Annual Operating Plan for Fire Weather Services
National Weather Service Wilmington Ohio

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1 Introduction.

The National Weather Service fire weather program provides forecast and warning services in support of fire management planning and control operations, leading to the effective prevention, suppression, and management of forest and rangeland fires. The major objective of the fire weather program is to provide a service which will meet the meteorological requirements of federal and state wildland management agencies in the protection and enhancement of the nation's forest and rangelands.

The following is based upon national policy as set forth in the National Agreement. (See Appendix I: NWS Instruction 10-406, Interagency Agreement for Meteorological Services in Support of Agencies with Land and Fire Management Responsibilities.) Local users should have a copy of these agreements within their copies of the operation plan. The National Weather Service agrees to furnish routine forecasts and warnings according to the needs of the fire weather community during the fire weather season.

The Eastern Area Coordination Center (EACC) will use this Annual Operating Plan with regards to its Memorandum of Understanding for Meteorological Services contained in chapter 40 of its Geographic Area Mobilization Guide for use in Indiana and Ohio.

The Southern Area Coordination Center (SACC) will use this Annual Operating Plan with regards to its Memorandum of Understanding for Meteorological Services and its Geographic Area Mobilization Guide for use in Kentucky. The National Weather Service Forecast Office in Wilmington Ohio (NWSFO ILN) and the Daniel Boone National Forest (DBNF) in Kentucky have the understanding that coordination will occur between these two agencies and contact with SACC will be initiated through the DBNF. See the Kentucky Interagency Coordination Center.

There are two fire weather seasons for the Wilmington Ohio forecast area, one in the spring and one in the fall. The spring season runs from February 15th through May 15th, the fall from October 1st through December 15th. To accommodate for the inherent variability of weather, these seasons may begin earlier than these dates or extend beyond them. Critical fire weather patterns outside of the normal seasons may also occur, and the appropriate agencies can request for daily forecasts to be issued for a period of time until the critical pattern ends.

The Meteorologist In Charge (MIC) and fire weather program leader will annually reassess issuance criteria, frequency of issuance, format, content, and dissemination, etc. for each fire weather product.

2 Service Area and Organizational Directory

Phone numbers have been stripped out for privacy. Please contact John Franks for any inquiries or additional information.

2.1 National

a. National Fire Weather Program Manager
Heath Hockenberry
National Weather Service
3833 South Development Ave.
Boise, ID 83705
(208)
(208)

b. Staff Meteorologist to the National Interagency Fire Center (SMN)
Larry VanBussum
National Weather Service
3833 South Development Ave.
Boise, ID 83705
(208)
(208)

c. NIFC Fire Weather Program Manager
Rick Ochoa
National Interagency Fire Center
3833 South Development Avenue
Boise, ID 83705
(208)

2.2 Regional

a. National Weather Service Eastern Region Headquarters
Regional Fire Weather Services Program Leader
Harvey Thurm W/ER1x3
Airport Corporate Center
630 Johnson Avenue
Bohemia, NY 11716
(631)

b. National Weather Service Western Region Headquarters
Regional Fire Weather Services Program Leader
Roger Lamoni W/WR1x3
125 South State Street
Salt Lake City, UT 84103

c. National Weather Service Central Region Headquarters
Regional Fire Weather Services Program Leader
Gary Schmeling W/CR1x3
7720 NW 101st Terrace
Kansas City, MO 64153
(816)

2.3 Local Area National Weather Service Offices

* denotes Fire Weather Program Manager/Focal Point
\# denotes Warning Coordination Meteorologist (WCM)

a. Wilmington NWS
1901 S. State Route 134
Wilmington, OH 45177
(937)
* John Franks
\# Mary Jo Parker

b. Cleveland NWS
Cleveland-Hopkins International Airport
Federal Facilities Building
Cleveland, OH 44135
(216)
* Frank Kieltyka
\# Gary Garnet

c. Louisville NWS
6201 Theiler Lane
Louisville, KY 40229-1476
(502)
*Joe Ammerman
#Norm Reitmeyer

d. Jackson NWS
1329 Airport Road
Jackson, KY 41339
(606)
*Jon Pelton
#Tom Johnstone

e. Paducah NWS
8250 KY Hwy 3520
Paducah, KY 42086
(502)
*Kelly Hooper
#Rich Shanklin

f. Indianapolis NWS
6900 West Hanna Avenue
Indianapolis, IN 46241-9526
(317)
*Joe Skowronek
#David Tucek

g. North Webster NWS
7550 East 850 North

Syracuse, IN 46567
(574)
*Lonnie Fisher
#Steven Eddy

h. Charleston NWS
400 Parkway Road
Charleston, WV 25309
(304)
*Kari Fleegel
#Dan Bartholf

i. Pittsburgh NWS
192 Shafer Road
Coraopolis, PA 15108
(412)
*Russ DeMaris
#Richard Kane

2.4 Participating Agencies

2.4.1 U.S. Forest Service

a. Region 9 Eastern Area Coordination Center
Bishop Henry Whipple Federal Building
1 Federal Drive Room G-20
Fort Snelling, MN 55111-4080
(612) - coordinator on duty
- center manager
- deputy center manager Ruda Glinski

b. Region 8 Southern Area Coordination Center
1200 Ashwood Parkway Suite 230
Atlanta, Georgia 30338
(678)

c. Boone National Forest
1700 Bypass Road
Winchester, KY 40391
(800) - Pager for after hours
(606) - Kathleen Kennedy/Angie Taulbee Graham

d. Wayne National Forest
6518 State Route 93
Pedro, OH 45659
(740) - Kevan Moore/John Crockett

2.4.2 U.S. Fish and Wildlife Service

Big Oaks National Wildlife Refuge
1661 West JPG Niblo Road
Madison, Indiana 47250
(812) - Brian Winters/Joe Robb

2.4.3 Department of Natural Resources (DNR) Division(s) of Forestry

a. Ohio State Headquarters
1855 Fountain Square Court H-1
Columbus OH 43224-1327
(614) - Nathan Kirk
- Michael Bowden
1) District 3 Office
2205 Reiser Avenue SE
New Philadelphia OH 44663
(330) - Frank Corona
Fax 339-8786
2) District 4 Office
360 East State Street
Athens, OH 45701
(740) - Paul Whyte
3) District 5 Office
345 Allen Avenue
Chillicothe, OH 45601
(740) - Bob Boyles
4) District 6 Office and Shawnee State Forest
13291 U.S. 52
Portsmouth, OH 45663
(740) - Ben Hamilton

b. Indiana Fire Control Headquarters
6220 Forest Road
Martinsville, IN 46151
(765) - Charlie Keller/Drew Daily

c. Kentucky Headquarters
627 Comanche Trail
Frankfort, KY 40601
(502) - Bernie Andersen

3. Services Provided by the National Weather Service

3.1 Basic Services

As found in the Fire Weather Products Specification NWS Instruction 10-401, the Wilmington forecast office will provide the following products as part of their basic services. These services will be made available without cost to Interagency Wildland Fire

Agencies.

