



**FIRE WEATHER SERVICES
ANNUAL OPERATING PLAN**

FOR

VERMONT AND NORTHERN NEW YORK

**NATIONAL WEATHER SERVICE
BURLINGTON, VT
802-862-9883**

March 2014

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1. Paul Sisson: SOO, software coordination and configuration
2. Eric Evenson: IMET, Fire Weather Intranet/Internet Pages, and Fire Weather Training
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5. Joseph Kennedy: (former New York State Forest Ranger) provided comments to assist in our understanding of user needs.
6. Email with Fire Weather Program Leaders of surrounding NWS offices
7. NWS Burlington Forecasters who test and use operational programs daily
8. Chuck McGill: IT, Computer/IT assistance

I. Fire Weather Program Overview

NWS Burlington Fire Weather Team

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BTV Forecaster/IMET	Brooke Taber	E-mail brooke.taber@noaa.gov

This document is based on the new Fire Weather Directives (10-400 series) issued by NOAA's National Weather Service (henceforth known as NWS). The NWS issues a core suite of Fire Weather products consisting of:

- a. Fire Weather Planning Forecast (FWF),
- b. National Fire Danger Rating System Forecasts (NFDRS) (FWM),
- c. Spot Forecast,
- d. Fire Weather Watches (RFW),
- e. Red Flag Warnings (RFW), and
- f. **Rarely**, localized service that is *specifically requested by the fire weather community* to reflect fire danger (**fire danger is different from Red Flag conditions**)

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. 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.

In general, the fire weather forecast season in Vermont and northern New York **runs from April through mid or late November**. Flexibility has been built into the program, thus seasonal weather patterns will determine the actual dates.

Provisions will be made for forecaster coverage whenever frequent consultation is needed. On rare occasions, during major fires or projects, a fire control agency may request fire weather

forecasts and briefings by telephone. As is the policy of the National Weather Service (NWS), these requests will be honored to the best of our ability.

Annually, **the NWS Office MIC and Office Fire Weather Program leader will reassess** issuance criteria, frequency of issuance, format, content, and dissemination (among other issues) for each Fire Weather product. The Fire Weather Program Leader may participate in forestry training sessions and assist in selecting and inspecting forest service fire danger observation stations. The fire control agencies agree to provide and maintain a network of fire danger observation stations. Daily reports of selected stations should be transmitted to NWS Burlington. Each fire control agency headquarters is responsible for the efficient collecting and distribution of National Weather Service forecasts and fire weather observations.

II. Fire Weather Products

A. The Fire Weather Planning Forecast

The NWS Burlington area of fire weather responsibility includes most of Vermont and northern New York. **Refer to appendix - A for a map of our fire weather area.** While the forecast will usually be broken up into the areas in appendix-A, the zone groupings will be weather dependent. In addition, the headers will consist of county names, not area names. This allows for more specificity in the Fire Weather Forecast. The forecaster will make every effort to combine zones or counties into groupings that are climatologically homogeneous and represent ongoing or expected weather. Weather at any particular site within a zone may be dictated by microclimates.

As previously noted, the fire weather season in Vermont and northern New York generally runs from April through approximately November 15th. This year (2014), the season is planned to begin on Monday, March 31, 2014. The issuance time of the fire weather forecast will be **between 5 and 7 AM**. Updated forecasts, *if necessary*, will be issued around noon, or when a Fire Weather Watch or Red Flag Warning is issued or cancelled. **An example of a fire weather planning forecast is on pages 8 through 10 of this document.**

Components of Fire Weather Planning Forecast:

Headline - A headline is **required** when a Fire Weather Watch or Red Flag Warning is in effect. Include the watch/warning type, geographical area, reason for issuance, and effective time period. Also include the headline in appropriate zone grouping. **The use of headlines is strongly encouraged during the peak fire season of April and May.** *Headlines will also be used for non-watch/warning periods during the remainder of the fire weather season to highlight situations or trends that may become a factor in fire weather operations.*

Discussion - Per NWS Directive 10-401, this is a brief, clear and non-technical description of the **weather systems impacting Vermont and Northern New York. Emphasis should be on the first two days**, but later periods may be included if significant weather is expected and the forecaster has a reasonable confidence level that it will occur. Our users have indicated that mention of significant trends in temperature, dewpoint and winds are useful.

Note: Our users have also stated that they prefer that we do **NOT** use the following terms in our discussions:

- *Elevated Fire Awareness*
- *Near Red Flag Conditions*
- *Fire Danger (or Elevated Fire Danger)*

Parameters - The Fire Weather Planning Forecast (FWF) uses the Universal Generic Code (UGC) zone format. The early morning forecast consists of three 12 hour time frames. The forecast will have a general outlook valid out to day 7. The following meteorological parameters will be entered in the forecast:

CLOUD AMOUNT:

CLR (clear).....0 to 25 percent coverage
MCLEAR (mostly clear).....26 to 51 percent coverage
PCLDY (partly cloudy).....52 to 68 percent coverage
MCLDY (mostly cloudy).....69 to 86 percent coverage
CLDY (cloudy).....89 to 100 percent coverage

PRECIP CHC (%): Probability of precipitation in percent (0 - 100%)

PRECIP TYPE: The type of precipitation expected.

MAX/MIN TEMP: Maximum daytime and minimum nighttime temperatures. (Temperature 24 hour trends are optional.)

20 FT WND AM: The prevailing 20 foot wind direction (8 compass points) and speed (mph) during the morning.

20 FT WND PM: The prevailing 20 foot wind expected during the afternoon for the daytime period and at night for the nighttime period (follow same nomenclature as AM wind).

PRECIP AMOUNT: Amount of average precipitation in inches.

PRECIP DURATION: Duration of precipitation in hours during the forecast period. Today/Tomorrow refers to 7 AM to 7 PM, Tonight is 7 PM to 7 AM. Duration does not have to quantitatively equal Precipitation Begin minus Precipitation End times (i.e., on/off precipitation).

PRECIP BEGIN: The onset time of any expected precipitation.

PRECIP END: The ending time of precipitation.

HUMIDITY (%): The minimum relative humidity during the day and the maximum value at night. (Relative humidity 24 hour trends are optional.)

HAINES: The **Haines Index** (HI) is calculated for the two **daytime periods**, but not the night period. The Haines Index is a **measure of stability and moisture** (does not incorporate wind or fuel moisture). The **HI** ranges from 2 to 6, which is a sum of two components, a temperature difference (categorized 1 to 3), and a moisture/dewpoint difference (also categorized 1 to 3). There are different options available in the Haines index, each customized for elevation. **For our forecast area, we will be using the low option.**

The following is a ***qualitative*** guide for using the **Haines Index:**

HI Value	Qualitative Term
2 or 3	VERY LOW
4	LOW
5	MODERATE
6	HIGH.

The HI has been related to **fire behavior**, such that **the higher the value, the better the chance of seeing large fire development**, mainly where winds are not a factor.

LAL: Lightning activity level category. Ranges from 1 to 6 and relates to the areal coverage of thunderstorms, corresponding to Lightning Activity Levels (LAL) from the National Fire Danger Rating System (NFDRS).

LAL and areal coverage should correspond as follows:

LAL Level	Coverage (%)	Descriptor
1	0	None
2	1-14	Isolated
3	15-24	Widely Scattered
4	25-54	Scattered
5	55+	Numerous
6 (Dry lightning)* (little/no rain)	>=15	Widely Scattered or greater

* *Dry lightning is **extremely** rare in the eastern United States.*

MIXING HGT: Refers to the mixing height. The Mixing Height is forecast for the daytime periods.

The **Mixing Height** is the maximum depth to which mixing will occur. One way to view this is by estimating the maximum temperature and lifting it dry adiabatically until it reaches the forecast sounding temperature. Generally, during the summer, if neither a low level inversion nor warm air advection is present, daytime heating will produce a well mixed atmosphere of 4000 to 7000 ft in depth. The more unstable the atmosphere, the greater the mixing height.

TRANSPORT WIND: The Transport Wind is the average wind from the surface to the top of the mixed layer. After calculating the mixing height, the average wind direction and speed within that layer needs to be calculated. One way to view this is as an estimate based on the surface to

850 mb wind field (approximately 5000 ft). The direction will be specified using 8 compass points, and the speed in miles per hour.

VENTILATION RATE: Generalized descriptions range from “Poor” to “Excellent”. There is no definitive classification of Ventilation Rate. It is a combination of mixing height and transport wind. Generally, **when the mixing height is low and transport winds are light, the Ventilation Rate will be poor.** The Ventilation Rate will be calculated only for the daytime periods.

The best procedure to manually calculate the ventilation rate is to multiply the mixing height in thousands of feet by the transport wind speed (mph). **These numbers are placed in the general Fire Weather Forecast. The table below is only a guide.**

- 100000 and up.....(corresponds to Excellent)**
- 61000 - 100000.....(corresponds to Good)**
- 41000 - 60000.....(corresponds to Average)**
- 21000 - 40000.....(corresponds to Fair)**
- 20000 or less.....(corresponds to Poor)**

- Examples: A) Mixing height 4500 feet, Transport Wind Speed 20 mph.
 4500 x 20 = 90000
- B) Mixing height 2500 feet, Transport Wind Speed 10 mph
 2500 x 10 = 25000

REMARKS: Any significant information (timing of wind shifts) can be entered here (optional).

Expanded Forecast Section - This is the forecast for days 3 to 7, taken from the first grouping in the Public ZONE FORECAST (ALBZFPBTV). *Winds will be included in each period of the extended forecast section.*

Outlook 8 to 14 Day - per Directive 10-401, this is based on local policy. Thus, we will continue using the 8-14 day outlook from the National (EONUS) extended forecast product for Vermont.

