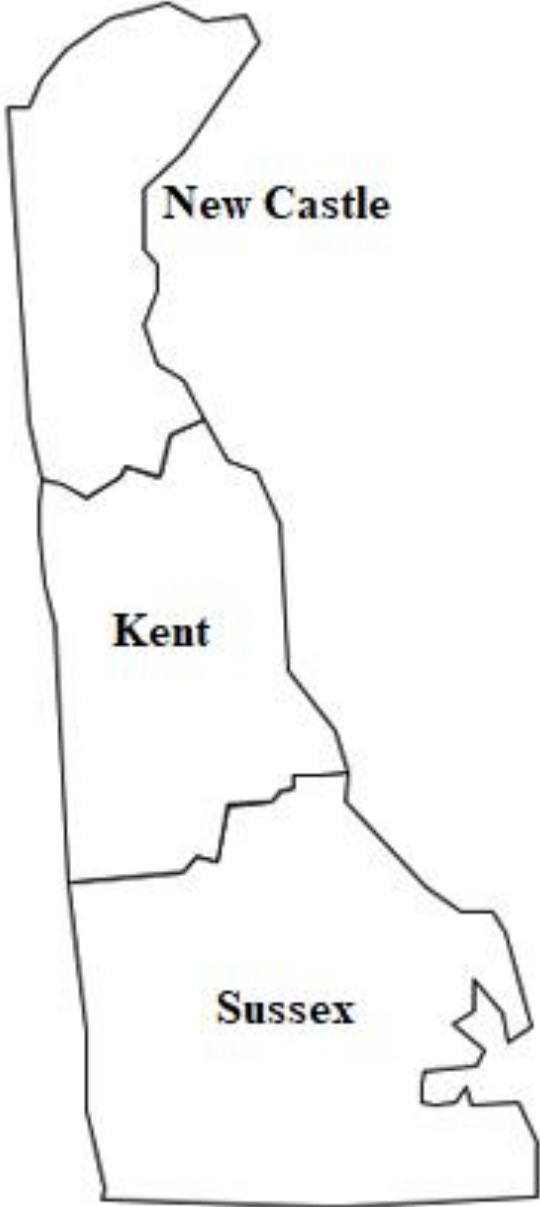


Delaware Annual Fire Operating Plan



Philadelphia/Mount Holly NWSFO

INTRODUCTION

Delaware is the second smallest state in the nation, with only 1,982 square miles. It is only 96 miles long, and between 9 and 35 miles wide. The land, mostly near sea level, is flat. The exception is the undulating hills of the Brandywine River valley in the north. About half the state is farmland, but the main attraction is its miles of unspoiled beaches along the Atlantic Ocean.

The climate of Delaware is dominated by the Westerlies, but the Atlantic Ocean has a significant influence on the weather in Delaware as well, especially for the coastal areas.

Because of the goal of protecting life, property and economic interests on government land, land management agencies must be critically concerned with the control of wildfire, as well as the use of fire as a land management tool. Critical to this goal is timely and accurate weather information.

The purpose of the operating plan is to outline the meteorological support available to state management agencies in Delaware as provided by the National Weather Service. Including but not limited to Daily Fire Weather Forecasts, Red Flag Warnings/Fire Weather Watches, and Spot Forecasts. We also provide forecasts for prescribed burns and land management forecasts to federal agencies.

AREAS OF RESPONSIBILITY

The Philadelphia/Mount Holly NWSFO (PHI) located in Mount Holly, New Jersey issue forecasts, watches, warnings, and other statements for the state of Delaware. Mount Holly's area of responsibility includes all three counties in Delaware: New Castle, Kent, and Sussex.



 Philadelphia/Mount Holly

Fire Weather Planning Forecast

The forecast is made up of fire weather zones that is broken down into each individual county, as well as one coastal zone.