3.1.1 Fire Weather Pre-Suppression Forecasts (fire weather zones) (FWF)

3.1.1.1 AIWPS identification and WMO header

CLEFWFILN FNUS51

3.1.1.2 Purpose

The Fire Weather Forecast is a zone-type product used by land management personnel primarily for input in decision-making related to pre-suppression and other planning.

3.1.1.3 Issuance Criteria and Frequency

The FWF is a routine product and will be issued at least once daily by 7 A.M. EST/EDT. The FWF will be updated when a Fire Weather Watch or a Red Flag Warning is issued or cancelled. The FWF will be corrected when a typographical/format error is detected.

3.1.1.4 Format

Forecasters will compose the product in the standardized tabular format shown below.

```
FNUS51 KILN 110913
FWFILN

FIRE WEATHER FORECAST
NATIONAL WEATHER SERVICE WILMINGTON OH
513 AM EDT SAT OCT 11 2003

.DISCUSSION...
HIGH PRESSURE CENTERED OVER NEW ENGLAND WILL REMAIN ACROSS THE
REGION TODAY. A COLD FRONT WILL SWEEP EAST FROM THE NORTHERN
PLAINS TONIGHT AND ACROSS THE AREA ON SUNDAY...PRODUCING SOME SHOWERS
THROUGH OUT THE REGION. ANOTHER HIGH PRESSURE SYSTEM WILL SETTLE
OVER THE AREA SUNDAY NIGHT AND MONDAY.

INZ050-058-059-OHZ042-051>053-060>062-070>072-112100-
BUTLER-CHAMPAIGN-CLARK-CLINTON-DARKE-FAYETTE IN-GREENE-MIAMI-
MONTGOMERY-PREBLE-UNION IN-WARREN-WAYNE-
INCLUDING THE CITIES OF...CONNERSVILLE...DAYTON...EATON...HAMILTON...
LEBANON...RICHMOND...SPRINGFIELD...TROY...URBANA...WILMINGTON...XENIA
513 AM EDT (413 AM EST) SAT OCT 11 2003

                                TODAY      TONIGHT          SUN

CLOUD COVER                    PCLDY        PCLDY        MCLDY
PRECIP TYPE                     NONE         NONE      SHOWERS
CHANCE PRECIP (%)                  0           10           30
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TEMP (24H TREND)              77 (+6)      53 (-2)          67
RH % (24H TREND)             42 (-10)      96 (-4)          49
20FTWND - AM(MPH)                E  3                    SW  6
20FTWND - PM(MPH)               SE  5        SE  4       NW  9
PRECIP AMOUNT                   0.00         0.00        0.07
PRECIP DURATION                    0            0           2
MIXING HGT(FT-AGL)              4610                     4350
TRANSPORT WND (MPH)             S  3                     NW 23
LAL                                1            1           1
HAINES INDEX                       5            5           4

REMARKS...NONE.

.FORECAST FOR DAYS 3 THROUGH 7...

.SUNDAY NIGHT...MOSTLY CLEAR. LOWS IN THE LOWER 40S. NORTHWEST WINDS
5 TO 10 MPH.
.MONDAY...MOSTLY SUNNY. HIGHS IN THE UPPER 60S. LIGHT WEST WINDS.
.TUESDAY...PARTLY CLOUDY WITH A 50 PERCENT CHANCE OF SHOWERS. LOWS
IN THE UPPER 40S. HIGHS IN THE UPPER 60S. LIGHT SOUTHWEST WINDS.
.WEDNESDAY...MOSTLY CLOUDY WITH A 50 PERCENT CHANCE OF SHOWERS. LOWS
IN THE MID 40S. HIGHS IN THE MID 50S. NORTH WINDS 10 TO 15 MPH.
.THURSDAY...PARTLY CLOUDY. LOWS IN THE UPPER 30S. HIGHS IN THE LOWER
60S. NORTHWEST WINDS 5 TO 10 MPH.
.FRIDAY...PARTLY CLOUDY. LOWS IN THE UPPER 30S. HIGHS IN THE MID
60S. SOUTHWEST WINDS 5 TO 10 MPH.

$$
.OUTLOOK 8 TO 14 DAYS...
TEMPERATURES BELOW NORMAL.  PRECIPITATION NEAR NORMAL.

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3.1.1.5 Content

a. Headlines: A headline is required when Red Flag Warnings and/or Fire Weather Watches are in effect. The headline will include the warning type, location, and effective time period. Locations will be described in terms of geographic areas such as south central Ohio and northeast Kentucky, but may also use other easily identified markers such as forests, parks, or drainage basins (e.g. Scioto River Valley). Also, the headline for a warning and/or watch will be included in each appropriate zone grouping.
   Significant trends of locally-defined critical weather elements should be headlined for non-watch or non-warning periods. Typically, no headline is included during a routine forecast when there is little or no fire danger.

b. Discussion: The discussion should be a brief, clear, non-technical description of weather patterns that influence the weather in the forecast area. The emphasis of the discussion should be on the first two days of the forecast period, though latter periods may be included if significant weather is expected to impact safety or

operations, and the forecaster has reasonable confidence the weather will occur.

c. UGC FIPS Coding and Geographic descriptors: Use the zone format (Z) of the Universal Generic Code (UGC) to identify each specific forecast zone within a FWF segment.
Typically, the fire weather forecast zone breakdown is the same as the public zone forecast breakdown, but may be compressed for brevity or expanded to include more detailed information if the forecaster desires.

d. Forecast Period: The FWF product should have a minimum of three 12-hour time periods. Each 12 hour period will contain:
   1) CLOUD COVER Amount of clouds in the sky expressed as cloudy, mostly cloudy (MCLDY), partly cloudy (PCLDY), clear, mostly clear (MCLEAR), etc.
   2) PRECIP TYPE: Type of precipitation expected (if any). For example, TSTMS for thunderstorms, SNOW for snow, SNOW/RAIN for a mix, etc.
   3) CHANCE PRECIP (%): Chance of precipitation expressed as a percentage from 0 to 100, rounded to the nearest 10 percent. Forecast values of 0, 10, and 20% will usually not carry a precipitation type, but may if isolated or widely scattered precipitation is expected, typically in the form of showers or thunderstorms.
   4) TEMP (24H TREND): The maximum and minimum 24 hour temperatures will be the expected highest and lowest temperature reached within the 12 hour period stated. The 24 hour trend of the maximum and minimum temperature will be the difference from the previous forecasted high and low temperature and the current forecast of the high and low (not the actual difference of the observed high and low versus the forecast).
   5) RH % (24H TREND): Minimum relative humidity will be forecast during the daytime and the maximum relative humidity during the nighttime. They will typically occur during the observed maximum and minimum temperatures. The 24 hour trend of the maximum and minimum relative humidity will be the difference from the previous forecasted max and min RH and the current RH forecast (not the actual difference of the observed humidities versus the forecast).
   6) 20FTWND - AM(MPH): Prevailing wind with the direction from the 8 point compass (N, S, SW...) and speed denoted in miles per hour (mph) in the morning. Wind may also be denoted as calm or light and variable (LGT/VAR). This will not be included in the tonight period.
   7) 20FTWND - PM(MPH): Prevailing wind with the direction from the 8 point compass (N, S, SW...) and speed denoted in miles per hour (mph) during the afternoon or overnight hours. Wind may also be denoted as calm or light and variable (LGT/VAR).
   8) PRECIP AMOUNT: If precipitation occurs, expected amount of liquid equivalent only. (Three inches of snow would typically be expressed as the melted equivalent of .10-.25 or .25-.50)

9) PRECIP DURATION: Number of hours where measurable (.01 inches) precipitation occurs.
10) MIXING HGT (FT-AGL): The mixing height will be forecast in feet above ground level (AGL). This value will be forecast for the time of the high or low temperature, i.e., for the time of the maximum or minimum mixing height.
11) TRANSPORT WND (MPH): The prevailing direction that the wind is coming from in the mixed layer at the time of the maximum or minimum temperature. Values are reported as calm, variable, or from the 8 point compass (N, S, SW...). The transport wind speed will be expressed in miles per hour (mph).