1. Example of a Fire Weather Planning Forecast from NWS Burlington, VT:

FNUS51 KBTV 091000
FWFBTV

FIRE WEATHER PLANNING FORECAST
NATIONAL WEATHER SERVICE BURLINGTON VT
600 AM EDT WED APR 9 2014

...IF YOU HAD A HEADLINE IT GOES HERE...

DISCUSSION...

A COLD FRONT WILL MOVE EAST OF THE AREA TODAY. HIGH PRESSURE WILL BUILD INTO THE REGION TONIGHT. A WEAK TROUGH OF LOW PRESSURE WILL SPREAD SNOW SHOWERS INTO THE AREA THURSDAY INTO FRIDAY. MAINLY DRY AND COLD WEATHER WILL PREVAIL SATURDAY INTO SUNDAY. IT WILL REMAIN DRY WITH A SIGNIFICANT WARMING TREND BEGINNING ON MONDAY.

VTZ001-002-005-009-016>018-NYZ028-035-101000-
EASTERN ADDISON-EASTERN CHITTENDEN-EASTERN CLINTON-EASTERN ESSEX-EASTERN
FRANKLIN-GRAND ISLE-WESTERN ADDISON-WESTERN CHITTENDEN-WESTERN FRANKLIN-
600 AM EDT WED APR 9 2014

	TODAY	TONIGHT	THU
	MO CLDY	PT CLDY	MO CLDY
CLOUD AMOUNT	20	20	40
PRECIP CHC (%)	20	20	40
PRECIP TYPE	NONE	NONE	SNOW
MAX/MIN TEMP	20	1	15
20 FT WND AM (MPH)	NW 12		NW 8
20 FT WND PM (MPH)	NW 20	E 2	NW 8
PRECIP AMOUNT	0	0	.02
PRECIP DURATION	0	0	1
PRECIP BEGIN	--	--	1 PM
PRECIP END	--	--	4 PM
HUMIDITY (%)	49	92	57
HAINES INDEX	4	--	3
LAL	1	1	1
MIXING HGT	7000		5000
TRANSPORT WIND	NW 15	-- --	NW 10
VENTILATION RATE	105000	--	50000
REMARKS...NONE			
\$\$			

VTZ003-004-006>008-010-101000-
CALEDONIA-ESSEX-LAMOILLE-ORANGE-ORLEANS-WASHINGTON-
600 AM EDT WED APR 9 2014

	TODAY	TONIGHT	THU
	MO CLDY	MO CLDY	MO CLDY
CLOUD AMOUNT	30	20	40
PRECIP CHC (%)	30	20	40
PRECIP TYPE	NONE	NONE	SNOW
MAX/MIN TEMP	20	-3	14

20 FT WND AM (MPH)	NW 12		NW 8
20 FT WND PM (MPH)	NW 20	E 5	NW 8
PRECIP AMOUNT	0	0	.04
PRECIP DURATION	0	0	3
PRECIP BEGIN	--	--	11 AM
PRECIP END	--	--	5 PM
HUMIDITY (%)	45	100	52
HAINES INDEX	4	--	3
LAL	1	1	1
MIXING HGT	6000		4500
TRANSPORT WIND	NW 20	-- --	NW 10
VENTILATION RATE	120000	--	45000
REMARKS...NONE			
\$\$			

VTZ011-012-019-101000-
EASTERN RUTLAND-WESTERN RUTLAND-WINDSOR-
600 AM EDT WED APR 9 2014

	TODAY	TONIGHT	THU
	MO CLDY	MO CLDY	MO CLDY
CLOUD AMOUNT	20	10	40
PRECIP CHC (%)	20	10	40
PRECIP TYPE	NONE	NONE	SNOW
MAX/MIN TEMP	24	2	18
20 FT WND AM (MPH)	NW 12		NW 8
20 FT WND PM (MPH)	NW 20	W 2	NW 8
PRECIP AMOUNT	0	0	.02
PRECIP DURATION	0	0	1
PRECIP BEGIN	--	--	1 PM
PRECIP END	--	--	4 PM
HUMIDITY (%)	45	84	53
HAINES INDEX	4	--	4
LAL	1	1	1
MIXING HGT	5500		4000
TRANSPORT WIND	NW 20	-- --	NW 10
VENTILATION RATE	110000	--	40000
REMARKS...NONE			
\$\$			

NYZ026-027-087-101000-
NORTHERN ST. LAWRENCE-NORTHERN FRANKLIN-SOUTHWESTERN ST. LAWRENCE-
600 AM EDT WED APR 9 2014

	TODAY	TONIGHT	THU
	PT CLDY	MO CLDY	MO CLDY
CLOUD AMOUNT	20	20	40
PRECIP CHC (%)	20	20	40
PRECIP TYPE	NONE	NONE	SNOW
MAX/MIN TEMP	18	-2	14
20 FT WND AM (MPH)	W 12		W 8
20 FT WND PM (MPH)	W 20	W 2	NW 8
PRECIP AMOUNT	0	0	.02
PRECIP DURATION	0	0	4
PRECIP BEGIN	--	--	11 AM
PRECIP END	--	--	5 PM

HUMIDITY (%)	57	100	62
HAINES INDEX	4	--	4
LAL	1	1	1
MIXING HGT	5000		4000
TRANSPORT WIND	NW 25	-- --	NW 15
VENTILATION RATE	125000	--	60000

REMARKS...NONE

\$\$

NYZ029>031-034-101000-
 SOUTHEASTERN ST. LAWRENCE-SOUTHERN FRANKLIN-WESTERN CLINTON-
 WESTERN ESSEX-
 600 AM EDT WED APR 9 2014

	TODAY	TONIGHT	THU
	MO CLDY	MO CLDY	MO CLDY
CLOUD AMOUNT			
PRECIP CHC (%)	30	20	40
PRECIP TYPE	NONE	NONE	SNOW
MAX/MIN TEMP	16	-6	12
20 FT WND AM (MPH)	W 12		W 8
20 FT WND PM (MPH)	W 20	W 2	NW 8
PRECIP AMOUNT	0	0	.04
PRECIP DURATION	0	0	1
PRECIP BEGIN	--	--	1 PM
PRECIP END	--	--	4 PM
HUMIDITY (%)	52	100	66
HAINES INDEX	4	--	3
LAL	1	1	1
MIXING HGT	6000		5000
TRANSPORT WIND	NW 15	-- --	NW 10
VENTILATION RATE	90000	--	50000

REMARKS...NONE

\$\$

.FORECAST EXTENDED...
 .THURSDAY NIGHT...MOSTLY CLOUDY WITH A CHANCE OF SNOW SHOWERS. LOWS 5
 BELOW TO 5 ABOVE. WINDS NORTHWEST 15 TO 25 MPH. CHANCE OF SNOW 40 PERCENT.
 .FRIDAY...MOSTLY CLOUDY WITH A CHANCE OF SNOW SHOWERS. HIGHS 15 TO 20.
 WINDS NORTHWEST 15 TO 25 MPH. CHANCE OF SNOW 30 PERCENT.
 .FRIDAY NIGHT...CLOUDY. LOWS 5 TO 10 ABOVE. WINDS NORTH 5 TO 15 MPH.
 .SATURDAY...PARTLY SUNNY. HIGHS IN THE 20S. WINDS NORTHWEST 10 TO 15 MPH.
 .SATURDAY NIGHT...MOSTLY CLEAR. LOWS 5 TO 15. WINDS NORTHWEST 5 TO 10 MPH.
 .SUNDAY...PARTLY SUNNY. HIGHS 30 TO 35. WINDS WEST 5 TO 10 MPH.
 .SUNDAY NIGHT...MOSTLY CLEAR. LOWS 20 TO 25. WINDS SOUTH 5 TO 10 MPH.
 .MONDAY...INCREASING CLOUDS. HIGHS 45 TO 50. WINDS SOUTH 5 TO 10 MPH.
 .MONDAY NIGHT...MOSTLY CLOUDY. LOWS 35 TO 40. WINDS SOUTH 5 TO 10 MPH.
 .TUESDAY...PARTLY SUNNY. HIGHS 55 TO 60. SOUTH WINDS 10 TO 20 MPH.

.OUTLOOK 8 TO 14 DAY...
 TEMPERATURES ABOVE NORMAL. PRECIPITATION NEAR NORMAL.

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SMOKEY AND READY

rjs - March 2014

B. Forecast Updates:

During the fire weather season, the fire weather forecaster will closely monitor weather conditions and issue an updated forecast if conditions are expected to **deviate significantly** from the original forecast. As a guide, an updated fire weather forecast should be issued only when any of the following criteria are met:

1. Red Flag criteria met, but not previously anticipated.
2. Observed wind is 10 mph or greater than forecast, and the direction differs by two or more compass points (based on 8 compass points).
3. Relative humidity, originally forecast to be greater than 30 percent, is now expected to be less than 30 percent.
4. Numerous thunderstorms where none were previously forecast.
5. The occurrence (or non-occurrence) of precipitation will **significantly** differ from the forecast.
6. Any unexpected weather conditions that will **significantly** impact fire service operations. (unexpected wind shifts, etc.)

C. Forecast Backup Responsibilities:

In the event that NWS Albany is unable to produce their fire weather forecasts and watches or warnings, NWS Burlington is their backup. In that role, we would produce their forecasts (ALBFWFALY) with a line in the MND Header stating that the product was produced by NWS Burlington, VT.