Mount Holly produces two routine FWF products that are issued around 330-400 am and 330-400 pm local time. The forecast should be updated when significant changes occur to the forecast, or conditions are significantly different from forecast, or a Red Flag Warning/Fire Weather Watch is issued. Forecasts are issued 365 days a year. The forecast consists of three 12 hour periods (today, tonight and tomorrow) beginning at 500 am local time on the day of forecast preparation for the morning issuance, and four 12 hour periods (tonight, tomorrow, tomorrow night, and the following day) beginning at 500 pm for afternoon issuance. An extended 3 to 7 day forecast, as well as an 8 to 14 day Outlook, is also included.

The forecast includes at a minimum Cloud Amount as a descriptive term, Chance of Precipitation in Percent, Precipitation Type, Max/Min Temperature, Max/Min Relative Humidity, 20 foot Wind Direction to 8 points of the compass and Speed in mph (am and pm), Precipitation Amount and Duration (if precipitation were to occur), Low Level Haines Index, Estimated Lightning Frequency using LAL, Mixing Height, and Transport Wind Direction and Speed; and may also include Ventilation Rate and a Dispersion Descriptor which is the product of the transport wind and mixing height.

...HEADLINE... REQUIRED FOR FIRE WEATHER WATCH OR RED FLAG WARNING

DISCUSSION

The discussion is a brief plain language summary of the weather pattern as it pertains to our County Warning Area. This is usually taken from the Area Forecast Discussion (AFD). When particularly windy and dry conditions are expected, they should be mentioned in the FWF discussion and Area Forecast Discussion (AFD). The FWF should be updated when a Red Flag Watch/Warning is issued, changed, or ended; or when conditions are significantly different than forecast.

GENERAL FORECAST

Parameter definitions:

Cloud Cover	(Cloudy, Mostly Cloudy, Partly Cloudy, Clear)
Precip Chc (%)	(Percent chance of Precip, 0-100)
Precip Type	(Thunderstorm, rain, freezing rain, snow/rain, drizzle, none)
Min/Max Temp	(Max/Min temperatures as zone avg)
Max/Min RH	(Max/Min Relative Humidity in percent)
20ft Wind-am (mph)	(20 foot wind speed and direction give to the 8 points of the compass for the morning)
20ft Wind-pm (mph)	(20 foot wind speed and direction give to the 8 points of the compass for the afternoon or evening/overnight)
Precip Amount	(A precipitation range similar to RDF ranges)
Precip Duration	(How long precip will accumulate (in hours))
Haines Index	(Low Level Haines Index)
LAL	(Lightning Frequency if Lightning were to occur)
Mixing Hgt (FT AGL)	(The mixing height to the nearest 100 feet at time of max/min temp)
Trans Wind (MPH)	(Transport wind direction and speed through the Mixed Layer)
Vent Rate (MPHXFT)	(Actual value of the product of the mixing height and transport wind)
Dispersion	(Categories based on the Dispersion Index)

Remarks:

Any item which you deem necessary to enhance usage of the forecast, such as additional information on strength and areal extent of thunderstorms, lightning activity, frontal timing, sudden wind shifts, or any other unusual weather activity which may not be evident from the general forecast.

