

Western Region Fire Weather/Marine Point Forecast Matrix (FWM PFM)

Product Description Document (PDD)

Part I - Mission Connection

- a. Product Description - Land management agencies have expressed a need for easily accessible tabular forecast data that is tailored toward fire behavior applications. A fire weather version of the Point Forecast Matrix (PFM) table with additional fire weather specific elements has been developed along with an intuitive point and click map interface to select the location of interest.

Similarly, marine customers have expressed a desire for marine-specific information within the marine coastal zones of Western Region (WR) WFOs. The Fire Weather PFM scripts were modified to provide marine forecast elements, such as swell and wave information, in the tabular PFM format.

FWM-PFMs are generated dynamically for any grid point in a WFOs digital forecast database upon user request. An interactive web-based interface with multiple selection methods is provided to the user. This includes a high quality shaded relief map with RAWS and/or Buoy locations (or other points of interest) annotated, a pull-down list of RAWS/Buoy locations (or other points of interest) and an entry form for the latitude/longitude of interest.

A demonstration of the fire weather capability can be seen at:

<http://www.wrh.noaa.gov/firewx/fwpfm/fwpfm.php?wfo=slc>

Similarly, a marine interface can be viewed here:

<http://www.wrh.noaa.gov/firewx/fwpfm/fwpfm.php?wfo=mtr&interface=marine>.

The FWM-PFM can include a sub-set of parameters that are unique to the WFO that produces them. In the example of a fire weather PFM in Section F below (from WFO Salt Lake City), these unique parameters include maximum clearing index (Max CLR Index), transport wind speed (Transwind Speed), transport wind direction (Transwind Dir) and Mixing Height. This set of added parameters can be different for each WFO depending on customer need.

- b. Purpose - Based on recent fire agency and marine requests, a standardized web interface for selection and display of FWM-PFMs across Western Region has been developed.
- c. Audience - For fire weather, all land management and fire agencies in Western Region, from the local to the state and federal level. In addition, a marine version was developed for marine customers of coastal WR WFOs.
- d. Presentation Format - The FWM-PFMs will be available to customers from standardized interactive web pages. The FWM-PFMs will have a standardized basic format, which may include extra local parameters based on customer need.

e. Feedback Method - FWM-PFMs was formally tested with customers from December 1, 2006 to June 1, 2008. MICs gathered customer comments during this period to determine the success of the products. WRH MSD will then determine if the FWM-PFM should be tested nationally.

f. Examples

Forecast prepared by WFO SLC
 39.274N -110.596W 6691FT
 0200 PM MDT Fri Sep 8 2006

DATE	FRI 09/08/06								SAT 09/09/06								SUN 09/10/06								
UTC 3HRLY	09	12	15	18	21	00	03	06	09	12	15	18	21	00	03	06	09	12	15	18	21	00	03	06	09
MDT 3HRLY	03	06	09	12	15	18	21	00	03	06	09	12	15	18	21	00	03	06	09	12	15	18	21	00	03
MAX/MIN TEMP	54				73				49				77				51				79				
TEMP	56	54	61	71	72	70	59	54	51	49	59	75	76	73	62	57	53	51	61	77	77	75			
DEWPT	36	36	39	42	42	43	38	38	37	34	37	39	37	36	33	32	31	28	32	37	35	36			
MAX/MIN RH	52				33				59				23				43				21				
RH	47	50	44	35	34	37	46	54	59	55	43	27	24	26	33	39	43	41	33	24	22	24			
WIND DIR	NW	NE	NE	N	W	NE	E	NE	NE	N	E	SE	W	W	N	NE	NE	W	SW	SE	S	SW			
WIND SPD	3	5	5	6	5	8	7	4	3	3	5	6	8	10	5	4	6	4	6	7	5	4			
CLOUDS	BK	BK	BK	BK	BK	BK	BK	SC	SC	SC	SC	SC	SC	SC	SC	FW	FW	FW	FW	SC	SC	SC			
CLOUDS(%)	82	82	82	62	62	62	62	53	53	53	53	59	59	59	59	30	30	30	30	56	56	56			
POP 12HR	0				60				30				10				20				10				
QPF	0.36				0.14				0.03				0.10				0.02				0.08				
RAIN SHWRS	SC	L	L	SC	SC	C	C	S	S			S	S	S	S					S	S	S			
TSTMS	SC	L	L	SC	SC	C	C					S	S	S	S					S	S	S			
MAX CLR INDX					1034								1050				1050								
TRANSWIND DIR					NW								NW				NW								
MIXING HEIGHT					15649								19165				19790								