III. Red Flag Program

A. Red Flag Event

from NWS Directives 10-401:

Forecasters will issue Fire Weather Watches/Red Flag Warnings when the combination of dry fuels and weather conditions support extreme fire behavior. These conditions alert land management agencies to the potential for widespread new ignitions or control problems with existing fires, both of which could pose a threat to life and property.

A red flag event is the **combination of a critical fire weather pattern and significantly dry fuels**. This combination could lead to the occurrence of large and dangerous wildfires. Since the potential for Red Flag conditions does not exist without receptive fuel conditions, knowledge of existing fuel conditions is essential. While Red Flag conditions may vary for each fire weather district, the purpose of the Red Flag Program is to alert land management agencies to developing weather conditions that, when coupled with critically dry wildland fuels, could lead to dangerous fire behavior. It is important to point out that High Fire Danger by itself does not necessarily result in Red Flag conditions. **Red Flag generally reflects how fires may behave after they are ignited, while fire danger specifically relates to the likelihood of fire development.**

B. Red Flag Criteria

NWS Directives 10-401 states that *both fuel and weather parameters* are important considerations. It suggests that the following weather criteria be considered:

- a. Lightning after an extended dry period
- b. Significant dry frontal passage
- c. Strong winds
- d. Very low relative humidity
- e. Dry thunderstorms

Thus, in the WFO Burlington Fire District, elements considered critical for red flag consist of a combination of:

- a. **Meteorological parameters** (winds, relative humidity, etc),
- b. **Long term dryness** (past rainfall and Keetch-Byram index), and
- c. **Vegetation status.**

WFO Burlington shall use the following sets of criteria to determine when a red flag warning will be issued for particular zones. Note there are two different criteria based primarily upon the season. *Forestry personnel will inform us of which vegetative stage we are in.*

****ALL OF THESE FACTORS HAVE TO BE MET IN ORDER TO HAVE A RED FLAG EVENT****

When in Vegetative Stage I & II (cured & pre green-up Spring/Fall)

- Winds *sustained* or with *frequent* gusts above 25 mph, **and**
- Relative Humidity at or below 30%, **and**
- Rainfall amounts for the previous 5 days of less than 0.25 inches

When in Vegetative Stage III (green Summer)

- Winds *sustained* or with *frequent* gusts above 25 mph, **and**
- Relative Humidity at or below 30%, **and**
- Rainfall amounts for the previous 8 days of less than 0.25 inches, **and**
- Keetch-Byram Drought Index values of 300 or greater

Note: WFO Burlington does *not* have any temperature criteria or restrictions for issuing a Fire Weather Watch or Red Flag Warning.

C. Fire Weather Watch

Our **Vermont** and **New York Fire Weather Users** have stated that they do NOT require a telephone call before we issue a Fire Weather Watch. However, the WFO Burlington forecaster will ***call both Vermont (Tess Greaves) and northern New York Forest Ranger Dispatch contacts*** at a reasonable time after the issuance of the watch. The phone contacts are the same as for a Red Flag Warning. After issuance of a Fire Weather Watch, and notification of our users, the Eastern Area Geographical Area Coordination Center (EACC) should be notified either by telephone (414-944-3811) or Fax (414-944-3838).

ISSUANCE: The Fire Weather Watch is issued under the PIL...**ALBRFWBTV**.

Fire Weather Watches and Red Flag Warnings will be broadcast on NOAA Weather Radio.

Forecasters should issue a Fire Weather Watch when there is a high potential for development of a Red Flag Event (per directives 10-401). The watch may be issued for the entire area or selected portions. However, our Vermont users have told us that it is simpler to issue for the entire area. The watch remains in effect until: 1.) It is cancelled, 2.) Upgraded to a Red Flag Warning, or 3.) Expires. Whenever any of the 3 actions in the previous sentence occur, an updated RFW will be issued as well as an updated routine fire weather forecast to reflect these changes.

First Period Fire Weather Watches are NOT allowed. Fire Weather Watches should be issued 18 to 72 hours in advance of the expected onset of criteria (2nd period on). Although fire weather watches may be issued for dry lightning, **our users have stated that they prefer that we highlight the “dry thunderstorms” in the routine forecast and not issue a Watch for this type of event,** unless the forecaster believes it is critical.

Per NWS Directives, a Fire Weather Watch should NOT be issued or continued in low confidence (below 50 percent) or borderline events. In these situations, the forecaster should describe the threat and uncertainty within the discussion in the routine forecast. A forecaster should cancel the watch if confidence to keep it is too low. As a guide, the confidence level of the forecaster should be about 50 percent or higher.

Remember, when a watch is issued, a headline needs to be included in the ALBFWFBTV, and an appropriate ALBRFWBTV statement is required. The headline should state something similar to the following (ensure time, location, and reason for are mentioned):

...FIRE WEATHER WATCH FOR TUESDAY IN THE CHAMPLAIN VALLEY OF VERMONT AND NORTHERN NEW YORK FOR STRONG WINDS AND LOW HUMIDITY...

If a watch is already in effect, the early morning forecaster will need to decide what to do with the watch. This will require the issuance of an RFW and headlines changed or removed to indicate:

- (a) upgrade to Red Flag Warning**
- (b) cancel the Watch**
- (c) continue the Watch in periods 2 and beyond**

...FIRE WEATHER WATCH FOR TUESDAY (TOMORROW) FOR NORTHEAST VERMONT FOR STRONG WINDS AND LOW HUMIDITY...

...FIRE WEATHER WATCH IN EFFECT TUESDAY AND WEDNESDAY FOR NORTHERN NEW YORK FOR STRONG WINDS AND LOW HUMIDITY...

Again, with the issuance of a Watch, **a separate short statement under the ALBRFWBTVPIL will be issued.** This product will describe, in more detail, the area (specific counties), reasons and timing of the Watch.

An example of a Fire Weather watch and associated forecast follows on pages 16 and 17:

1. Example of a Fire Weather Watch *and* associated Fire Weather Forecast

WWUS81 KBTV 081700
RFWBTV

FIRE WEATHER WATCH
NATIONAL WEATHER SERVICE BURLINGTON VT
100 PM EDT TUE APR 8 2014

NYZ028-035-VTZ001-002-005-009-091200-
/O.NEW.KBTV.FW.A.0001.130409T1500Z-130410T0100Z/
EASTERN CLINTON-EASTERN ESSEX-GRAND ISLE-WESTERN FRANKLIN-
WESTERN CHITTENDEN-WESTERN ADDISON-
100 PM EDT TUE APR 8 2014

...FIRE WEATHER WATCH IN EFFECT FROM 11 AM TO 9 PM EDT WEDNESDAY..

THE NATIONAL WEATHER SERVICE IN BURLINGTON HAS ISSUED A FIRE WEATHER
WATCH...WHICH IS IN EFFECT FROM 11 AM TO 9 PM EDT WEDNESDAY.

- * LOCATIONS...CHAMPLAIN VALLEY OF NEW YORK AND VERMONT.
- * TIMING...RED FLAG CONDITIONS POSSIBLE FROM 11 AM TO 9 PM EDT WEDNESDAY.
- * HUMIDITY...10 TO 20 PERCENT.
- * WINDS...SOUTHWEST WINDS 20 TO 30 MPH.
- * IMPACTS...VERY DRY FUELS EXIST ACROSS THE CHAMPLAIN VALLEY. GIVEN THE
EXPECTED WEATHER CONDITIONS...ANY FIRES THAT DO OCCUR WEDNESDAY WILL
LIKELY SPREAD QUICKLY...BURN INTENSELY...AND BE DIFFICULT TO CONTAIN.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A FIRE WEATHER WATCH MEANS THAT DANGEROUS FIRE WEATHER CONDITIONS MAY OCCUR.
LISTEN FOR LATER FORECASTS AND POSSIBLE RED FLAG WARNINGS.

STAY TUNED TO NOAA WEATHER RADIO OR GO TO WWW.WEATHER.GOV/BURLINGTON FOR
FURTHER UPDATES ON THIS SITUATION.

\$\$

FNUS51 KBTV 081700
FWFBTV

FIRE WEATHER PLANNING FORECAST...UPDATED
NATIONAL WEATHER SERVICE BURLINGTON VT
100 PM EDT TUE APR 8 2014

...FIRE WEATHER WATCH ON WEDNESDAY FOR THE CHAMPLAIN VALLEY FOR STRONG WINDS
AND LOW HUMIDITY...

.DISCUSSION...

HIGH PRESSURE TO OUR EAST WILL RESULT IN A DRY AIRMASS IN PLACE ACROSS NEW
ENGLAND AND NORTHERN NEW YORK THROUGH WEDNESDAY. AS THE HIGH MOVES SLOWLY
EAST...SOUTH WINDS WILL INCREASE TO AROUND 30 MPH WEDNESDAY. A COLD FRONT
WILL MOVE ACROSS THE REGION WEDNESDAY NIGHT WITH WINDS SHIFTING TO THE
NORTHWEST.

VTZ001-002-005-009-016>018-NYZ028-035-091000-
EASTERN ADDISON-EASTERN CHITTENDEN-EASTERN CLINTON-EASTERN ESSEX-EASTERN
FRANKLIN-GRAND ISLE-WESTERN ADDISON-WESTERN CHITTENDEN-WESTERN FRANKLIN-
100 PM EDT TUE APR 8 2014

...FIRE WEATHER WATCH FOR TUESDAY...