12) LAL: The Lightning Activity Level will be expressed as a value from 1 to 6. Click here for an explanation of the different values.
13) HAINES: The Haines Index (Haines 1988) will be calculated for the lowest elevation ranges for the Wilmington forecast area (elevation range from 500' to 1500' above sea level). The Haines index is composed of two terms - one represents stability and the other dryness. These two terms are calculated and added together to give the total Haines Index, which ranges from 2 (very low fire growth potential) to 6 (high fire growth potential).

Stability Term =	+	Dryness Term =
T (950 mb) - T (850 mb)		950 mb dewpoint depression
assigned		assigned
1 when 3° C or less		1 when 5° C or less
2 when 4-7° C		2 when 6-9° C
3 when 8° C or more		3 when 10° C or more

The Haines Stability Index will be forecast for the time of maximum temperature. Morning (12Z) values are available on a national graphic available on the Wilmington fire weather web page. These morning values are produced by the U.S.F.S. from NWS observations.

e. REMARKS: This section may be used by the forecaster to annotate any additional information that they feel is pertinent to the forecast.

f. FORECAST FOR DAYS 3 THROUGH 7... Weather elements in the outlook period may include any or all of the mandatory day 1 and day 2 forecast elements. Typically, they will express the sky condition and/or expected weather, high or low temperature, wind speed and direction.

g. OUTLOOK 8 TO 14 DAYS... All issuances should have a general outlook section valid beyond day 7. In this general outlook section, a forecast period is a 24-hour block of time beginning at 12 midnight and ending at 12 midnight the next day.
The outlook is typically taken from the Climate Prediction Center and is based on Ohio's average value for this time frame.

3.1.2 National Fire Danger Rating System Forecasts (NFDRS) (FWM)

3.1.2.1 AIWPS identification and WMO header

CLEFWMILN FNUS81

3.1.2.2 Purpose

The National Fire Danger Rating System measures wildland fire danger at observation sites throughout the contiguous United States. The National Weather Service role in NFDRS is forecasting weather input which, combined with user input, allows the NFDRS software to predict the next day's fire danger indices.

3.1.2.3 Issuance Criteria and Frequency

The FWM is a product that is generated upon user request during the spring and fall fire seasons. A current observation must be received for a NFDRS forecast to be generated. The spring season runs from February 15th through May 15th, the fall from October 1st through December 15th.

Weather observations valid for approximately 1300 Local Standard Time (LST) are taken by the land management agencies and transmitted through AWIPS using the FWO product ID.

Forecasters will use these observations as a basis for generating forecasts valid 24 hours later (the NFDRS forecast).

When the NWS NFDRS Forecast (FWM) is sent to the Weather Information Management System (WIMS), the product is automatically combined with information entered by land management personnel to provide the NFDRS fire index forecast.

At roughly 1500 LST, the AWIPS product NMCFWOER should be available if the forecast values were accepted into the WIMS system. The product will look similar to the observed values reported an hour earlier, but the header should read "Listing of Forecasted Observations". If the page is blank, some formatting error prevented the forecast values from being accepted.

3.1.2.4 Format

The NFDRS forecast will follow the comma delimited format exactly as shown:
ZONE/FCST,NO,YYMMDD,13,WX,TEMP,RH,LAL1,LAL2,WIND,10HR,TX,TN,RHx
,RHn,PD1,PD2,WETFLAG

3.1.2.5 Content

The NFDRS forecast will include all of the following parameters:

FCST Shows that this forecast is for an NFDRS individual station.

NO NFDRS Zone Number (or individual NFDRS site number)
YYMMDD Year, month, and day valid forecast time.
13 Always 1300 LST
WX Weather valid at 1300 LST tomorrow. Valid entries are:

0 clear
1 scattered clouds (1/8 to 4/8) (partly cloudy)
2 broken clouds (5/8 to 7/8) (mostly cloudy)
3 overcast clouds (more than 7/8) (cloudy)
4 foggy
5 drizzle *
6 raining *
7 snowing or sleeting *
8 showers (in sight or at the station)
9 thunderstorm
* (Categories 5, 6, or 7 sets NFDRS index to 0)

TEMP Temperature in deg F valid at 13 LST
RH Relative humidity in percent valid at 13 LST
LAL1 Lightning Activity Level 1400 LST to 2300 LST
LAL2 Lightning Activity Level 2300 LST to 2300 LST
WIND Wind speed in mph valid at 13 LST (20 ft level/10 minute average)
10HR 10 hour timelag fuel moisture in percent valid at 13 LST (This value will be annotated by a blank between commas ,, since we are unable to forecast fuel moisture.)
Tx Max temperature from 1300 LST to 1300 LST tomorrow
Tn Min temperature from 1300 LST to 1300 LST tomorrow
RHx Max relative humidity from 1300 LST to 1300 LST tomorrow
RHn Min relative humidity from 1300 LST to 1300 LST tomorrow
PD1 Precipitation duration in hours 1300 LST to 0500 LST (This is the number of hours in which measurable (.01 inch or more) precipitation will occur.)
PD2 Precipitation duration in hours 0500 LST to 1300 LST (This is the number of hours where measurable (.01 inch or more) precipitation will occur.)
WETFLAG (Yes or No). Indicates whether liquid water will be on the fuels at 13 LST. (Y will set all the NFDRS indices to zero and indicate zero fire danger.)

3.1.3 Spot Forecasts (FWS)

3.1.3.1 AIWPS identification and WMO header

CLEFWSILN FNUS71

3.1.3.2 Purpose

The spot forecast is a site-specific, localized weather forecast available to any agency for wildfire support, hazardous materials incidents (toxic release, chemical spill, etc.), or search and rescue operations. It may be used for a prescribed burn on federal

land, or if there is a federal agency presence* on a prescribed burn anywhere within the Wilmington CWA (*such as interagency agreements, or federal resources including but not limited to personnel and/or equipment). This product includes a forecast of wind, temperature, humidity and any effects local topography will have on the weather.

NWS Spot is the national standard for requesting and issuing spot forecasts and will be supported by the Wilmington WFO. However, due to the infrequent nature of spot forecast requests for wildfire in the CWA, the preferred method for requesting a spot forecast will be via phone, and the issuance will be via fax.

Spot forecasts must ideally have an observation in close proximity to the fire. A contact number and person must be supplied by the requesting agency.

A spot forecast may be declined by the forecaster if no observation is supplied. We will try to accommodate all requests, but without supporting observations and real-time feedback, the spot forecast will not be as specific as it could be. Observations are expected to be representative of the burn site.

The person or agency requesting the spot forecast needs to specify which weather elements and time periods are needed for the spot forecast. If possible, burn plans should be provided ahead of time on a prescribed burn.

3.1.3.3 Issuance Criteria and Frequency

The spot forecast is generated upon user request at any time of day throughout the year. Copies (either electronic or hard copies) of spot forecasts will be retained for 5 years.

3.1.3.4 Format

Forecasters will compose the product in the national format shown below.

