using the same group of stations that was used in previous years.

In 2008, Seattle showed a 32.6% improvement over persistence in temperature forecasts, a 22.5% improvement over persistence in relative humidity forecasts, and a 16.0% improvement over persistence in wind speed forecasts. The temperature and humidity scores were down from 2007 but still fit in with an overall trend of forecast improvement since 2003. The 16.0% improvement in wind speed forecasting was the best since verification record-keeping began in 1984. This wind speed improvement is likely the result of a higher persistence error in 2008 and additional experience using climatology-based forecast recommendations that were developed and implemented at WFO Seattle in the 2007 season. The narrow range in possible winds speeds, when compared with the possible range in temperature and relative humidity, has traditionally made wind speed forecasting a special challenge in western Washington.

2008 Percent Improvement over Persistence by Fire Weather Zone



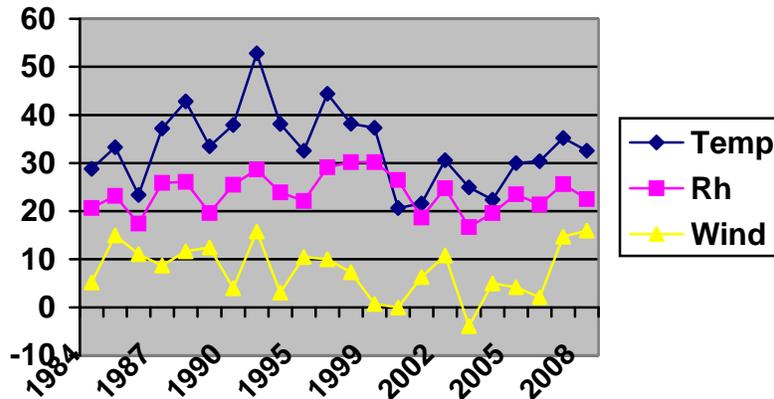
2008 Percent Improvement over Persistence by Month



Yearly Zone Average Verification											
Year	Temperature			Relative Humidity			Wind Speed				
	MAE(f)	MAE(p)	%IMPV	MAE(f)	MAE(p)	%IMPV	MAE(f)	MAE(p)	%IMPV		
1984	3.7	5.2	28.8	8.8	11.1	20.7	1.8	1.9	5.2		
1985	3.2	4.8	33.3	8.6	11.2	23.2	1.7	2.0	15.0		
1986	3.6	4.7	23.4	9.0	10.9	17.4	1.6	1.8	11.1		
1987	3.4	5.4	37.2	8.0	10.8	25.9	1.5	1.7	8.7		
1988	3.2	5.6	42.8	8.2	11.1	26.1	1.7	1.7	11.7		
1989	3.2	4.8	33.5	8.5	10.6	19.6	1.5	1.7	12.5		
1990	3.3	5.4	37.9	8.5	11.5	25.5	1.4	1.5	4.0		
1991	3.3	5.7	52.8	8.2	11.5	28.7	1.6	1.9	15.8		
1992	3.2	5.1	38.1	9.0	11.8	23.9	1.5	1.6	3.1		
1995	3.3	4.9	32.6	8.8	11.3	22.1	1.7	1.9	10.5		
1996	3.0	5.4	44.4	7.8	11.0	29.1	1.8	2.0	10.0		
1998	3.4	5.5	38.2	8.1	11.6	30.2	1.6	1.6	0.7		
1999	3.8	6.1	37.3	9.0	12.9	30.3	1.5	1.5	0.7		
2000	3.6	5.2	30.7	8.6	11.7	26.5	1.6	1.6	0.0		
2001	3.5	4.4	21.6	8.1	10.0	18.7	1.6	1.8	6.3		
2002	3.4	4.9	30.6	8.0	10.7	24.8	1.7	1.9	10.8		
2003	4.1	5.5	25.0	9.2	11.3	16.7	1.9	1.9	-3.9		