	TONIGHT	WED	WED NIGHT	THU
CLOUD AMOUNT	PT CLDY	PT CLDY	MO CLDY	PT CLDY
PRECIP CHC (%)	10	10	40	20
PRECIP TYPE	NONE	NONE	TSTMS	NONE
MAX/MIN TEMP	70	88	60	78
20 FT WND AM (MPH)		S 25		NW 20
20 FT WND PM (MPH)	S 10	S 30	W15	NW 15
PRECIP AMOUNT	0	0	0.15	0
PRECIP DURATION	0	0	2	0
PRECIP BEGIN	--	--	9 PM	--
PRECIP END	--	--	3 AM	--
HUMIDITY (%)	55	25	85	45
HAINES	--	4	--	4
LAL	1	1	3	1
MIXING HGT		6000		7000
TRANSPORT WIND	-- --	S 30	-- --	NW 20
VENTILATION RATE	--	180000	--	140000
REMARKS...NONE				
\$\$				

ETC

D. Red Flag Warning Product

ISSUANCE: Red Flag Warnings are issued via the RFW pil...(ALBRFWBTV)...using the UGC zone code.

Red Flag Warnings and Fire Weather Watches will be broadcast on NOAA Weather Radio.

If a Red Flag Warning (RFW) is issued, an updated routine fire weather forecast (FWF) is required with the Red Flag Warning and reason for the warning as a headline. The Red Flag Warning is used to warn of an impending or occurring Red Flag Event. It is issued when there is a high degree of confidence (70 percent or greater) that both fuel and weather parameters will meet Red Flag criteria within **24 hours**. If a Red Flag Warning is issued, this should be included in the highlights section of the area forecast discussion.

Per NWS Directives 10-401 and per request of both our **Vermont** and **New York Fire Weather Users**, they shall be called, 7 days a week by 6:00 AM, **before** a Red Flag Warning is issued.

In Vermont, call *Tess Greaves*. **Section VIII of this manual has a list of telephone numbers for the appropriate officials.** If you are unable to reach her, then just issue the appropriate product, and contact her as soon as possible.

In New York, our primary instructions are to call the *NY State Forest Rangers Dispatch (24/7)* in Ray Brook, NY. Call this facility before issuing a Red Flag Warning (see **Section VIII for phone numbers**). If you are unable to reach them, issue the appropriate product and contact them as soon as possible.

After issuance of a Red Flag Warning, and notification of our users, **notify the Eastern Area Coordination Center (EACC)**, either by telephone (414-944-3811) or Fax (414-944-3838)

Vegetative stage must be evaluated before issuing a warning. The Vermont Department of Forests Parks and Recreation will provide meteorological and fuel moisture information to us when critical. Since fuel moisture changes gradually, this data can be used by the midnight fire weather forecaster, over periods of time.

The forecaster can call Tess Greaves in Vermont or Capt. John Streiff (or the Dispatch Center) in New York (refer to section VIII Fire Weather Contacts) between 730 AM and 430 PM Monday through Friday for consultation. At other times and during an emergency, they can be called at home.

If, during the day, the forecaster decides that an unanticipated need for a Red Flag Warning exists, **first call our primary Vermont and New York Fire Weather Contacts. Discuss the situation.** Once a decision is reached, issue an ALBRFWBTV statement to alert users of the situation. Also issue an updated ALBFWFBTV with the Red Flag Warning highlighted.

An **unanticipated** Red Flag Warning means that fire weather users may already be in the field and unaware of the situation. The last issuance they received may have been the early morning ALBFWFBTV. That's why it's important to communicate with the key fire weather contacts.

Note: In some synoptic situations, weather conditions meeting warning criteria may exist for portions of a two day period, with only a break of several hours where red flag criteria are not met. In these situations, it is less confusing for fire agency customers if a Red Flag Warning or Fire Weather Watch is issued for the entire period, as opposed to issuing and cancelling warnings and watches each time weather conditions go into and out of warning criteria. If a Red Flag Warning or Fire Weather Watch is issued in this fashion, the discussion portion of the warning must contain explicit information regarding the short term periods(s) when critical conditions will subside.

As a note of interest, our New York contacts have stated that the fuel moisture should be very similar in Vermont and New York...and that we would be most likely to issue a Warning for the Champlain and St Lawrence valley regions of New York, and less likely for the Adirondacks. This is due to differences in the type of fuel moisture and the cooler temperatures in the Adirondacks.

Former NY Forest Ranger Joe Kennedy also stated that there are many times we have strong winds but no fires. He said that the 2 most important factors (in his opinion) for fire weather are:

**--number of days without rain (relates to fuel moisture), and
--nights without the temperature reaching the dew point (no wetting dew)**

A few points about dealing with Near Red Flag Situations:

- Use **strongly worded headline** in the Fire Weather Planning Forecast (FWF)
- Give details in the discussion portion of the Fire Weather Planning Forecast
- ***A Red Flag Warning will be issued in marginal situations only if requested by users***
- ***If requested by users...a Special Weather Statement (SPS) can be issued and broadcast on NOAA Weather Radio in times of high fire danger and marginal Red Flag events. The Fire Danger details will be provided by and attributed to the user agency providing the information.***

Example of a Red Flag Warning (RFW) and associated routine FWF) forecast is on pages 20 and 21.

1. Example of Red Flag WARNING and Associated Fire Weather Forecast

WWUS81 KBTV 091015
RFWBTV

RED FLAG WARNING
NATIONAL WEATHER SERVICE BURLINGTON VT
615 AM EDT WED APR 9 2014

NYZ028-035-VTZ001-002-005-009-100130-
/O.NEW.KBTV.FW.W.0001.130409T1500Z-130410T0100Z/
EASTERN CLINTON-EASTERN ESSEX-GRAND ISLE-WESTERN FRANKLIN-
WESTERN CHITTENDEN-WESTERN ADDISON-
615 AM EDT WED APR 9 2014

...RED FLAG WARNING IN EFFECT FROM 11 AM TO 9 PM EDT...

THE NATIONAL WEATHER SERVICE IN BURLINGTON HAS ISSUED A RED FLAG
WARNING...WHICH IS IN EFFECT FROM 11 AM TO 9 PM EDT.

- * LOCATIONS...CHAMPLAIN VALLEY OF NEW YORK AND VERMONT.
- * TIMING...RED FLAG CONDITIONS EXPECTED FROM 11 AM TO 9 PM EDT.
- * HUMIDITY...10 TO 20 PERCENT.
- * WINDS...SOUTHWEST WINDS 20 TO 30 MPH THIS AFTERNOON AND EVENING.
- * IMPACTS...VERY DRY FUELS EXIST ACROSS THE CHAMPLAIN VALLEY. GIVEN THE
EXPECTED LOW HUMIDITIES AND GUSTY WINDS...ANY FIRES THAT DO OCCUR WILL
LIKELY SPREAD QUICKLY...BURN INTENSELY...AND BE DIFFICULT TO CONTAIN.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A RED FLAG WARNING MEANS THAT DANGEROUS FIRE WEATHER CONDITIONS ARE EXPECTED
DUE TO THE COMBINATION OF GUSTY WINDS...LOW RELATIVE HUMIDITIES...AND DRY FUELS.
ANY FIRES THAT DEVELOP MAY QUICKLY GET OUT OF CONTROL AND BECOME DIFFICULT TO
CONTAIN.

STAY TUNED TO NOAA WEATHER RADIO OR GO TO WWW.WEATHER.GOV/BURLINGTON FOR
FURTHER UPDATES ON THIS SITUATION.

\$\$

FNUS51 KBTV 091025
FWFBTV

FIRE WEATHER PLANNING FORECAST
NATIONAL WEATHER SERVICE BURLINGTON VT
625 AM EDT WED APR 9 2014

...RED FLAG WARNING FOR THE CHAMPLAIN VALLEY TODAY FOR STRONG WINDS AND LOW HUMIDITY...

DISCUSSION...

HIGH PRESSURE WILL RESULT IN VERY DRY WEATHER TODAY AND SOUTH WINDS WILL INCREASE TO 30 MPH. A COLD FRONT WILL CROSS THE DISTRICT THURSDAY WITH SCATTERED SHOWERS AND WINDS SHIFTING TO THE NORTHWEST.

VTZ001-002-005-009-016>018-NYZ028-035-101000-
EASTERN ADDISON-EASTERN CHITTENDEN-EASTERN CLINTON-EASTERN ESSEX-EASTERN FRANKLIN-
GRAND ISLE-WESTERN ADDISON-WESTERN CHITTENDEN-WESTERN FRANKLIN-
625 AM EDT WED APR 9 2014

...RED FLAG WARNING FOR TODAY...

	TODAY	TONIGHT	THU
CLOUD AMOUNT	PT CLDY	PT CLDY	MO CLDY
PRECIP CHC (%)	20	20	50
PRECIP TYPE	NONE	NONE	SHOWERS
MAX/MIN TEMP	92	70	82
20 FT WND AM (MPH)	S 20		NW 15
20 FT WND PM (MPH)	S 28	SW15	NW 15
PRECIP AMOUNT	0	0	.01-.10
PRECIP DURATION	0	0	2
PRECIP BEGIN	--	--	9 AM
PRECIP END	--	--	3 PM
HUMIDITY (%)	15	80	70
HAINES	4	--	4
LAL	1	1	4
MIXING HGT	7000		5000
TRANSPORT WIND	S 30	-- --	NW 20
VENTILATION RATE	210000	--	100000
REMARKS...NONE			
\$\$			
ETC			

IV. The NFDRS Point Forecasts

The National Fire Danger Rating System (NFDRS) measures wildfire fire danger. The NWS role in NFDRS is that of forecasting weather parameters for input which when combined with fire weather community input (fuel moisture, etc) allows the NFDRS software to predict the next day's fire danger index.