```
FNUS71 KILN 110051
FWSILN

SPOT FORECAST FOR (location or name of burn)
ISSUED BY NATIONAL WEATHER SERVICE WILMINGTON OHIO
600 PM EDT THU OCT 10 2002

VALID UNTIL 251 AM EDT FRI OCT 11 2002
IF CONDITIONS BECOME UNREPRESENTATIVE, CONTACT THE NATIONAL WEATHER
SERVICE.

...HEADLINE...(if a fire weather watch or red flag warning is in
effect, a headline is required - otherwise, a headline is recommended
for every issuance.)

DISCUSSION...(required)
```

```
FIRST PERIOD* (Specify period, this afternoon, tonight, etc)
SKY/WEATHER.........
TEMPERATURE.........
HUMIDITY............
WIND................(specify the wind level)
OPTIONAL ELEMENTS...(as requested by the users)

SECOND PERIOD* (Specify period)
SKY/WEATHER.........
TEMPERATURE.........
HUMIDITY............
WIND................(specify the wind level)
OPTIONAL ELEMENTS...(as requested by the users)

THIRD PERIOD* (Specify period)
SKY/WEATHER.........
TEMPERATURE.........
HUMIDITY............
WIND................(specify the wind level)
OPTIONAL ELEMENTS...(as requested by the users)

FORECASTER...(optional)

*The valid time will be determined at the time of the request. Most
spots contain three periods, usually “TODAY”, “TONIGHT”, and “NEXT
DAY”, e.g., “TODAY”, “TONIGHT”, and “THURSDAY”.
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In the case of a verbal briefing (no hard copy requested or necessary due to brevity of forecast), it will just be annotated on the Spot Forecast Request Log. This is typically the case when county EMA's or 911 centers need support for a gas or other leak and request a current wind direction and speed with a forecast for the next 2 or 3 hours.

3.1.3.5 Content

The national standard format for wildfire spot forecasts defines the required elements:

a. Headlines (mandatory when RFW is in effect, strongly suggested otherwise)
b. Discussion
c. Sky/Weather
d. Temperature
e. Relative Humidity
f. Wind

The content for non-wildfire spot forecasts (including prescribed burns and other land management non-wildfire activities) is determined by the requester. In most cases, the requesting agency will only need a verbal briefing and not require a hard copy of the forecast. In this instance, the specifics will be annotated on the Spot Forecast Request Log.

In other cases, the forecaster will compose and disseminate the spot forecast (FWS) for any request within the CWA.

3.1.4 Fire Weather Watches and Red Flag Warnings (RFW)

3.1.4.1 AIWPS identification and WMO header

CLERFWILN WWUS81

3.1.4.2 Purpose

Forecasters will issue Fire Weather Watches and/or Red Flag Warnings when the combination of dry fuels and weather conditions support extreme fire danger.

The same product identifier (RFW) will be used for issuing, updating, and canceling Fire Weather Watches and Red Flag Warnings. Forecasters will also update the FWF product when a RFW product is issued, updated, or cancelled.

3.1.4.3 Issuance Criteria and Frequency

The Red Flag Event criteria are determined by coordination between WFO personnel and land management customers in the Wilmington CWA.

Red Flag Event criteria consists of both fuel and weather parameters. Below are the criteria for the Wilmington CWA. 10 hour fuel moisture must be at or below 8%.

The forecaster will determine this by obtaining observations from the Crittenden and Big Oaks RAWS stations since these are the only two observing stations in the CWA to provide real-time fuel moisture information.

Once the forecaster determines that the air mass will allow the 10 hour fuel moisture to drop to or below 8%, then For Indiana and Kentucky, the relative humidities must be below 25% and wind speed (sustained or gust) at the surface must meet or exceed 15 mph.

For Ohio, the relative humidities must be below 25% and/or wind speed (sustained or gust) at the surface must meet or exceed 15 mph.

Forecasters should coordinate with local fire and land managers prior to the issuance of a Fire Weather Watch or Red Flag Warning. If coordination is not possible (land management agencies are typically staffed 8AM to 5PM Mon-Fri and coordination is not always possible outside of these times), the forecaster will issue the appropriate product if deemed necessary.

