1/04/08

MEMORANDUM FOR: Roger Lamoni
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FROM: Jim Prange
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SUBJECT: 2007 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 2007 fire season. 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 2007 fire season were extremely conducive to high fire danger in Western Washington especially early in the season. After a wet and blustery winter with average snow pack levels in the Olympics and Cascades, conditions began to turn dry in late May and June with the Cascades and Olympics reaching very high values as the 4th of July weekend approached. However, a surge of tropical moisture near the end of July produced upwards to 200% of normal precipitation over parts of western Washington. While the fire season tried to return throughout the remainder of the summer, it was never able to recover from the effects of late July's and early Augusts' heavy rains. Our fall rains arrived in late August and early September, bringing an end to Fire Season 2007.

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. 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.

There were 11 Red Flag Warnings (RFWs) and 21 Fire Weather Watches (FWWs) issued for the Seattle fire weather district during the 2007 Fire Season. Six of the RFWs were issued for July 10 to cover a combination of wind and low relative humidity. The other five warnings were issued for July 13 to cover a scattered lightning event. Nine of the 11 RFWs were preceded by FWWs.

The Fire Weather Forecaster issued six FWWs for September 11 to highlight extremely warm and dry conditions. This set of watches was never upgraded to Red Flag Warnings.

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 Dry Thunderstorms - 12 issued
Fire Weather Watch for Wind and Low RH - 17 issued
Average lead-time on Fire Weather Watches - 24 hours

Red Flag Warnings for Scattered Lightning - 5 issued
- 5 verified
Red Flag Warnings for Wind/Low RH - 6 issued
- 3 verified
All Red Flag Warnings - 11 issued
- 8 verified
Average lead-time on Red Flag Warnings - 14 hours

Of Red Flag Warnings issued = a + c = 11
Of Red Flag Warnings that verified = a = 8
Of Red Flag Warnings that did not verify = c = 3
Of Red Flag events with no warning issued = b = 3

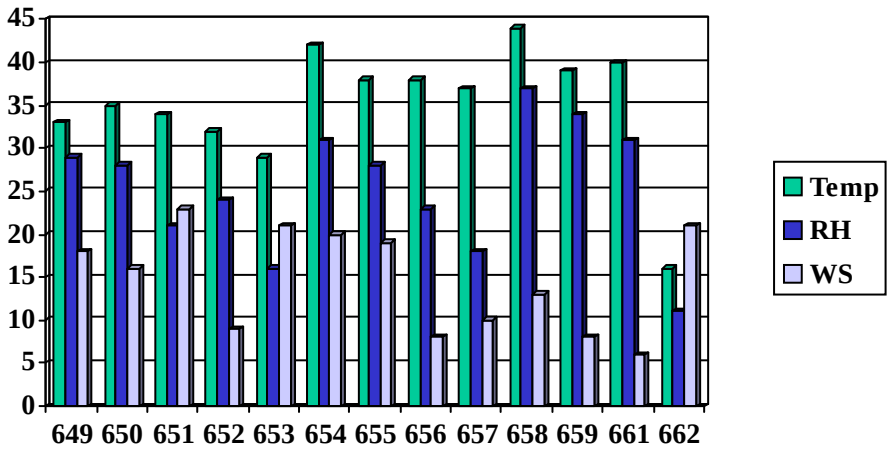
Probability of Detection (POD)	= a/(a+b)	= 8/(8+3)	= 0.73
False Alarm Rate (FAR)	= 1 - (a/(a+c))	= 1 – (8/(8+3)	= 0.27
Critical Success Index (CSI)	= a/(a+b+c)	= 8/(8+3+3)	= 0.57

NFDRS Trend Forecast Verification:

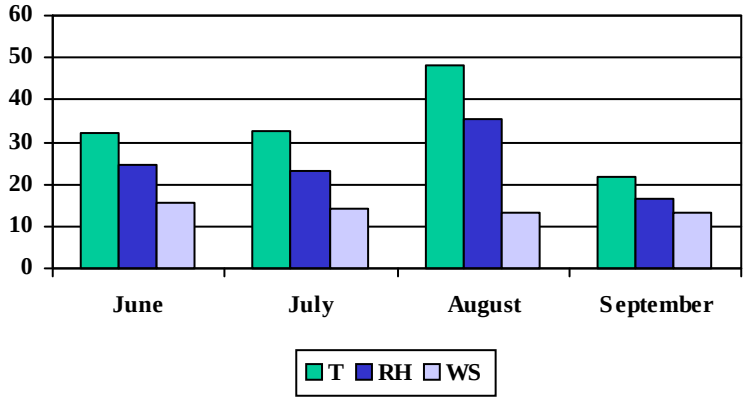
NFDRS Trend Forecast verification was accomplished by comparing the average forecast values derived from the 2 p.m. Zone Tend Forecasts with the 2 p.m. NFDRS Fire Weather Zone observation averages for the following day. While not the most accurate method of verifying NFDRS forecasts, it is the best method 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 set or group of stations that was used in previous years.