NWS Burlington is responsible for inputting weather parameters (ALBFWMBTV) into the National Fire Danger Rating Forecast. **These forecast parameters are generally valid for the next day at 1300 LST, except some parameters (for example, max/min temperature and RH) are for a range of time. Per request of our users, NWS Burlington will issue this product by 3:00 PM. Updates are not required.**

Per Directives 10-401, a fire weather observation *must* be received for an NFDRS forecast to be generated. These site forecasts are currently issued for 4 Vermont locations, as well as for 5 sites in New York. The locations are as follows:

VERMONT

#430501 - Essex Junction, VT (Chittenden county)

Elevation: 340 ft. 44.5078 N 73.1153 W

Owner: State of Vermont

Contact: Tom Simmons

#431301 - Sweezy (Mt. Tabor) (Danby), VT (Rutland county)

Elevation: 668 ft. 43.33 N 73.16 W

Owner: Green Mountain National Forest

Contact: William Garrison

#430601 - Lake Elmore, VT (Lamoille county)

Elevation: 1200 ft. 44.5422 N 72.5266 W

Owner: Green Mountain National Forest/Vt Forests and Parks

Contact: Tess Greaves

#430402 - Nulhegan (near Island Pond), VT (Essex county)

Elevation: 1243 ft. 44.7700 N 71.7017 W

Owner: U.S. Fish and Wildlife

Contact: Rick Vollick

NEW YORK

- #300311 - Schroon Lake, NY (Essex county)
Elevation: 820 ft. 43.8711 N 73.7519 W
Owner: New York State Forest Rangers
Contact: John C. Streiff

- #300191 - Schuyler Falls, NY (Clinton county)
Elevation: 650 ft 44.6 N 73.6 W
Owner: New York State Forest Rangers
Contact: John C. Streiff

- #300892 - Brasher Falls, NY (St Lawrence county)
Elevation: 300 ft. 44.8 N 74.8 W
Owner: New York State Forest Rangers
Contact: John C. Streiff

- #300891 - Wanakena, NY (St Lawrence county)
Elevation: 1500 ft. 44.1469 N 74.9006 W
Owner: New York State Forest Rangers
Contact: John C. Streiff

- #300312 - Mt VanHoevenberg, NY (Essex county)
Elevation: 2000 ft. 44.2195 N 73.9184 W
Owner: New York State Forest Rangers
Contact: John C. Streiff

A. The FWM Forecast format is as follows:

FCST,#####,YYMMDD,13,X,TT,RH,L1,L2,DD,SS,,TX,TN,RX,RN,P1,P2,F
 where:

NFDRS Station Identifier {see above}
 YYMMDD Year Month Day (**forecast valid date which is the next day**)
 140605: June 5th, 2014
 13 Time (forecast valid time 1300 hours/1PM). *Does not change.*

** The double comma “,,” in the forecast line between SS and TX is needed to hold the place for *10 hour fuel moisture* values. The NWS does not forecast this however.

*The following parameters are valid at 1300 LST for the forecast valid **date (next day)**:*

X	Weather	
	<u>Codes:</u>	
	0 - clear	5 - drizzle
	1 - scattered clouds (mostly clear)	6 - rain
	2 - broken clouds (partly-mostly cloudy)	7 - snow/sleet
	3 - overcast	8 - showers
	4 - fog	9 - thunderstorms
TT	Dry Bulb Temperature	
RH	Relative Humidity	
DD	Wind direction (N, NE, E, SE etc)	
SS	Wind speed (10 minute average in MPH)	

*The following parameters are valid for the 24 hour **period** ending at 1300 LST on the forecast valid date:*

L1	Lightning Activity Level (period 1400-2300 LST hours)		
	<u>Codes:</u>	LAL Level	Coverage (%) Descriptor
		1	0 None
		2	1-14 Isolated
		3	15-24 Widely Scattered
		4	25-54 Scattered
		5	55+ Numerous
		6 (Dry lightning)	>=15 Widely Scattered or greater
		(little/no rain)	
L2	Lightning Activity Level (period 2300-2300 LST hours on forecast valid date)		
TX	Maximum temperature		
TN	Minimum temperature		
RX	Maximum relative humidity		
RN	Minimum relative humidity		
P1	Precipitation duration (1300-0500 LST period) in whole hours		
P2	Precipitation duration (0500-1300 LST period) in whole hours		
F	Wet Flag “Y/N” (only use Y for widespread heavy rainfall and early in the season when Significant snow remains in the vicinity of the RAWS. State contacts will direct when to use Y early in the season.)		

**** 5,6,7 weather codes set elements to zero and when to go with a wet flag = Yes ****

1. Example of ALBFWMBTV - Point Forecast:

ZCZC ALBFWMBTV ALL
TTAA00 KBTW DDHHMM

NATIONAL FIRE DANGER RATING FORECAST
NATIONAL WEATHER SERVICE BURLINGTON VT
305 PM EDT WED JUN 4 2014

FCST,430501,140605,13,1,64,40,1,1,NE, 8,,65,50,90,40,0,0,N

Remember...the double comma “,,” in the forecast line above, between SS and TX is needed to hold the place for *10 hour fuel moisture* values. The NWS is not responsible for this parameter.

Guidance products used to develop these forecasts include, but are not limited, to the following sources:

- Numerical MOS guidance for nearby stations,
- Fire weather observations (Observation is REQUIRED per Directive 10-401),
- Current METAR and RAWS surface observations (via ROMAN), and
- Satellite and Radar imagery.

V. Statements (ALBSPSBTV) And Other Public Products

It is NWS Burlington office policy, based upon user input, to **refrain from issuing statements for High or Extreme Fire Danger conditions**. The Fire Danger is something that is calculated and posted each day at state and national parks. Their determination is based on local measurements, leaning heavily toward various fuel moistures. Media inquiries concerning the specific fire danger should be directed to the appropriate State Division of Forestry.

On *rare occasions*, the fire weather community may request that we help get the word out about their fire danger calculations. In these *rare* cases, the senior Forecaster may decide to issue a statement, if requested by the forestry officials. This statement would incorporate portions or all of the information received from the fire weather community. ***The fire danger information should be attributed to the user agency providing us with the information. It is geared for NWR broadcast only. If a long-line SPS is issued, make sure the SPS is for 6 hours or less.***

Fire Weather Watches and Red Flag Warnings will be broadcast on NOAA Weather Radio (NWR). Fire Weather Watches and Red Flag Warnings are *not* highlighted in general Public Forecasts.

VI. Spot Forecasts

Site-specific (spot) forecasts are issued by WFOs in support of wildfire suppression and natural resource management. These forecasts aid the land management and fire control agencies in protecting life and property during wildland fires, hazardous fuels reduction, and rehabilitation and restoration of natural resources. Appendix E contains a list of the primary POC's in the State of Vermont that are authorized to request SPOTs.

NWS Spot is the national standard software for requesting and issuing SPOT forecasts and should be used when possible. In times when the internet is hindered or not available, SPOT forecasts may be requested and disseminated through other mutually agreed upon methods. The forecast is a non-routine product. The forecast should state that it is valid until...[Date and Time]. SPOT forecasts should be updated when they are unrepresentative of conditions.

Per NWS Directives 10-401, the NWS will provide site-specific (SPOT) forecasts upon request of any federal user agency to support land management activities associated with wildland fire (including prescribed burning). ***Provision of non-federal, non-wildlife SPOTs will be restricted to purposes directly related to protecting life and property; or whenever some aspect of federal resources are involved*** (i.e., personnel, equipment, or interagency protection agreements providing such involvement). ***SPOTs may also be issued for HAZMAT incidents*** upon customer request. Based on this, it is best to maintain contact with another Federal Agency (USFS, Military, etc) when requesting SPOTs.

Upon receipt of a request for a spot forecast (see appendix D), the first question to ask is:

“What type of fire is this, a Prescribed Burn or Wildfire?”

Federal legislation still has limiting constraints on specialized aspects of the fire weather program for non-federal agencies that deal with non-wildfire activities. This includes, among other aspects, spot forecasts for non-federal prescribed burns.

--Spot forecasts for **wildfires in progress and other emergency situations** (i.e. affecting life or property) are available to *any federal, state or local* agency.

--Spot forecasts for **prescribed burns** are also available at any time *for federal agencies*. **State requested spot forecasts for prescribed burns will be honored where some aspect of federal resources are involved. It is recommended that state users make the request through their nearest federal agency.**

When the NWS receives a request for a SPOT forecast, both the forecaster and the agency making the request will need to determine the specific contents, frequency of issuance, be clear on means of distribution or communication and any other details required for a particular SPOT.

The user requesting the spot forecast will also, at a minimum, provide the following data: Location (town, county, state and latitude & longitude), topography and elevation, size of burn, ignition time and contact person with telephone number. Fuel (vegetation) type is also important information (stand of dense pines, or in a grassy field?).

In the spot forecast, the surface winds are generally the most important weather parameter, especially the timing of wind shifts. However, actual weather, humidity, transport winds, and temperatures may also be specifically requested. Each fire is different, presenting differing challenges with various requirements.

Remember, exchange telephone and/or fax numbers to share weather information. The requesting agency is encouraged to provide feedback regarding the spot forecast.

On site or reasonably close weather observations should be provided to the NWS with updated observations during the course of the event for issuance of a SPOT forecast.

Minimum requirements for a weather observation should include:

- actual weather
- dry bulb temperature
- relative humidity
- surface wind speed and direction

If those elements are unavailable, and the forecaster feels that will negatively impact the forecast, he/she may decline to fulfill a formal spot forecast request.