DATE	MON 09/11/06				TUE 09/12/06				WED 09/13/06				THU 09/14/06			
UTC 6HRLY	06	12	18	00	06	12	18	00	06	12	18	00	06	12	18	00
MDT 6HRLY	00	06	12	18	00	06	12	18	00	06	12	18	00	06	12	18
MAX/MIN TEMP	50		80		51		78		54		79		55		82	
TEMP	57	50	77	76	58	51	76	75	59	54	77	76	60	55	81	79
DEWPT	31	25	36	37	32	27	34	32	28	23	33	32	30	26	36	35
RH	37	38	23	24	37	39	22	21	30	30	20	20	32	33	20	20
WIND DIR	N W SE SE				E SE S NE				NW NW NW NW				NW NW W W			
WIND SPD	<15<15<15<15				<15<15<15<15				<15<15<15<15				<15<15<15<15			
AVG CLOUD	FW	FW	SC	SC	FW	FW	SC	SC	FW	FW	FW	FW	FW	FW	SC	SC
POP 12HR	20		0		10		0		0		0		10		0	

BELOW IS A WEATHER ELEMENT KEY FOR THIS PRODUCT

DAY 1 THROUGH 3...

MAX/MIN TEMP OR MIN/MAX TEMP(F).....MAXIMUM/MINIMUM AIR TEMPERATURE

TEMP(F).....AIR TEMPERATURE

DEWPT(F).....DEW POINT TEMPERATURE

MIN/MAX RH OR MAX/MIN RH(%).....MAXIMUM/MINIMUM HUMIDITY

RH(%).....RELATIVE HUMIDITY

WIND DIR(8 POINT COMPASS).....WIND DIRECTION

WIND SPD(MPH).....WIND SPEED

CLOUDS(CAT).....CLOUD COVER CATEGORY

EXAMPLE: CL = CLEAR; FW = FEW; SC = SCATTERED; BK = BROKEN; OV = OVERCAST

CLOUDS(%).....CLOUD COVER AS A PERCENTAGE

POP 12HR(%).....PROBABILITY FOR ACCUMULATING PRECIPITATION

WEATHER...

TYPE...

RAIN.....RAIN

RAIN SHWRS.....RAIN SHOWERS
 TSTMS.....THUNDERSTORMS
 DRIZZLE.....DRIZZLE
 SNOW.....SNOW
 SNOWSHWRS.....SNOW SHOWERS
 SLEET.....SLEET
 FRZG RAIN.....FREEZING RAIN
 FRZG DRZL.....FREEZING DRIZZLE
 FOG.....FOG
 COVERAGE...
 IS.....ISOLATED
 SC.....SCATTERED
 NM.....NUMEROUS
 O.....OCCASIONAL
 S.....SLIGHT CHANCE
 C.....CHANCE
 L.....LIKELY
 WD.....WIDESPREAD
 D.....DEFINITE
 AR.....AREAS
 PA.....PATCHY

DAY 4 THROUGH 7...

MAX/MIN TEMP OR MIN/MAX TEMP(F).....MAXIMUM/MINIMUM AIR TEMPERATURE
 TEMP(F).....AIR TEMPERATURE
 DEWPT(F).....DEW POINT TEMPERATURE
 RH(%).....RELATIVE HUMIDITY
 WIND SPD(MPH).....WIND SPEED
 EXAMPLE: <15 = LESS THAN 15 MPH; 15> = 15 MPH OR GREATER
 POP 12HR(%).....PROBABILITY FOR ACCUMULATING PRECIPITATION
 WEATHER...

SEE DAY 1 THROUGH 3 WEATHER DESCRIPTIONS

[HTTP://WEATHER.GOV/](http://weather.gov/)

An example of a marine PFM from WFO MTR:

Forecast prepared by WFO MTR
 37.372N -122.908W 0FT
 0400 AM PDT Wed Sep 27 2006

DATE	WED 09/27/06								THU 09/28/06								FRI 09/29/06							
UTC 3HRLY	10	13	16	19	22	01	04	07	10	13	16	19	22	01	04	07	10	13	16	19	22	01		
PDT 3HRLY	03	06	09	12	15	18	21	00	03	06	09	12	15	18	21	00	03	06	09	12	15	18		
WIND DIR	SW	W	W	W	W	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NW		
WIND SPD	6	5	5	5	5	8	8	5	5	8	8	8	8	6	6	6	6	8	8	6	6	6		
CLOUDS	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK		
CLOUDS(%)	90	90	90	80	80	80	80	90	90	90	90	74	74	74	74	90	90	90	90	70	70	70		
POP 12HR	0								0								0							
QPF	0.00				0.00				0.00				0.00				0.00							
WAVE HGT	1		2		2		3		2		3		3		3		3		4		3			
SWELL HGT	1		2		2		2		2		2		3		3		3		3		3			
SWELL DIR	W		W		W		W		W		W		W		W		W		W		W			
SWELL PER	10		10		10		9		9		9		9		--		--		--		--			