3.1.4.4 Format

Forecasters will compose the product in the standardized format shown below.

```
WWUS81 KILN 071527
RFWILN

RED FLAG WARNING
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NATIONAL WEATHER SERVICE WILMINGTON OH
1127 AM EDT FRI OCT 7 2005

...RED FLAG WARNING IN EFFECT FOR SOUTH CENTRAL OHIO AND NORTHERN
KENTUCKY UNTIL 7 PM FOR LOW HUMIDITIES AND HIGH WINDS...

.DRIER AIR IN THE MID LEVELS OF THE ATMOSPHERE THIS AFTERNOON WILL
MIX DOWN AND CREATE SURFACE RELATIVE HUMIDITIES IN THE 20 TO 25
PERCENT RANGE. AT THE SAME TIME...SOUTHWEST WINDS WILL INCREASE TO
15 TO 25 MPH WITH HIGHER GUSTS.

KYZ099-100-OHZ073-079>082-088-072330-
/X.NEW.KILN.FW.W.0001.051007T1527Z-051008T0100Z/
MASON-LEWIS-ROSS-BROWN-HIGHLAND-ADAMS-PIKE-SCIOTO-
1127 AM EDT FRI OCT 7 2005

...RED FLAG WARNING IN EFFECT UNTIL 7 PM EDT THIS EVENING...

THE NATIONAL WEATHER SERVICE IN WILMINGTON HAS ISSUED A RED FLAG
WARNING...WHICH IS IN EFFECT UNTIL 7 PM EDT THIS EVENING.

RELATIVE HUMIDITIES THIS AFTERNOON ARE APPROACHING 25% WITH SOME
SPOTS DROPPING BELOW 25%. COMBINED WITH WINDS GUSTING TO 25 MPH
THIS AFTERNOON AND 8% OR LESS FUEL MOISTURE, RED FLAG CONDITIONS
WILL PERSIST UNTIL ABOUT SUNSET. AFTER SUNSET, AN INVERSION WILL
SET UP AND WINDS WILL BEGIN TO RELAX. HUMIDITY RECOVERIES WILL
ALSO START AROUND THIS TIME.

A RED FLAG WARNING MEANS THAT CRITICAL FIRE WEATHER CONDITIONS
ARE EITHER OCCURRING NOW...OR WILL SHORTLY. A COMBINATION OF
STRONG WINDS...LOW RELATIVE HUMIDITY...AND WARM TEMPERATURES WILL
CREATE EXPLOSIVE FIRE GROWTH POTENTIAL.

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3.1.4.5 Content

a. Mass Media Header. Use either FIRE WEATHER WATCH or RED FLAG WARNING as the first line to denote the type of product. If both are used, for example a fire weather watch for tomorrow with a red flag warning today, the MND header will read RED FLAG WARNING only.
b. The effective UGC Zone Codes and the product expiration.
c. A headline which states “Fire Weather Watch” or “Red Flag Warning”, the critical weather element(s) causing the event, the effective time of the event, and a description of the affected area.
d. A discussion which describes adverse weather conditions.

Forecasters will place the FIRE WEATHER WATCH or RED FLAG WARNING headline in the routine Fire Weather Forecast (FWF) and in any Spot Forecast (FWS). The headline will be placed in the pertinent zone section of the Fire Weather Forecast until the watch/warning expires or is canceled. It will address whether it is a “Fire Weather Watch” or “Red Flag Warning”, the critical weather element(s) causing the event, the effective time of the event, and a description of the affected area. The location

should be described in terms of geographic or other easily identified markers such as forest, parks, cities, towns, rivers, or highways.

Forecasters should include the RFW highlights in the appropriate list of highlights in the Area Forecast Discussion. Dissemination of RFW information on NOAA Weather Radio is left to local or regional policy. Current policy for the Wilmington WFO is that red flag warnings and fire weather watches are not placed on NOAA Weather Radio.

3.1.5 Land Management Forecasts (FWL)

3.1.5.1 AIWPS identification and WMO header

CLEFWLILN FNUS81

3.1.5.2 Purpose

The Land Management Forecast product is a general-purpose, miscellaneous-type product with content, format, issuance, etc. determined per locally established requirements.

3.1.5.3 Issuance Criteria and Frequency

Currently, the Wilmington WFO does not create a Land Management Forecast.

3.1.6 Smoke Management Forecasts (SMF)

3.1.6.1 AWIPS identification and WMO header

CLESMFILN FNUS71

3.1.6.2 Purpose

Smoke management forecasts are issued at the request of land management agencies. The SMF may be issued on a routine basis, or issued as needed, and may be narrative, or tabular in format, or a combination of both. Forecasters may include the smoke management forecast as part of another weather product (for instance, the FWF) or as a separate product. The content, format, frequency of issuance, dissemination method, etc will be coordinated between WFO Wilmington and appropriate land management agencies. This product may contain forecasts of the transport winds and the variability of transport winds with height and time, air mass stability, air dispersion and measures of dispersion, mixing depths and variations with time as well as other smoke management related parameters.

3.1.6.3 Issuance Criteria and Frequency

Currently, the Wilmington WFO does not create a Smoke Management Forecast.

3.1.7 Rangeland/Grassland Fire Danger Statement (RFD)

3.1.7.1 AWIPS identification and WMO header

CLERFDILN FNUS61

3.1.7.2 Purpose

A Rangeland or Grassland Fire Danger Statement product is a miscellaneous product which provides advisory information on rangeland and/or grassland fire potential or conditions. The content, format, frequency of issuance, dissemination method, etc will be coordinated between WFO Wilmington and appropriate land management agencies. This product may be issued on a routine or non-routine basis.

3.1.7.3 Issuance Criteria and Frequency

Currently, the Wilmington WFO does not create a Rangeland/Grassland Fire Danger Statement.

3.1.8 Public Information Statement (PNS) / Special Weather Statement (SPS)

3.1.8.1 AWIPS identification and WMO header

CLEPNSILN NOUS41 / CLESPSILN WWUS81

3.1.8.2 Purpose

A Public Information Statement (PNS) or a Special Weather Statement (SPS) will be issued when the appropriate state DNR supplies information that the fire danger has reached very high or extreme, or that it changes between the two categories. This product will be placed on NOAA Weather Radio All Hazards when the product is issued but will not be sent with the 1050Hz tone.

3.1.8.3 Issuance Criteria and Frequency

These products will only be issued upon request by the appropriate state DNR office and only for very high or extreme fire danger circumstances. It will be issued year-round regardless of fire season or time of day.

3.1.8.4 Format

Forecasters will compose the product in the standardized format shown below.

a. Very High fire danger for Indiana and/or Ohio

```
NOUS41 KILN 230800
PNSILN
or
WWUS81 KILN 230800
SPSILN

PUBLIC INFORMATION STATEMENT / SPECIAL WEATHER STATEMENT
NATIONAL WEATHER SERVICE WILMINGTON OH
400 PM EDT (300 PM EST) FRI MAY 23 2003

...VERY HIGH FIRE DANGER IN (LOCATION/REGION)...