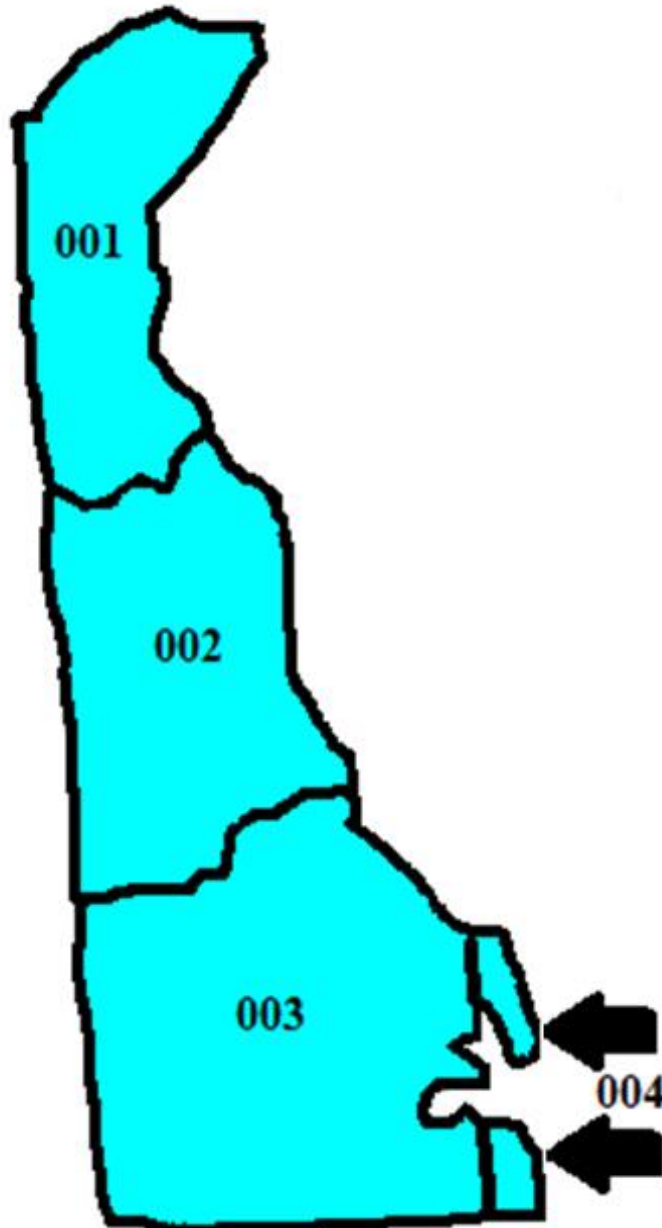
EXTENDED FORECAST INCLUDING WINDS (3 to 7 days)

The extended forecast (broken into 12 hour segments) is a basic narrative forecast of expected weather over the 3 to 7 day extended period.

DISSEMINATION

Products are disseminated via the National Weather Service AWIPS Network and are transmitted on the NOAA Weather Wire Service. In addition, all forecasts are available on the Internet.

Fire Weather Zones Used in Fire Weather Forecast (FWF)



Fire Weather Zones

- 001. New Castle
- 002. Kent
- 003. Inland Sussex
- 004. Delaware Beaches

Fire Weather Forecast Examples

Fire Weather Planning Forecast
National Weather Service Mount Holly NJ
337 AM EST Thu Mar 7 2019

.DISCUSSION...

High pressure will continue slowly building into the region from the west through today as a weak wave of low pressure passes north of our area. High pressure moves offshore early Friday then weak low pressure will pass across the Mid-Atlantic later on Friday. High pressure will build from the north into Saturday. Much stronger low pressure is forecast to track across the Great Lakes Sunday with a warm front lifting north into our area Sunday morning. A cold front will follow in the wake of this system late Sunday and again late Monday then high pressure returns through the middle of next week.

PAZ054-055-072115-

Carbon-Monroe-

Including the cities of Jim Thorpe and Stroudsburg

337 AM EST Thu Mar 7 2019

	Today	Tonight	Fri
Cloud Cover	PCldy	MClear	PCldy
Chance Precip (%)	20	0	50
Precip Type	Snow Showers	None	Snow
Min/Max Temp	28	10	32
Max/Min RH %	46	77	50
20ft Wind-AM(mph)	W 6		SW 3
20ft Wind-PM(mph)	W 9	NW 4	S 5
Precip Amount	0.00	0.00	0.03
Precip Duration	1		2
Haines Index	3	3	3
LAL	1	1	1
Mixing Hgt(ft agl)	6280	70	3020
Trans Wind (mph)	W 23	W 10	SW 16
Vent Rate (mphXft)	144440	700	48320
Dispersion	Very Good	Very Poor	Good

REMARKS...None.

.FORECAST FOR DAYS 3 THROUGH 7...

.FRIDAY NIGHT...Mostly cloudy. A chance of flurries. Lows in the lower 20s. Light winds.

.SATURDAY...Sunny. Highs around 40. North winds around 5 mph.