SPOT forecasts are considered one-time requests, and are *not* routinely updated. Land management personnel may contact the appropriate WFO for a spot update if forecast conditions appear unrepresentative of the actual weather conditions.

Example of Standardized SPOT forecast Format

The SPOT forecast will should follow this general format. The synopsis or discussion should key in on critical weather pattern and be brief. If it differs SIGNIFICANTLY from the routine fire weather forecast (FWF), the routine forecast should be updated as soon as possible. The updating of the ALBFWFBTV may be delegated out to whoever is available depending upon workload and resources.

FNUS7i KBTW DDHHMM
FWSBTV

SPOT FORECAST FOR [LOCATION OR NAME OF BURN]
NATIONAL WEATHER SERVICE BURLINGTON VT
2 PM EDT TUE JUL 8 2014

VALID UNTIL []
IF CONDITIONS BECOME UNREPRESENTATIVE, CONTACT THE NATIONAL
WEATHER SERVICE.

...HEADLINE...[RECOMMENDED BUT ONLY REQUIRED FOR FIRE WEATHER WATCH/RED FLAG WARNING]

DISCUSSION...[required]

FIRST PERIOD [SPECIFY, THIS AFTERNOON, TONIGHT, ETC]

SKY WEATHER.....

TEMPERATURE.....

HUMIDITY.....

20 FOOT WIND.....

OPTIONAL ELEMENTS AS REQUESTED BY USER

TIME (EDT)	9 AM	11 AM	1 PM	3 PM	5 PM
SKY (%).....					
WEATHER COV.....					
WEATHER TYPE.....					
TEMP.....					
RH.....					
20 FT WIND.....					
20 FT WIND GUST..					
CHC OF PCPN (%)...					

SMOKEY [YOUR NAME/INITIALS]

Example of Standardized WFO Burlington SPOT forecast:

FNUS71 KBTV DDHHMM
FWSBTV

SPOT FORECAST FOR DEVILS RIDGE FIRE...GREEN MOUNTAIN NATIONAL FOREST
ISSUED BY NATIONAL WEATHER SERVICE BURLINGTON VT
723 AM EDT SAT SEP 13 2014

VALID UNTIL 123 PM EDT SAT SEP 13 2014
IF CONDITIONS BECOME UNREPRESENTATIVE, CONTACT THE NATIONAL WEATHER
SERVICE.

HIGH PRESSURE WILL MOVE OFF THE NEW ENGLAND COAST THIS AFTERNOON.
INCREASING MOISTURE WILL MOVE NORTHEAST FROM THE OHIO VALLEY...AS A COLD
FRONT DROPS SOUTHEAST ACROSS THE GREAT LAKES. THE FRONT WILL MOVE ACROSS
THE FORECAST LOCATION SUNDAY AFTERNOON. THERE WILL BE A CHANCE OF
SHOWERS LATE TONIGHT...WITH STEADIER RAIN ON SUNDAY...TAPERING TO SHOWERS
SUNDAY EVENING. SOUTH WINDS WILL BE GUSTY TONIGHT...SHIFTING TO NORTH
SUNDAY AFTERNOON.

FOR THE REST OF TODAY
SKY/WEATHER.....MOSTLY SUNNY (10-20%)
CHANCE OF PCPN.....10 PERCENT
BEGIN/END OF PCPN....NONE
TEMPERATURE.....75 TO 80
HUMIDITY.....40 TO 45 PERCENT
20 FOOT WIND.....S 10 TO 15 MPH

TIME (EDT)	9 AM	11 AM	1 PM	3 PM	5 PM
SKY (%).....	10	15	18	18	20
WEATHER COV.....					
WEATHER TYPE.....	NONE	NONE	NONE	NONE	NONE
TEMP.....	65	71	75	77	79
RH.....	60	55	49	44	41
20 FT WIND.....	S 5	S 7	S 10	S 12	S 14
20 FT WIND GUST...7		9	12	12	15
CHC OF PCPN (%)...0		5	10	10	10

FORECASTERS NAME

VII. Additional Fire Weather Information

A. Fire Weather Observations

Fire weather observation stations provide the specialized observations to support fire weather forecasts, wildfire control and suppression, and various other land management operations. These stations may either be manned observation stations operated by the fire control agencies, or unmanned Remote Automated Weather Stations (RAWS) deployed by any of the federal or state land management agencies.

All weather observation stations are assigned a six (6) digit identification number. These are the same 6 digit identifier which would show up in the FWMBTV NFDRS point forecast product. The first two digits denote the state. For example;

VERMONT.....43
NEW YORK.....30

The next 4 digits are utilized differently in Vermont and New York:

In Vermont, the second two (2) digits denote the county in which the station is located, thus Chittenden county is 05. The last 2 digits is the sequential number of stations (as they are added) in each county. Chittenden has 1 observation site so 01 is used. If an additional site is added to Chittenden county it would be assigned 02. Thus Observation site Essex Junction VT is 430501.

In New York, the middle 3 digits are the FIPS code, thus Essex county is 031. The remaining digit is the sequential number of stations (as they are added) in each county. Essex county NY has 1 observation site so 1 is used. If an additional site is added to Essex county NY, it would be assigned 2. Thus, observation site Schroon Lake (Essex county NY) is 300311.

If a new weather station is being deployed, users should contact the fire weather program leader for station ID assignment, who should in turn contact the ERH Fire Weather Program Leader to maintain consistency in methodology across the area.

In addition, these stations need to be provided a special forecast zone number if the owners wish to have the station catalogued with Weather Information Management System (**WIMS**). This is a 3 digit number which begins with a '9' (referring to Region 9 of the Forest Service Agency).

The Fire Weather Program is a cooperative effort between the National Weather Service and the federal, state, local and private fire control interests involved in the management of our timber and grasslands. Wildfire presents a serious threat. Accurate and timely weather information is one of the most important tools available to the land manager.

Observations are the single most important effort the control agencies put into the fire weather program because the product derived from these observations is the fire danger rating. Fire danger rating is the guidance tool that, together with the weather forecast, is used to make a variety of fire management decisions. It is important that observing agencies be well trained and informed of the necessity of accurate, timely, and representative observations. The goal is to effectively manage a natural resource. Questions on weather observations should be directed to the NWS Fire Weather Program Leader.

Fire weather observations are to be transmitted in a *timely manner*. Observations sent into the WIMS system are made available to the NWS computer system for access by fire weather forecasters. In addition, more observations are finding their way to the Internet every month. Users should make NWS forecasters aware of these observations.

The *owners and operators* of the fire weather stations are responsible for restocking of supplies for the daily operation of the station. They are also responsible for station inspection and quality control of the data.

The *NWS fire weather focal* is available for consultation on siting issues and for help in the correct method of taking a fire weather observation. Training is also the responsibility of the fire control agency, however the fire weather focal is available to assist upon request.

Special meteorological services are those services which are uniquely required by land management agencies, which require National Weather Service personnel to be away from their duty station and/or, in emergency situations to be on overtime. User agencies pay the costs for: overtime, travel and per diem (food and lodging, etc), and other miscellaneous costs pertaining to these special services.

Special services include: Mobile Unit and other on-site meteorological services, weather observer training, weather station visitation requested by user agencies, participation in user agency training activities.

Costs, to be recovered from user agencies, will be calculated on the basis of expense reports submitted to the NWS finance division, by the servicing NWS forecast office. Billing of user agencies will be handled by the appropriate NWS administrative divisions based on these expense reports. Bills include a statement of services rendered, and the dates and locations of these services.

B. Incident Support, On-Site Services Equipment and Incident Meteorologists (IMETS)

On-site forecast service is a non-routine service available from WFOs with designated Incident Meteorologists (IMETS). IMETS may be dispatched to support:

- a) Wildland or urban-wildland fires (including high risk or critical resource value prescribed burns.

- b) Land management coordination and dispatch centers, and Area Commands
- c) Hazardous substance releases
- d) Any special projects or incidents which fall under the mandate of the NWS

The NWS will provide on-site meteorological support upon request through the IMET program to: 1) federal land management agencies for wildland fire events, and 2) other government agencies involved in wildfire incidents. State and local fire fighting agencies involved in non-wildfire events (e.g., prescribed burning) may be supported depending upon available resources. Other events listed above (1b, 1c, or 1d) may be supported depending upon resources and approval by the appropriate Regional Headquarters and Meteorologist-in-Charge (MIC).

In case of competing resources, events requiring on-site services will be prioritized as shown below:

- a) Wildfire or a life threatening non-fire all hazards event
- b) Prescribed fires
- c) General public safety (non life threatening, not imminent)
- d) All others

The AMRS (All Hazards Meteorological Response System), theodolite equipment (now using ATMU designation), and FireRAWS are the main pieces of equipment used by IMETs (Incident Meteorologists). All are considered to be national fire fighting resources. The AMRSs are used to provide a mobile platform for data collection and forecast preparation. The theodolite is used to take winds aloft measurements at the site. FireRAWS provides on-site meteorological observation capabilities for the incident. Only trained personnel will operate the AMRS, and AMRSs will only be dispatched when a certified IMET is requested.

AMRSs are positioned at various WFOs around the country by the Staff Meteorologist to the NIFC (SMN) in coordination with the Regional Program Managers. ATMUs (Atmospheric Theodolite Meteorological Unit) are generally stored in interagency caches. Seasonal changes in the cache locations will be coordinated through NWS Regional Headquarters and the SMN. Units may be pre-positioned to caches anywhere in the country as fire danger requires.

Configuration and management of AMRSs and ATMUs will reside with the National Fire Weather Program Manager (NFWPM) and the Staff Meteorologist to the National Interagency Fire Center (SMN) in coordination with the Regional Program Managers.