THE (INDIANA/OHIO) DEPARTMENT(S) OF NATURAL RESOURCES/DIVISION(S)
OF FORESTRY REPORT(S) THAT FIRE DANGER IS VERY HIGH FOR
FORESTS... GRASSES AND CROPLANDS IN (LOCATION/REGION).

THIS MEANS THAT MANY FIRES WILL OCCUR...AND RESIDENTS SHOULD
REFRAIN FROM PERFORMING ANY OPEN BURNING. MOST FIRES WILL BE
DIFFICULT TO CONTROL FOR RESPONDING FIRE PERSONNEL...AND
DEPARTMENTS MAY BE REQUIRED TO RESPOND TO MULTIPLE FIRE STARTS AT
THE SAME TIME.

$$
NAME
```

b. Extreme fire danger for Indiana and/or Ohio

```
NOUS41 KILN 230800
PNSILN
or
WWUS81 KILN 230800
SPSILN

PUBLIC INFORMATION STATEMENT / SPECIAL WEATHER STATEMENT
NATIONAL WEATHER SERVICE WILMINGTON OH
400 PM EDT (300 PM EST) FRI MAY 23 2003

...EXTREME FIRE DANGER IN (LOCATION/REGION)...

THE (INDIANA/OHIO) DEPARTMENT(S) OF NATURAL RESOURCES/DIVISION(S)
OF FORESTRY REPORT(S) THAT THE FIRE DANGER IS EXTREME FOR THE
FOREST...GRASSES AND CROPLANDS IN (LOCATION/REGION).

THIS MEANS THAT ALL WILDLAND VEGETATION IS TINDER DRY. ALL
OUTDOOR BURNING (IS/WILL BE) PROHIBITED. MOST FIRES WILL REQUIRE
REINFORCED ATTACK BY RESPONDING FIRE SUPPRESSION FORCES...AND
EXTREME CAUTION SHOULD BE EXERCISED BY FIREFIGHTERS. THIS IS THE
HIGHEST FIRE DANGER LEVEL ISSUED.

$$
NAME
```

c. Very High fire danger for Kentucky

```
NOUS41 KILN 230800
PNSILN
or
WWUS81 KILN 230800
SPSILN

PUBLIC INFORMATION STATEMENT / SPECIAL WEATHER STATEMENT
NATIONAL WEATHER SERVICE WILMINGTON OH
400 PM EDT (300 PM EST) FRI MAY 23 2003

...VERY HIGH FIRE DANGER ACROSS (LOCATIONS) IN NORTHERN
KENTUCKY...

THE KENTUCKY DIVISION OF FORESTRY REPORTS THAT (TODAY/TOMORROW)
(IS/WILL BE) A VERY HIGH FOREST FIRE DANGER DAY ACROSS (AREA).

CONDITIONS EXIST THAT MAKE FOREST FIRES LIKELY. OUTDOOR BURNING
SHOULD BE DELAYED IF POSSIBLE UNTIL WEATHER CONDITIONS CHANGE
LESSENING THE THREAT TO FORESTLANDS.

$$
NAME
```

d. Extreme fire danger for Kentucky

```
NOUS41 KILN 230800
PNSILN
or
WWUS81 KILN 230800
SPSILN

PUBLIC INFORMATION STATEMENT / SPECIAL WEATHER STATEMENT
NATIONAL WEATHER SERVICE WILMINGTON OH
400 PM EDT (300 PM EST) FRI MAY 23 2003

...EXTREME FIRE DANGER ACROSS (LOCATIONS) IN NORTHERN KENTUCKY...

THE KENTUCKY DIVISION OF FORESTRY REPORTS THAT (TODAY/TOMORROW)
(IS/WILL BE) AN EXTREME FOREST FIRE DANGER DAY ACROSS (AREA).

CONDITIONS EXIST MAKING MAJOR OUTBREAKS OF FOREST FIRES LIKELY.
NO OUTDOOR BURNING IS RECOMMENDED IN OR AROUND FORESTLANDS.