DATE	SAT 09/30/06				SUN 10/01/06				MON 10/02/06				TUE 10/03/06			
UTC 6HRLY	07	13	19	01	07	13	19	01	07	13	19	01	07	13	19	23
PDT 6HRLY	00	06	12	18	00	06	12	18	00	06	12	18	00	06	12	16
WIND DIR	NW	W	W	W	W	W	W	NW	NW	NW	NW	NW	NW	NW	NW	NW
WIND SPD	<15<15<15<15				<15<15<15<15				<15>15>15>15				>15>15>15>15			
AVG CLOUD	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK	BK
POP 12HR	0				0				0				0			

BELOW IS A WEATHER ELEMENT KEY FOR THIS PRODUCT

DAY 1 THROUGH 3...

WIND DIR(8 POINT COMPASS).....WIND DIRECTION
WIND SPD(MPH).....WIND SPEED
CLOUDS(CAT).....CLOUD COVER CATEGORY
EXAMPLE: CL = CLEAR; FW = FEW; SC = SCATTERED; BK = BROKEN; OV = OVERCAST
CLOUDS(%).....CLOUD COVER AS A PERCENTAGE
POP 12HR(%).....PROBABILITY FOR ACCUMULATING PRECIPITATION
QPF 12HR(in).....QUANTITATIVE PRECIPITATION FORECAST
WEATHER...
TYPE...
RAIN.....RAIN
RAIN SHWRS.....RAIN SHOWERS
TSTMS.....THUNDERSTORMS
DRIZZLE.....DRIZZLE
SNOW.....SNOW
SNOWSHWRS.....SNOW SHOWERS
SLEET.....SLEET
FRZG RAIN.....FREEZING RAIN
FRZG DRZL.....FREEZING DRIZZLE
COVERAGE...
IS.....ISOLATED
SC.....SCATTERED
NM.....NUMEROUS
O.....OCCASIONAL
S.....SLIGHT CHANCE
C.....CHANCE
L.....LIKELY
WD.....WIDESPREAD
D.....DEFINITE
AR.....AREAS
PA.....PATCHY
WAVE HGT (ft).....TOTAL WAVE HEIGHT
SWELL HGT (ft).....SWELL HEIGHT
SWELL DIR (8 POINT COMPASS).....SWELL DIRECTION
SWELL PER (sec).....SWELL PERIOD

DAY 4 THROUGH 7...

WIND SPD(MPH).....WIND SPEED
EXAMPLE: <15 = LESS THAN 15 MPH; 15> = 15 MPH OR GREATER
AVG CLOUDS(CAT).....AVERAGE CLOUD COVER CATEGORY
POP 12HR(%).....PROBABILITY FOR ACCUMULATING PRECIPITATION
WEATHER...

SEE DAY 1 THROUGH 3 WEATHER DESCRIPTIONS

- f. Approval - PDD Approved by Vickie Nadolski, Director, Western Region

Part II - Technical Description

- a. Format and Science Basis - The FWM-PFM is produced using scripts that are run on the WR web farm. The product format output of these scripts is similar to the standard PFM, but containing parameters of importance to fire weather and/or marine customers. The gridded data needed for the FWM-PFM scripts to run is taken directly from the netCDF file sent to the WR web farm by each WFO. The FWM-RFM is produced at the WR web page.

A shaded relief map will be generated for each Western Region (WR) WFO by the WFO Salt Lake City ITO with a configuration file allowing each WFO to annotate the

map to include RAWS locations (or other points of interest) in an aesthetically pleasing presentation that is appropriate for each WFO. The map will cover an area larger than the CWA of an individual WFO and the user will be able to mouse click anywhere on the map and get the same type of product regardless of which CWA is selected.

This program can also be configured to display marine specific data for sites along the coast. This is configured in the same method as the fire weather specific elements, except each office that has a marine responsibility will have a separate file to be configured. The software checks where the user clicks on the map. If the user clicks inside of a marine zone, marine elements are displayed instead of fire weather elements. Each marine site is currently configured with WaveHeight. Marine PFM maps should include full WFO marine zone coverage with marine zone boundaries overlaid.

Workload at each WFO to implement this proposal is anticipated to include:

1. Selection of the unique parameters to be included in the PFM-like product is via configuration files.
 2. Annotation of the shaded-relief map and pull-down menu via configuration files.
 3. Identification of the geographic area to be included in the map.
- b. Product Availability - FWM-PFMs will be available consistently on the standardized dynamic web page as described above from each Western Region WFO. New PFM data will be available each time a WFO publishes their DFD.