In 2007, Seattle showed a 35.2**%** improvement over persistence in temperature forecasts, a 25.6**%** improvement over persistence in relative humidity forecasts, and a 14.7**%** improvement over persistence in wind speed forecasts. This continues a trend of steady improvements in forecasting since 2003. The 14.7% improvement in wind speed forecasting was the best performance since 1991. This was also the first time in over 5 years that no fire weather zones showed negative improvement. This is the result of climatology-based forecasting recommendations developed and implemented at WFO Seattle for 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.

2007 Percent Improvement over Persistence by Fire Weather Zone

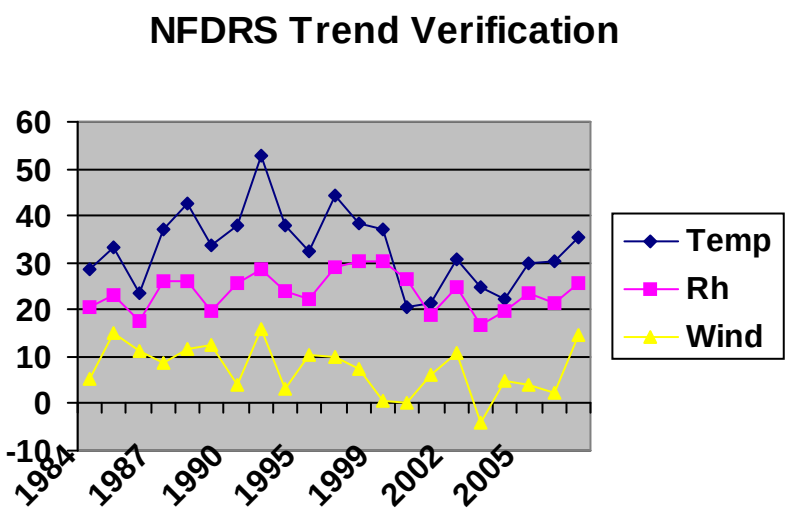


2007 Percent Improvement over Persistence by Month



Yearly Zone Average Verification												
Temperature					Relative Humidity				Wind Speed			
Year		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



2007 Spot Forecasts:

Seattle issued 142 spot forecasts during the 2007 season. This is an increase of 104% increase from our previous record of 136 spots issued during the 2003 season. The majority of 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 2007 fire season. By category: 58 were issued for wildland fire support, 34 for prescribed burning support, 3 for Search and Rescue (SAR) support, 32 for HAZMAT operations and 15 for other tests and operations.

2007 IMET Dispatches

In 2007, a total of *56* days were spent in on-site IMET support of HAZMAT and wildland fire support activities. The table below lists the assignments.

Dates	IMET	Location	Wildfire
7/11-24	**Prange**	**Jordan Valley, OR**	**Boulder Creek/Tongue Cmplx (14 Days)**
7/16-22	**Haner**	**Dufur, OR**	**Ball Point Fire (7 Days)**
8/10-20	**Prange**	**White Bird, ID**	**Poe Cabin Fire (11 Days)**
8/24-9/03	**Cerniglia**	**Chelan, WA**	**Domke Lake Fire (11 Days)**
8/31-9/12	**Haner**	**Ketchum, ID**	**Castle Rock Fire (13 Days)**

Training and Liaison Activities in 2007:

There were a total of ***25*** out of office days spent in 2007 in support of fire weather training and/or liaison activities. The table below lists the assignments. (363 student and veteran Fire Fighters trained, 75 other participants at fire weather related outreach/liaison activities)

Date	Forecaster	Location	Activity
2/09	Prange	Tacoma, WA	S290 (14 Students)
3/05	Prange	Tacoma, WA	S190 (22 Students)
3/25-27	Prange	Forks, WA	S290 (21 Students)
4/04	Prange, Cerniglia, Colman Buehner	Seattle, WA	FWX Users Conf (18 Attendees)
4/26	Prange	Port Angeles, WA	All-Hazards Response Presentation (26 Attendees)
4/28-29	Prange	Mt. Erie, WA	FWX Refresher (39 Crew Members)
5/11	Prange	Darrington, WA	S190 (6 Students)
6/03	Prange	Mt. Erie, Wa	S190 (15 Students)
6/06	Prange	Auburn, WA	S290 Weather Review (8 Students & Facility Members)
6/10	Prange	Mt. Erie, WA	Training Burn (25 Trainee and Veteran Fire Fighters)
6/12	Prange, Haner	Port Angeles, WA	Crew Refresher Training (62 Crew Members)
6/18	Prange	Sedro Woolley, WA	S190 (32 Students)
6/19	Prange, Cerniglia	Port Angeles and Roy, WA	S190s (62 Students)
6/22	Prange	Ft. Lewis, WA	Training Burn (37 Trainee and Veteran Fire Fighters)
6/25	Haner	Ocean Shores, WA	S190 (19 Students)
6/28	Prange, Buehner & Haner	Seattle, WA	2007 Fire Wx Media Tour (27 Attendees)
7/3	Prange	Western WA	July 4th Briefing (2 Attendees)
7/4	Prange	Western WA`	July 4th Briefing (2 Attendees)