$$
NAME
```

3.1.8.5 Content

a. Mass Media Header. Use either PUBLIC INFORMATION STATEMENT or SPECIAL WEATHER STATEMENT as the first line to denote the type of product.
b. The effective UGC Zone Codes and the product expiration.

c. A headline which states “Fire Weather Watch” or “Red Flag Warning”, the critical weather element(s) causing the event, the effective time of the event, and a description of the affected area.
d. A discussion which describes adverse weather conditions.

3.1.9 Fire Weather Outlook (FWD)

3.1.9.1 AWIPS identification and WMO header

Storm Prediction Center (SPC) Fire Weather Outlook (Product Category FWD, WMO Header - FNUS21 and FNUS22).

3.1.9.2 Purpose

The SPC Day One and Day Two Fire Weather Outlooks (narrative and graphical) describe large-scale meteorological conditions in the lower 48 states which, when combined with the antecedent fuel conditions, favor the rapid growth and spread of a fire, should a fire ignition occur. These outlooks provide guidance for WFO forecasters and aid land management agencies in determining large-scale areas of fire danger risk.

3.1.9.3 Issuance Criteria and Frequency

The Day One and Day Two Fire Weather Outlooks are scheduled products and are issued once per day.

Outlooks are issued at 4:00 AM CST and 5:00 AM CDT.

3.1.9.4 Creation Software

NAWIPS, PC and Web based.

3.2 Special Services

As found in the Fire Weather Services On-Site Support NWS Instruction 10-402, the Wilmington forecast office may provide on-site meteorological support as part of their special services. On-site forecast service is a non-routine service available from WFOs with designated Incident METeorologists (IMET), of which the Wilmington forecast office has one as of January 2004.

IMETs may be dispatched to support:

- Wildland or urban-wildland fires (including high risk or critical resource value prescribed burns).
- Land management coordination and dispatch centers.
- Hazardous substance releases.
- Any special projects or incidents which fall under the mandate of the NWS.

By the Interagency Agreement for Meteorological Services (NWS Directive 10-406), the NWS will support the land management agencies with on-site meteorological support to wildland fires upon request through the IMET program. Other events listed above may be supported depending upon resources and approval by the appropriate Regional Headquarters and Meteorologist-in-Charge (MIC).

On-Site Services Equipment: The Fire Weather Laptops, All hazards Meteorological Response System (AMRS), Advanced Technology Meteorological Unit (ATMU), and fire RAWS are the main pieces of equipment used by IMETs on deployment, and like the IMETs, considered national fire fighting resources. The Fire Weather Laptops, ATMU, and communication equipment are used to provide a mobile platform for data collection and forecast preparation.

- The AMRS consists of the fire weather laptop, the 2 way satellite dish, the IMET, and all of the equipment such as printers, cables, and tools for the satellite setup.
- The ATMU is the theodolite system that enables measurements of the winds aloft on-site. MicroREMS provides on-site meteorological observation capabilities for the incident.
- Only trained personnel will operate the ATMU, and ATMUs will only be dispatched to an incident when a certified IMET is requested.
- ATMUs and MicroREMS are generally stored in Federal, state, or local interagency caches.
- Seasonal changes in the cache locations will be coordinated through Regional Headquarters, the Staff Meteorologist to the National Interagency Fire Center (SMN), and customers at the national level. Units may be pre-positioned to caches anywhere in the country as fire danger requires.

Availability of IMETs: All Regions should ensure there are a sufficient number of trained IMETs to meet normal requests for on-site services. By March 1st of each year, the Regions will advise the appropriate land management agency dispatch center(s) and the SMN in Boise, ID, of the following:

- Name and location of currently certified IMETs serving those states within the dispatch area.
- A 24-hour telephone number where the agency dispatch center will be able to initiate the request for each IMET.
- The Regions should also keep the SMN up-to-date on any changes in the status of certified IMETs.

IMET Request and Dispatch: Request and dispatch of IMETs and equipment (ATMUs and MicroREMS) should be accomplished through the National Resource Coordination System.

IMET Dispatch Coordination and Notification: Since IMET dispatches are filled at the local, regional, or national level, coordination and notification are very important in maintaining a viable system of response.

- IMETs must keep the MIC informed of their availability for on-site support.
- MICs of WFOs with IMETs will report all IMET operational status changes immediately to the SMN in Boise and the appropriate Regional Program Manager. The WFO Boise senior forecaster will record this information when the SMN is not available.
- Regional Headquarters will work with the SMN to ensure sufficient on-site capability. To help meet this requirement, Regional Program Managers should keep the SMN up-to-date on any known status changes of their region's IMETs.
- When the SMN receives a request for an IMET dispatch, the request should be coordinated with the MIC and IMET, the affected Region, and NIFC logistics personnel. The SMN should also notify the Regions and MICs when fire danger activity is increasing over an area for which they are not responsible, but could impact their IMETs.

The SMN will maintain a status report of the condition and location of all ATMUs and IMETs and report that status to the regions and the NFWPM. This will include any change in WFO capabilities to meet ATMU operations as well as other circumstances which may impact the operational readiness and capability of NWS IMET support services. The SMN will prepare an end of the year report summarizing IMET/ATMU dispatches by each WFO and GACC area. This report will be provided to Regional and National Headquarters annually.

3.3 Training

The Fire Weather Program Leader (FWPL) will complete: S-591 Fire Weather Forecasters Course.

Acquire advanced knowledge of the NFDRS system.
S-390 Introduction to Wildland Fire Behavior Calculations is recommended, but not required.