Each Region will assign routine maintenance and restocking responsibility and property management for AMRSs and ATMUs to specific NWS offices. The MICs of these offices should ensure restocking and maintenance of the equipment is accomplished before the equipment is dispatched again. The SMN and NFWPM should ensure that caching agencies will allow access to cached ATMUs by NWS staff for the purpose of restocking, maintenance, and training.

NWS Regional Headquarters should ensure there are a sufficient number of trained IMETs to meet normal requests for on-site services. Per NWS Directive 10-402, by March 1st the Regions will advise appropriate forestry officials/agencies of the following:

- a. Names and Locations of certified IMETS (and updated any status changes during the year) within each dispatch area.
- b. A 24 hour telephone number where the dispatch center can initiate the request for each IMET.

Availability of the IMET will be determined by the local MIC and the IMET. When an IMET knows in advance they will be unavailable (AL, station shortage, etc) the MIC and IMET will note this unavailable status on the IMET non-availability roster on the IMET website. Request and dispatch of IMETs and equipment should be accomplished through the National Resource Coordination

System Dispatch centers are responsible for providing logistical support to initial attack and project fires at the unit (Forest, Park, District, etc.) level. A dispatch center requests support from a Geographic Area Coordination Center (GACC). These centers act as focal points for internal and external requests not filled at the local dispatch centers. The **Eastern Area Coordination Center (EACC)** located in St. Paul, MN serves as this purpose and **may be reached at 612-713-7300**.

The National Interagency Coordination Center. NICC is responsible for coordinating movement of all resources between GACCs. NICC is located on the campus of the **National Interagency Fire Center (NIFC)**. The NIFC may be reached at **208-387-5512**.

An incident will initiate the request for an IMET from the WFO in their area. The request will be handled by a dispatch center. The local MIC is responsible for dispatching the IMET or notifying the center that the IMET is not available. If the local IMET is not available, the request goes to the SMN through the GACC. If the SMN is unable to find an available IMET then the request goes to the NICC. Non-land management IMET requests (HAZMET incident for Emergency Manager) will follow a similar request flow (refer to directives 10-402).

The MIC and IMET will follow the procedures below during a dispatch:

1. The MIC will inform Region and the SMN if the request is filled at the WFO level.
2. The IMET coordinates with the SMN and makes sure appropriate equipment has been ordered.
3. The IMET gets proper documentation: Overhead and Equipment Resource Orders, Travel Order, Travel Itinerary.
4. The IMET is responsible for shipping equipment.
5. The IMET prepares initial briefing and travels to fire.
6. Upon arrival at the site through completion of duty, the IMET follows the procedures set forth in NWS Directives 10-402, pages 7-11 including appendix A.

C. Training:

Fire Behavior Courses:

The Fire Weather Program Leader (FWPL) will complete fire weather course numbers S-290 (Intermediate Wildland Fire Behavior) and S-591 (Fire Weather Forecasters Course). S-390 (Introduction to Wildland Fire Behavior Calculations) is recommended, but not required. In addition, the FWPL will acquire advanced knowledge of NFDRS, which can be accomplished through self study of S-491 course materials.

All weather forecasters involved in the fire weather forecast program are required to complete course number S-290 as well as the NWS Fire Weather based learning module.

All forecasters are also required to complete local training as specified by the local and/or regional Fire Weather Program Leader. This training should focus on: 1) the effects of local terrain on fire weather parameters and fire behavior, with an emphasis on wind; 2) local fire weather forecast techniques; 3) local fire season climatology; and 4) Remote Automated Weather Stations (RAWS) observations (where available). They should also become familiar with all NWS fire weather products and services and become proficient in the preparation and dissemination procedures for those products.

Training, certification and recertification procedures and requirements are outlined on pages 3 through 5 of NWS Directives 10-405.

D. Communications:

Fire Weather products issued by the National Weather Service in Burlington are prepared on our AWIPS computer system. They are stored and then transmitted via NWS computers, passing through the NWS Gateway System where they are then directed to users of NWS products. Among these users are our fire management partners through WIMS. Other methods of dissemination include the NWS Family of Services. The daily fire weather forecast will also be available on the NWS Burlington homepage at:

<http://weather.gov> (and click on Vermont or northern New York)

or

<http://www.erh.noaa.gov/btv>

***** Users should note, the Internet *is not* an officially endorsed means of communication by the NWS, thus there is no guarantee of timely delivery of products via this mode. *****

VIII. Fire Weather Contacts

A. VERMONT

Federal contacts:

Jeremy Nelson – Assistant Fire Management Officer
USDA Forest Service, Green Mountain/Finger Lakes NF
231 North Main Street
Rutland, VT 05701-2417
Email: jeremynelson@fs.fed.us
Tel : 802-747-6796 FAX : 802-362-1251

Ethan M. Ready – Public Affairs Officer
USDA Forest Service, Green Mountain/Finger Lakes NF
231 North Main Street
Rutland, VT 05701
Email: eready@fs.fed.us
Tel : 802-747-6760 FAX: 802-747-6766

Jen Edmonds – Forest Dispatcher
USDA Forest Service, Green Mountain/Finger Lakes NF
99 Ranger Road
Rochester, VT 05767
Email: jedmonds@fs.fed.us
Tel : 802-767-4261 FAX: 802-767-4777

William Garrison - Forestry Technician
Green Mountain and Finger Lakes National Forest – Manchester Ranger District
USDA Forest Service
2538 Depot Street
Manchester Center, VT 05255
Email: wgarrison@fs.fed.us
Tel : 802-362-2307 x 228 FAX : 802-362-1251

Rick Vollick, Zone FMO
Wallkill River NWR
1547 County Road 565.
Sussex, NJ 07461
Email: rick_vollick@fws.gov
Tel : 973-702-7266 X 19

Vermont State contacts:

Tess Greaves (Primary VT contact for NWS forecaster)

Vermont Dept. of Forests, Parks and Recreation
1229 Portland St., Suite 201
St. Johnsbury, VT 05819-2099
Email: tess.greaves@state.vt.us

Tel : 802-751-0116

FAX : 802-748-6687

Lars Lund – Fire Supervisor
Vermont Dept. of Forest, Parks and Recreation
271 North Main Street, Suite 215
Rutland, VT 05701
Email: lars.lund@state.vt.us

Tel : 802-786-3856 FAX : 802-786-3870

Lisa Thornton - Vermont Dept. of Forest, Parks and Recreation, Rutland VT

Email: lisa.thornton@state.vt.us

Tel : 802-786-3858 FAX : 802-786-3870

Dan Dillner – Protection Forester
Vermont Dept. of Forest, Parks and Recreation
111 West Street
Essex Jct., VT 05452
Email: dan.dillner@state.vt.us

Tel : 802-879-5683

Jim Esden – Forestry Specialist
Vermont Dept. of Forest, Parks and Recreation
100 Mineral Street, Suite 304
Springfield, VT 05156-3168
Email: jim.esden@state.vt.us

Tel : 802-885-8822 FAX : 802-885-8890

Neil Monteith – Forester - Vermont Dept. of Forests, Parks and Recreation

Email: neil.monteith@state.vt.us

Tel : 802-751-0118

Joe Flynn - Director
Dept. of Public Safety - Vermont Emergency Management
103 South Main St.
Waterbury, VT 05676-0850
Email: joe.flynn@state.vt.us

Tel : 802-244-8721 FAX : 802-241-5556

B. NEW YORK

State contacts:

***New York State Forest Rangers Dispatch
Ray Brook, NY (operations 24/7)... Primary contact for Red Flag issuances
518-891-0235 otherwise contact John Streiff***

Captain John C. Streiff - Regional Forest Ranger (**Primary NY forest condition
informational contact for NWS forecaster**)

NYS Department of Environmental Conservation (DEC)

Route 86 PO BOX 296

Raybrook, NY 12977

Email: jcstreiff@gw.dec.state.ny.us

Tel : 518-897-1300 FAX : 518-897-1370

Lt Ranger Robert Barstow

NYS Department of Environmental Conservation (DEC)

6739 U.S. Highway 11

Potsdam, NY 13676

Email: rhbarsto@gw.dec.state.ny.us

Tel : 315-265-3090

Captain Robert Drew Cavanagh – Regional Forest Ranger

NYS Department of Environmental Conservation

State Office Building

317 Washington St.

Watertown, NY 13601

Email: r6info@gw.dec.state.ny.us

Tel: 315-785-2558

David Russell - NY State Forest Ranger (Fire prevention specialist)

dgrussel@gw.state.ny.us.gov or russ92079@hotmail.com

Andrew Feeney – NY OEM Director

State Campus - Building 22 Suite 101

Albany, NY 12226-2251

Tel: 518-292-2301

Email: andrew.feeney@semo.state.ny.us

New York State contacts continued:

Eric Day - Director
Clinton County Fire Control and Emergency Services
16 Emergency Services Dr.
Plattsburgh, NY 12903
Email: DayE@co.clinton.ny.us
Tel : 518-565-4791 (ADM), 518-561-3370 (24 HR OPS)
FAX : 518-565-4547

Kelly Donoghue – Assistant Director
Clinton County Fire Control and Emergency Services
16 Emergency Services Dr.
Plattsburgh, NY 12903
Email: DonoghueK@co.clinton.ny.us
Tel : 518-565-4791 (ADM), 518-561-3370 (24 HR OPS)
FAX : 518-565-4547