.SATURDAY NIGHT...Snow, a chance of sleet, rain and a chance of freezing rain. Lows in the upper 20s. Southeast winds around 5 mph.

.SUNDAY...Rain and freezing rain. Highs in the mid 40s. Southeast winds around 10 mph.

.SUNDAY NIGHT...Mostly cloudy. Lows in the lower 30s. South winds around 5 mph.

.MONDAY...Mostly sunny. Highs in the lower 40s. West winds around 10 mph.

.MONDAY NIGHT...Partly cloudy. Lows in the mid 20s. West winds around 10 mph.

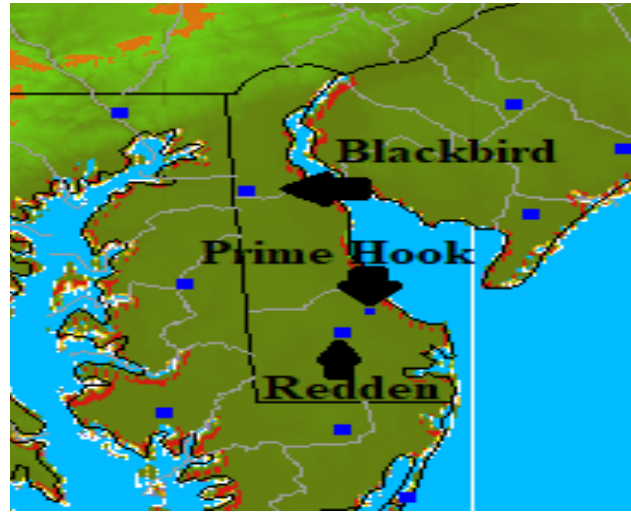
.TUESDAY...Mostly sunny. Highs in the upper 30s. Northwest winds around 10 mph.

.TUESDAY NIGHT...Partly cloudy. Lows in the lower 20s. North winds around 5 mph.

.WEDNESDAY...Mostly sunny. Highs in the lower 40s. North winds around 5 mph.

National Fire Danger Rating System (NFDRS) Forecast (FWM)

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. These indices impact agency resource management decisions, firefighter safety, and protection of the public and property. Note that a NFDRS station may represent a large fire danger rating area of similar climatology and fuel type. NFDRS forecasts for a station are intended to be applied across a large fire danger rating area. The forecast is issued under the PIL PHLFWMPHI.



Sites used in Mount Holly's FWM:

Blackbird (070031); Prime Hook (070301); Redden (070052)

INFO

The forecast will be for the previously determined RAWS stations. The product will be automatically run around 330-400 pm after Fire Weather grids are created, saved and published.

GENERAL FORECAST

1. ZONE/FCST Shows whether this forecast is for an NFDRS zone or individual station. Zone average trends can be used when enough observations are available for the zone area. Choice between zone or individual station forecasts should be worked out in the AOP with fire weather users.
2. NO NFDRS Zone Number (or individual NFDRS site number)
3. YYMMDD Year, month, and day valid forecast time
4. 13 Always 1300 LST
5. WX Weather valid at 1300 LST tomorrow. Valid entries are:
 - a. 0-clear
 - b. 1-scattered clouds (1/8 to 4/8)
 - c. 2-broken clouds (5/8 to 7/8)
 - d. 3-overcast clouds (more than 7/8)
 - e. 4-foggy
 - f. 5-drizzle
 - g. 6-raining
 - h. 7-snowing or sleeting
 - i. 8-showers (in sight or at the station)
 - j. 9-thunderstorm (Categories 5, 6, or 7 sets wet flag to "yes")
6. TEMP Temperature in deg F valid at 13 LST (or temperature trend + or -)
7. RH Relative humidity in percent valid at 13 LST (or RH trend + or -)