2004		3.8	4.9	22.4		9.2	11.5	19.6		1.6	1.8	5.0
2005		3.8	5.4	30.0		9.5	12.6	23.5		1.5	1.6	4.2
2006		3.9	5.6	30.4		8.7	11.2	21.4		1.5	1.6	2.1
2007		3.6	5.5	35.2		9.0	12.5	25.6		1.4	1.6	14.7
2008		3.6	5.5	32.6		9.1	12.0	22.5		1.7	2.1	16.0

NFDRS Trend Verification



2008 Spot Forecasts:

Seattle issued **56** spot forecasts during the 2008 season. All requests were made using the Internet spot forecast request form. Each spot forecast was in support of search and rescue missions, HAZMAT operations, prescribed burns, or wildfire support during the 2008 fire season. By category: **22** were issued for wildland fire support, **12** for prescribed burning support, **6** for Search and Rescue (SAR) support, **9** for HAZMAT/Marine operations and **5** for other tests and operations.

2008 IMET Dispatches

In 2008, a total of **7** fire dispatches for **86** days in on-site IMET support of for wildland fire support activities. The table below lists the assignments.

<u>Dates</u>	<u>IMET</u>	<u>Location</u>	<u>Wildfire</u>
6/25-7/10/08	Cerniglia	Kernville, CA	Clover Fire
7/02-18/08	Prange	Quincy, CA	Canyon Complex
7/15-30/08	Haner	Quincy, CA	Canyon Complex
7/20-8/04/08	Cerniglia	Happy Camp, CA	Bear Wallow Complex
8/10-23/08	Prange	Parkdale, OR	Gnarl Ridge Fire
8/23-30/08	Haner	Oakridge, OR	Middlefork Complex
9/29-10/4/08	Prange	Sisters, OR	Wizard Fire

Training and Liaison Activities in 2008:

There were a total out of **38** office days spent in 2008 in support of fire weather training and/or liaison activities. The table below lists the assignments. (**464** student and veteran Fire Fighters trained, **106** other participants at fire weather related outreach/liason activities)

Date	Forecaster	Location	Activity
3/31-4/04	Prange	Redmond, OR	S490 (35 Students and Cadre)
4/7-11	Prange, Haner, Cerniglia	North Bend, WA	S290 (28 Students)
5/5	Prange	Savannah, GA	Insitu Burn Presentation (28 Attendees)
5/12-15	Prange, Haner, Cerniglia, Buehner	Seattle, WA	HAZMAT Response Trng Seattle Fire (41 Attendees)
5/20	Haner	Bellevue, WA	S190 (20 Students)
5/21	Prange	Auburn, WA	S290 (19 Students & Staff)
5/23	Cerniglia	Darrington, WA	S190 (5 Students)
6/2-4	Haner	Sedro Woolley, Wa	S290 (20 Students)
6/06	Haner	Ft. Lewis, WA	Air National Guard Fire Season Brief(22 Attendees)
6/7-8	Prange	Mt. Erie, WA	Crew Refresher Training (26 Crew Members)
6/10	Prange, Cerniglia	Port Angeles, WA	Crew Refresher Training (55 Crew Members)
6/11	Prange, Haner, Cerniglia, Buehner	Seattle, WA	FWX Users Conf (21 Attendees)
6/14	Prange	Mt. Erie, WA	Officer Refresher Training (14 Attendees)
6/16	Prange	Port Angeles,WA	S190 (55 Students)
6/17-20	Prange	Port Angeles, WA	S290 (29 Students)
6/17	Haner, Mercer	Steilacoom, WA	S190(22 Students)
6/20	Haner	Ft.Lewis, WA	Training Burn (30 Students And Veteran Firefighters)
6/23	Prange	Sedro Woolley, WA	S190 (28 Students)
6/26-27	Prange	Mt. Erie, WA`	S190 & Trng Fire (37 Students & Veteran Firefighters)
7/1	Haner, Buehner	Seattle, WA	Annual FWX Media Tour (35 Journalists and TV Reporters)