Any NWS meteorologist producing any of the core suite of fire weather products needs to be trained as a Fire Weather Forecaster. This training will include but is not limited to: S-290 Intermediate Wildland Fire Behavior (either by computer based training or residence course).

NWS Fire Weather computer based learning module. S-190 Introduction To Fire Behavior is recommended, but not required. It can be found at the following site: http://www.meted.ucar.edu/fire/fwx

Additional training: A glossary of fire weather terminology can be found at the following site: http://www.fs.fed.us/r6/fremont/scofmp/glossary.html

4. Participating Agencies Responsibilities

Participating agencies mentioned within this plan are responsible to review the AOP and provide the FWPL with any suggestions (additions, removals, etc) annually. It is recommended that the plan be reviewed after the end of each spring season to highlight what can be improved, establish best practices, and amend for address and personnel changes, updated internet links, etc.

Agencies should provide the FWPL with any annual reports or prescribed burn plans dealing with lands within the Wilmington CWA.

Representatives of these agencies should provide the FWPL with at least one date per year for the FWPL to visit with them to review the plan and overall fire weather program. If the FWPL attends an interagency meeting, this will suffice this requirement.

It must be emphasized that field observations and that current contact numbers, such as phone, fax and e-mail are necessary for yielding NWS services, especially spot forecast requests.

Agencies are expected to be pro-active with relaying situational awareness. If red flag conditions are forecast and do not materialize, the forecaster needs insight on why this did not occur. Likewise, if no mention of "approaching red flag conditions" or a marked decrease in afternoon minimum relative humidity appears in the routine FWF, and these should have been highlighted, please contact the forecaster with your insight.

Access to information systems such as WIMS, RAWS, and local observing networks, along with the appropriate software and hardware is crucial. RAWS stations are a key element for information on current fuel moisture and humidities to the forecaster, and the upkeep of this equipment and maintenance of reliable collection and communication platforms is essential.

5. Joint Responsibilities

Negotiate service boundaries and fire weather forecast zones to meet customer and forecaster need.

6. Effective Dates

This AOP has been in effect since the spring of 2004 and is a living document. Any subsequent additions, subtractions, or revisions will be annotated below, along with the date they are put into effect.

7. Signature Page

National Weather Service Wilmington Ohio
Kenneth J. Haydu, Meteorologist In Charge

John J. Franks, Jr, Fire Weather Program Leader

Ohio Department of Natural Resources Division of Forestry
Michael W. Bowden, Fire Supervisor

Indiana Department of Natural Resources Division of Forestry
Charles Keller, Fire Supervisor

Kentucky Department of Natural Resources Division of Forestry
Bernard Andersen, Fire Supervisor

U.S. Forest Service Wayne National Forest
Kevan Moore, Forest Fire Management Officer

John Crockett, Forest Fire Management Officer

U.S. Department of the Interior, Fish and Wildlife Service, Big Oaks National Wildlife Refuge
Brian Winters, Prescribed Fire Specialist

Appendices

Appendix A

Links to the Fire Weather section of the NWS Directives system:

National Weather Service Directives: Chapter 10 - Operations and Services

Chapter 10-4 Fire Weather Services

Chapter 10-401 Fire Weather Services Products Specification

Chapter 10-402 Fire Weather Services On-Site Support

Chapter 10-403 Fire Weather Services Coordination and Outreach

Chapter 10-404 Fire Weather Services Annual Operating Plan and Report

Chapter 10-405 Fire Weather Services Training and Professional Development

Chapter 10-406 Interagency Agreement for Meteorological Services in Support of Agencies with Land and Fire Management Responsibilities

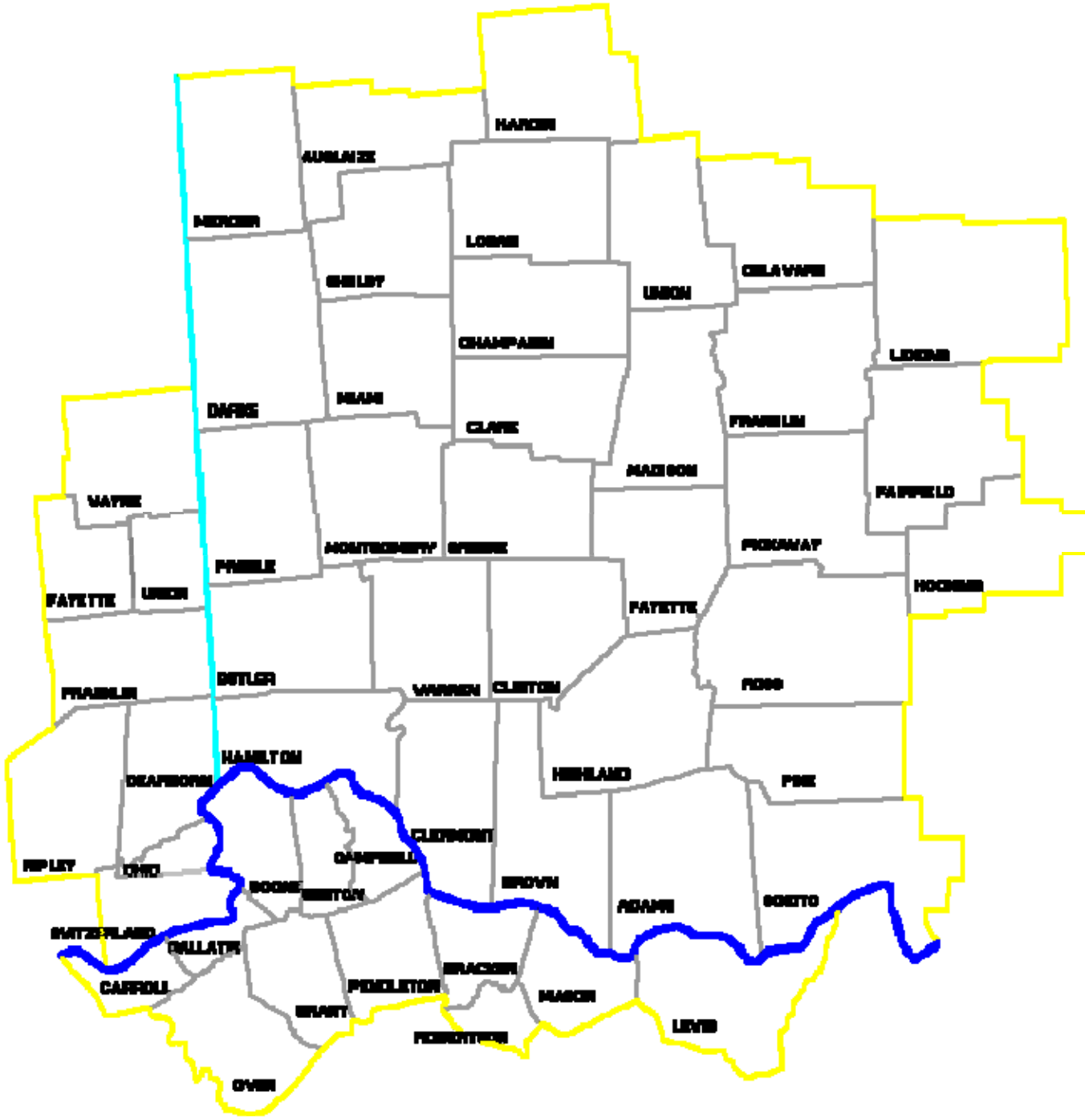
Chapter 10-407 Fire Weather Services Zone Change Process

Appendix B

Fire Weather Zone Maps

The fire weather zones will typically mirror the public zone combination for the zone forecast product (ZFP). The zone forecast product encompasses the same area and counties as the fire weather product and is typically segmented based on expected weather over a particular area.

Below are the counties that will be represented in the fire weather zones. Any combination of counties may be used to create the fire weather zones.


HARDIN
AUGLAIZE
MERCER
LOGAN
SHELBY
UNION
CHAMPAIGN
DARKE
MIAMI
CLARK
MADISON
FRANKLIN
PREBLE
MONTGOMERY
GREENE
FAYETTE
UNION
BUTLER
WARREN
CLINTON
FAYETTE
HAMILTON
DEARBORN
HIGHLAND
PIKE
RIPLEY
OHIO
BOONE
BROWN
ADAMS
SCIOTO
SWITZERLAND
GALLATIN
CARROLL
PENDLETON
BRACKEN
MASON
GRANT
LEWIS
OWEN

Appendix C

Catalog of fire weather observation sites

There are two NFDRS points that are catalogued as observation sites within the Wilmington forecast area. They are Big Oaks and Crittenden. The Chillicothe station has been providing data, but has not been catalogued in the WIMS system to begin NFDRS forecasts.

An additional site is expected to come on line in Scioto County soon. A full listing of station information for this is currently unavailable.

Current observations and past conditions from these sites can be accessed through the internet at http://raws.wrh.noaa.gov/roman/

Station Name:	Big Oaks
Station Number:	127301
County, State:	Ripley, Indiana
Elevation:	900 feet
Lat/Lon:	N 38.9253 (38 deg/55 min/31 sec) W -85.3625 (-85 deg/21 min/45 sec)
Aspect:	S (little to no slope)
Section/Township/Range:	R 10 E T 6 N Sec 36
Protection Agency:	U.S.D.I. Fish and Wildlife Service

Station Name:	Crittenden
Station Number:	150703
County, State:	Grant, Kentucky
Elevation:	935 feet
Lat/Lon:	N 38.7692 (38 deg/46 min/09 sec) W -84.6019 (-84 deg/36 min/07 sec)
Aspect:	SW (very little slope - less than 5%)
Section/Township/Range:	Not used in the state of Kentucky
Protection Agency:	State of Kentucky Department of Natural Resources

Station Name:	Chillicothe
Station Number:	337301
County, State:	Ross, Ohio
Elevation:	630 feet
Lat/Lon:	N 39. (39 deg/23 min/09 sec) W -82. (-82 deg/59 min/06 sec)
Aspect:	
Section/Township/Range:	
Protection Agency:	State of Ohio Department of Natural Resources