8. LAL1 Lightning Activity Level 1400 LST to 2300 LST (optional)
9. LAL2 Lightning Activity Level 2300 LST to 2300 LST (optional)
10. WDIR Use only for point forecast (FCST) version. Enter direction using sixteen point compass (N, NNE, NE, ENE, etc.) valid at 13 LST (20 ft level/10 minute average).
11. WSPD Enter wind speed in mph valid at 13 LST (or wind speed trend + or -, 20 ft level/10 minute average)
12. 10HR 10 hour timelag fuel moisture in percent valid at 13 LST (or trend + or -) (**Forecasted only for manual NFDRS stations**)
13. Tx Max temperature from 1300 LST today to 1300 LST tomorrow
14. Tn Min temperature from 1300 LST today to 1300 LST tomorrow
15. RHx Max relative humidity from 1300 LST today to 1300 LST tomorrow
16. RHn Min relative humidity from 1300 LST today to 1300 LST tomorrow
17. PD1 Precipitation duration in hours 1300 LST today to 0500 LST tonight
18. PD2 Precipitation duration in hours 0500 LST tonight to 1300 LST tomorrow
19. WETFLAG Y or N. Indicates whether liquid water will be on the fuels at 13 LST. (Use with caution - a "Y" will set all the NFDRS indices to zero!)

Format

The NFDRS Forecast will follow the comma delimited format as shown:

**FCST,NO,YYMMDD,13,WX,TEMP,RH,LAL1,LAL2,WDIR,WSPD,10HR,TX,TN,
RHx,RHn,PD1,PD2,WETFLAG**

Examples of the point and zone products, formatted for transmission into AWIPS, are displayed below:

FNUS81 KPHI DDHHMM
FWMPHI

FCST,280071,030219,13,1,69,43,1,1,SE,8,,72,46,100,40,0,0,N

Follow the format precisely in order for the forecasts to be used as NFDRS input. Separate each element by a comma with no intervening spaces. (Some elements may not be forecast, but are represented by the null space between two consecutive commas.)

Updates and Corrections and Other information

Since the NFDRS system runs once a day, FWMs are not typically updated. The FWM will be corrected when a typographical/format error is detected. The forecast no includes 7 days.

SPOT FIRE WEATHER FORECAST

The National Weather Service will issue Spot Fire Weather Forecasts in support of wildfire management, and natural resource management. The National Weather Service will provide spot forecast service upon request of any federal, state, tribal, or local official who represents the spot forecast is required to support a wildfire. For non-wildfire purposes, resources permitting, the National Weather Service will provide spot forecast service under the following circumstances and conditions:

1. Upon request of any federal official who represents that the spot forecast is required under the terms of the Interagency Agreement for Meteorological Services (NWS Instruction 10-406).
2. Upon request of any state, tribal, or local official who represents that the spot forecast is required to carry out their wildland fire management responsibilities in coordination with any federal land management agency participating in the Interagency Agreement for Meteorological Services (NWS Instruction 10-406).
3. Upon request of any public safety official who represents the spot forecast is essential to public safety, e.g. due to the proximity of population centers or critical infrastructure. A “public safety official” is an employee or contract agent of a government agency at any level (federal, state, local, tribal, etc.) charged with protecting the public from hazards including wildland fires of whatever origin and/or other hazards influenced by weather conditions such as hazardous material releases.

THE SPOT FORECAST PROCEDURE:

Spot forecasts will be requested by the acting official via the Spot Forecast Request webpage located at www.weather.gov/spot which is linked from the Mount Holly fire weather webpage. The requesting official will enter all required information on the spot request page. Once the request is submitted, the spot forecast requests will be received via AWIPS with the product header PHLSTQPHI and information about the request will be available on the Spot Forecast webpage. Spot forecasts will be issued through the GFE formatter; only the GFE formatter should be used to create a forecast. The forecast is issued under the PIL PHLFWSPHI. Once the forecast is issued, it will update on the webpage, usually within a minute or two.

Requests should only be made through the internet. As a backup a Spot Request Form (WS FORM D-1) can be used and then faxed, or the request can be called in directly to the office. The faxable form is located on the Mount Holly Fire Weather page at www.weather.gov/phi

Under optimal conditions, a forecast should be available in a short period of time. Only under the most adverse weather conditions will a forecast be delayed.

