

## Experimental Western Region Fire Weather/Marine Point Forecast Matrix (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 fits this need well because it allows agency specialists to quickly run simple fire behavior models for planning purposes. This in turn allows land management agencies to ensure the safety of fire crews as well as better plan prescribed burns and other projects in a cost and resource effective manner.

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

WFO Fire Weather-Marine (FWM) PFMs are generated for Remote Automated Weather Station (RAWS) and/or Buoy locations using an edited version of the standard PFM formatter. This formatter produces needed fire weather and/or marine parameters from the local Digital Forecast Database (DFD). Although experimental FWM-PFMs have been well-received by local WFO customers, there has been no attempt to standardize either the product or a web-based delivery method.

Experimental FWM-PFMs are generated dynamically for any grid point in a DFD based upon user request. An interactive web-based interface with multiple selection methods is provided to the user. This interface 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. The fire agency or marine customer can mouse click anywhere on the map, select from the pull-down list, or enter a latitude/longitude pair, and an experimental PFM-like product will be returned for the DFD grid point matching the request. The web interface for fire weather customers will include a disclaimer at the top of the page stating *“This experimental product is for planning and review purposes only and is not to be substituted for an official fire weather spot forecast. The data displayed are calculated from a 2.5 by 2.5 km digital database and only approximates weather conditions in highly varying terrain. Please relay any comments you have to your local NWS office.”* The interface for the marine web page will include the following disclaimer: *This experimental product is for planning and review purposes only. Users should also check current marine weather and wave conditions and consult the latest Coastal Waters Forecast(s) for any applicable marine warnings and/or advisories. The data displayed are calculated from a 2.5 by 2.5 km digital database and only approximate weather conditions in the coastal waters. Please relay any comments you have to your local NWS office.”*

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

<http://www.wrh.noaa.gov/firewx/fwpfm/fwpfm.php?wfo=slc> . Similarly, an experimental marine interface can be viewed here:

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

The experimental FWM-PFM can include a sub-set of parameters that are unique to the WFO that produces them. In the example of an experimental fire weather PFM in Paragraph 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 experimental parameters can be different for each WFO depending on customer need.

b. Purpose – Based on recent fire agency and marine requests, test a standardized web interface for selection and display of experimental FWM-PFMs across Western Region.

c. Audience – For fire weather, all land management and fire agencies in Western Region, from the local to the state and federal level. For marine, all marine customers of coastal WR WFOs.

d. Presentation Format – The experimental FWM-PFMs will be available to customers from standardized interactive web pages. The experimental FWM-PFMs will have a standardized basic format, but may include extra local parameters based on customer need.

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

f. Examples

An example of a fire weather PFM from WFO SLC:

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		
MDT 3HRLY	03	06	09	12	15	18	21	00	03	06	09	12	15	18	21	00	03	06	09	12	15	18		
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	53	53	53	53	53	59	59	59	59	30	30	30	56	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	S			
TSTMS	SC	L	L	SC	SC	C	C					S	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 HUMDITY  
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	90	90	90	90	70	70	70			
POP 12HR	0								0								0							
QPF	0.00								0.00								0.00							
WAVE HGT	1	2	2	2	3	2	2	3	3	3	3	3	3	3	4	3	3	3	3	3	3			
SWELL HGT	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3			
SWELL DIR	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W			
SWELL PER	10	10	10	10	9	9	9	9	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			
POP 12HR	0 0	0 0	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

g. Approval – PDD approved by Vickie Nadolski, Western Region Director.

## Part II – Technical Description

a. Format and Science Basis – The experimental 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 we farm by each WFO. The experimental FWM-PFM is produced at the WR web farm for each WFO based on a customer-entered location request through a dynamic web page.

A shaded relief map has been 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 covers an area larger than the CWA of an individual WFO and the user is 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 with 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 experimental product includes:

1. Selection of the unique parameters to be included in the PFM-like product and inclusion 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 – Experimental FWM-PFMs are available consistently on a 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.