Because of the numerous non-forestry duties and forecast products, the staff at the National Weather Service must ascertain the priority of the request among severe weather threats, aviation, marine, and public forecast deadlines.

The submission of at least one recent, accurate observation from the fire site is optional, but requested if possible. Especially if current conditions are different than previously forecast.

Constructive critique of spot forecasts by users is encouraged, preferably directly to the forecaster and substantiated by on-site observations. There is an option of the spot forecast page for feedback.

Spot Forecast Examples

Forecast:

Spot Forecast for JB MDL D10-1...USFWS
National Weather Service Mount Holly NJ
1210 PM EST Wed Mar 6 2019

Forecast is based on ignition time of 0600 EST on March 07.
If conditions become unrepresentative...contact the National Weather Service.

Please contact our office if you have questions or concerns with this forecast.

.DISCUSSION...

High pressure will continue slowly building into the region from the west through Thursday when a weak wave of low pressure passes north of our area. Low pressure will pass across the Mid-Atlantic on Friday; then high pressure will build from the north into Saturday. Much stronger low pressure is forecast to track across the Great Lakes Sunday. A cold front will follow in the wake of this system late Sunday and again on Monday; then high pressure builds early next week.

.THURSDAY...

Sky/weather.....Mostly sunny (45-55 percent).
CWR.....10 percent.
Chance of pcpn.....10 percent.
LAL.....No Tstms.
Max temperature.....Around 34.
Min humidity.....36 percent.
Wind shift.....None.
Wind (20 ft).....Light winds becoming west 5 to 14 mph with gusts to around 20 mph.
Mixing height.....1200-2500 ft AGL increasing to 3800-5100 ft AGL late in the morning, then increasing to 5800-7000 ft AGL late in the morning decreasing to 4000 ft AGL late in the afternoon.
Transport winds.....West 20 to 26 mph.

TIME (EST)	6AM	7AM	8AM	9AM	10A	11A	12P	1PM	2PM	3PM	4PM	5PM
Sky (%)	48	53	54	56	57	59	60	61	56	50	44	37
Weather cov												
Weather type												
Tstm cov												
CWR	0	10	10	10	10	10	10	10	10	10	0	0
Chc of pcpn (%)	0	10	10	10	10	10	10	10	10	10	0	0
LAL	1	1	1	1	1	1	1	1	1	1	1	1
Temp	17	17	20	24	28	30	32	34	34	34	34	32
RH	61	61	54	47	42	39	37	36	37	38	39	44
20 FT wind dir	W	W	W	W	W	W	W	W	W	W	W	W
20 FT wind spd	3	5	6	7	9	12	13	14	14	14	12	10
20 FT wind gust	7	8	10	13	16	18	18	20	20	20	16	14
Mix hgt (kft)	1.2	1.2	2.5	3.8	5.1	5.8	6.4	7.0	6.7	6.3	5.9	4.0
Transp wind dir	W	W	W	W	W	W	W	W	W	W	W	W
Transp wind spd	21	20	21	23	24	25	25	26	25	24	23	23

Fire Weather Watches, Red Flag Warnings, and Special Weather Statements

I. ISSUANCE TIMES AND PRODUCTS

Fire Weather Watches (PHLRFWPHL) are issued for the 2nd, 3rd or 4th 12 hour period of a forecast. A Red Flag Warning (also PHLRFWPHL) is issued for the 1st or 2nd period of a forecast.

FIRE WEATHER WATCHES AND RED FLAG WARNINGS WILL BE HEADLINED IN THE FIRE WEATHER FORECAST (PHLFWPHL) AS WELL AS THE HAZARDOUS WEATHER OUTLOOK (PHLHWOPHI) AND INCLUDED IN THE AREA FORECAST DISCUSSION (PHLAFDPHI) WARNING SECTION.

If Red Flag Warning conditions are expected in the Day 2-7 period, it should be discussed in the Hazardous Weather Outlook (HWO), in addition to the Fire Weather Forecast (FWF), and Area Forecast Discussion (AFD).

After coordinating with Fire Weather partners, if it is determined that conditions will be close to Red Flag Warning Criteria, but a Red Flag Warning is not needed, a Special Weather Statement (SPS) may be issued if determined necessary (e.g., fuels are not critically low, or duration of conditions are not expected to be very long). In certain situations, an SPS may be issued during the overnight without coordination with partners to give a “heads up.” However, coordination with surrounding WFOs should occur before an SPS is issued overnight. When an SPS is in effect or expected, there is no need to include fire weather information in the HWO.

II. GENERAL GUIDELINES

The Watches and Warnings indicate the potential for spread of any fires that may develop. They are NOT an indication or forecast of whether fires will develop.

Per ER Supplement 11-2004: Red Flag Warnings will **not** be based solely on weather conditions. Bottom line – coordination with the customer before the issuance of a *RFW* is critical to ensure that **both** the meteorological and non-meteorological (fuels) parameters will meet the necessary criteria.

There are rare situations when a Red Flag Warning can be issued on the overnight shift without coordination with partners. If surrounding offices are confident ALL factors, including fuels, will be below criteria, even without partner coordination, we can issue a Red Flag Warning. However, this is rare and should only be done when confidence is high that a borderline case will not occur and we will not be the only office issuing warnings. But again, this should be a rare occurrence, and if possible, waiting for coordination with state partners should occur most of the time.

III. RFW Criteria

For Mount Holly's Area of Responsibility

The National Weather Service Forecast Office in Mount Holly will issue a Fire Weather Watch or Red Flag Warning for the following conditions (must meet all 3):

- 1) Any sustained wind of 20 mph or greater.
- 2) Relative Humidity less than or equal to 30%.
- 3) 10 hour time lag fuels are less than 10 percent.

Red Flag Warning Example

URGENT - FIRE WEATHER MESSAGE
National Weather Service Mount Holly NJ
357 AM EDT Wed May 2 2018

NJZ001-007>010-012>027-PAZ054-055-060>062-070-071-101>106-030100-
/O.CON.KPHI.FW.W.0002.180502T1400Z-180503T0100Z/
Sussex-Warren-Morris-Hunterdon-Somerset-Middlesex-
Western Monmouth-Eastern Monmouth-Mercer-Salem-Gloucester-Camden-
Northwestern Burlington-Ocean-Cumberland-Atlantic-Cape May-
Atlantic Coastal Cape May-Coastal Atlantic-Coastal Ocean-
Southeastern Burlington-Carbon-Monroe-Berks-Lehigh-Northampton-
Delaware-Philadelphia-Western Chester-Eastern Chester-
Western Montgomery-Eastern Montgomery-Upper Bucks-Lower Bucks-
357 AM EDT Wed May 2 2018

...RED FLAG WARNING REMAINS IN EFFECT FROM 10 AM THIS MORNING TO
9 PM EDT THIS EVENING FOR NEW JERSEY AND EASTERN PENNSYLVANIA...

- * AFFECTED AREA...New Jersey and eastern Pennsylvania.
- * TIMING...From late this morning through just after sunset this evening.
- * WINDS...Southwest 10 to 15 mph with gusts up to 25 mph.
- * RELATIVE HUMIDITY...As low as 20 to 25 percent.
- * TEMPERATURES...In the lower to mid 80s, except mid to upper 70s near the coast and in the southern Poconos.
- * IMPACTS...The combination of low fuel moisture, low relative humidity, and gusty winds may contribute to the enhanced spread of fires.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A Red Flag Warning means that critical fire weather conditions are either occurring now...or will shortly due to a combination of strong winds...low relative humidity...and dry fuels. Any fires that develop may quickly get out of control and become difficult to contain.

For more information about wildfire danger...burn restrictions...and wildfire prevention and education...please visit your state forestry or environmental protection website.

Fire Weather Partners

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Fire Weather Program Manager
Philadelphia/Mount Holly National Weather Service

Jason Franklin
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