Don Jaquish – Director
Essex County Fire Control and Emergency Services
P.O. Box 30
702 Stowersville Rd.
Lewis, NY 12950
Email: DJaquish@co.essex.ny.us
Tel : 518-873-3901 (ADM), 518-873-6410 (24 HR OPS)
FAX: 518-873-3963

Michael Blaise – Deputy Director
Essex County Fire Control and Emergency Services
Email: mblaise@co.essex.ny.us
Tel : 518-873-3902 (ADM), 518-873-6410 (24 HR OPS)

Ricky Provost - Director
Franklin County Fire Control and Emergency Services
55 Bare Hill Rd.
Malone, NY 12953
Email: rprovost@co.franklin.ny.us
Tel : 518-483-2580 (ADM), 518-483-1219 (24 HR OPS)
Sheriff's FAX : 518-483-6828

John Bashaw – Deputy Director
Franklin County Fire Control and Emergency Services
Email: jbashaw@co.franklin.ny.us
Tel : 518-483-8584

New York State contacts continued:

Mike Lecuyer - Director

Email: mlecuyer@stlawco.org

St. Lawrence County Fire Control and Emergency Services

Emergency Operations Center

48 Court St.

Canton, NY 13617

Email: mlecuyer@stlawco.org

Tel : 315-379-2240 FAX : 315-379-0681

Keith Zimmerman

Email: kzimmerman@stlawco.org

Cell : 315-854-2672

Scott W. Edkin – Fire Protection Specialist

Department of State

41 State Street, 12th Floor

Albany, NY 12231-0001

Email: SEDKIN@DHSES.NY.GOV

Tel : 518-474-6746 FAX: 518-474-3240

Bruce Jordan

New York State Division of Homeland Security and Emergency Services

bjordan@dhses.ny.gov

C. COORDINATION CENTERS

Eastern Area Coordination Center

626 E. Wisconsin Avenue
Suite 500
Milwaukee, WI 53202

Tel: 414-944-3811 FAX: 414-944-3838

******Notify when we issue a Fire Weather Watch or Red Flag Warning******

Normal hours of operation: 730 AM to 430 PM

Primary Contact: Trudy Fagre

Stephen Marien

Eastern Area Fire Weather Program Manager – EACC

Mississippi National River and Recreation Area

111 East Kellogg Blvd, Suite 105

St. Paul, MN 55101

Tel : 651-290-3030 Ext 229 Cell : 402-250-7844 FAX : 651-290-3815

Stephen_Marien@nps.gov

National Interagency Coordination Center

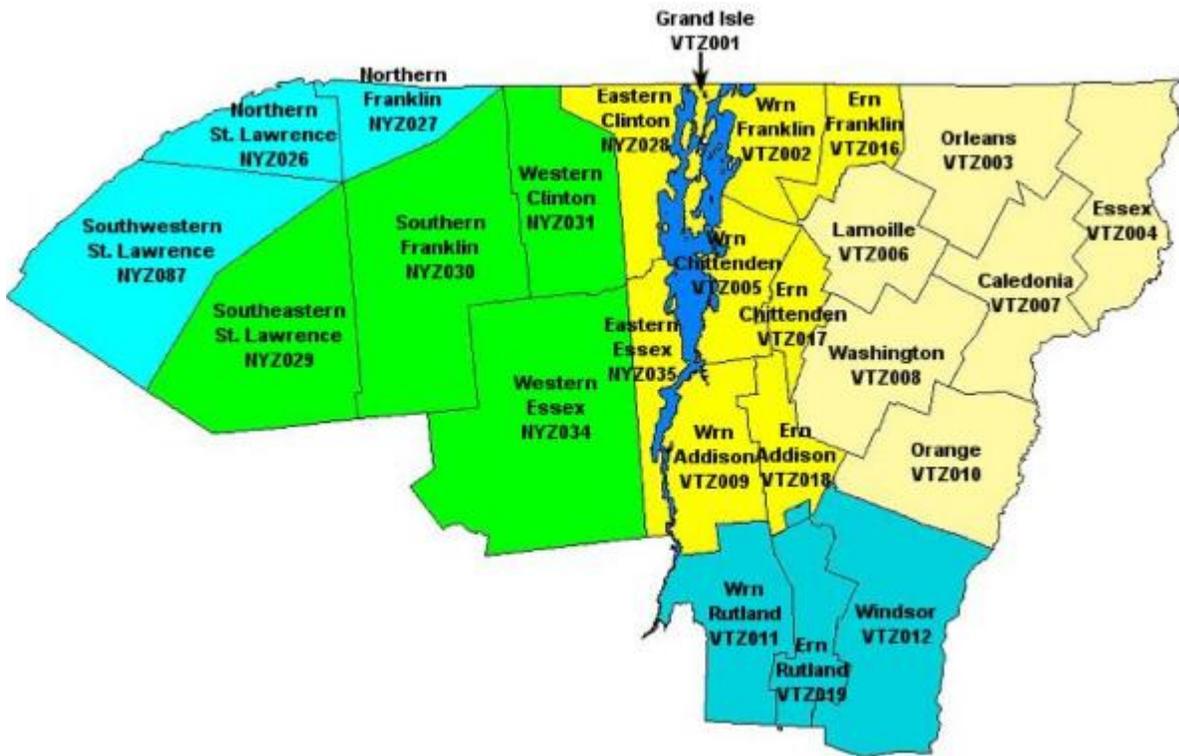
National Interagency Fire Center

3833 S. Development Ave., Boise, Idaho 83705

Tel: 208-387-5050 or 208-387-5512

Burlington Fire Weather Zones

Remember, county names are used in the forecast, not area names.



Appendix - B

TERMS COMMONLY USED IN FIRE WEATHER FORECASTS

Adiabatic (process): A thermodynamic change of state of a system in which there is no transfer of heat or mass (i.e. compression results in warming, expansion in cooling).

Adiabatic Chart: A thermodynamic diagram with temperature as abscissa and pressure as ordinate.

Advection: Transport of an atmospheric property solely by the mass motion of the atmosphere.

Air Mass: A homogenous mass of air, the properties of which can be identified as having been established while the air was situated over a particular region of the earth's surface.

Anabatic Wind: An upslope wind usually applied only when the wind is blowing up hill or mountain as the result of local surface heating, and apart from the effects of the larger scale circulation.

Anemometer: Instrument designed to measure the speed of the wind.

Anticyclone: A closed circulation of the atmosphere, of relative high pressure. (clockwise flow in the northern hemisphere).

Atmospheric Pressure: The pressure exerted by the air as a result of gravity. It is measured by the barometer, and expressed in millibars or inches of mercury.

Backing: A change of wind direction in a counter-clockwise direction (the opposite of veering); i.e. from west to south.

Blocking: Obstruction, on a large scale, of the normal west to east movement of highs and lows.

Calm: Absence of apparent motion of the air.

Climate: The statistical collective of weather conditions over a specified period of time (i.e. usually several decades).

Cloud: The visible aggregate of minute water droplets and/or ice particles in the atmosphere above the earth's surface.

Cold Front: The leading edge of a relatively cold air mass.

Complex: An area of low pressure within which more than one center is found.

Condensation: The physical process by which a vapor becomes a liquid.

Conduction: The transfer of energy within and through a conductor by means of molecular activity.

Contour: In meteorology, a line of constant height on a constant pressure surface map.

Convection: In meteorology, atmospheric motions that are predominantly vertical, i.e. usually means upward as opposed to subsidence (downward).

Convergence: Net horizontal inflow of air into a layer. If at the surface, vertical motion results. Associated with low pressure systems.

Coriolis Force: The deflecting influence of the earth's rotation on winds. Deflects winds to the right (with wind at your back) in the northern hemisphere.

Critical Fire Weather Pattern: Patterns that can quickly increase fire danger and trigger rapid fire spread.

Cumulus: A principal cloud type in the form of individual detached elements, sharp non-fibrous outlines, and vertical development.

Cumulonimbus: The ultimate growth of a cumulus cloud into a mushroom shape, with considerable vertical growth, usually fibrous ice crystal tops, and probably accompanied by lightning, thunder, hail and strong winds,

Cut off Low: A cold low which has become displaced to south, out of the basic westerly flow.

Cyclonic: Having a sense of counter-clockwise rotation about the local vertical.

Cyclone: A closed isobaric circulation in the atmosphere, with counter-clockwise rotation in the northern hemisphere.

Deepening: A decrease in the central pressure of a cyclonic, or low pressure system.

Dew Point: The temperature to which a parcel of air must be cooled to reach saturation.

Diffuse front: A front across which the wind shift and temperature change are weakly defined.

Divergence: Downward (subsidence) motion results. Associated with high pressure system.

Diurnal: Daily, especially pertaining to daily cycles of temperature, relative humidity and wind.

Drought: A period of moisture deficiency, extensive in space and time.

Dust Devil: A small but vigorous whirlwind, usually of short duration.

Extended Forecast: A forecast of general weather conditions for days 3 through 7.

Fair: A weather term implying no precipitation and no extreme conditions of clouds, visibility or wind.

Fire Danger: A subjective expression of an objective assessment of environmental (fuels and weather) factors which influence whether fires will start and how they may spread.

Fire Weather Watch: Issued when the forecaster feels reasonably confident that red flag conditions will develop in the next 12 to 48 hours.

Fog: Same as cloud except base of cloud is touching earth's surface.

Front: A transition zone between two air masses of different density.

Free Air: That portion of the atmosphere that is not modified by local influence.

Free Air Wind: The wind at the bottom layer of the atmosphere called free air, or just above the portion that is modified by local influences and friction approximately 1,000 feet above the earth's surface.

Friction Layer: The layer of air from the earth's surface to the geostrophic wind level or level of free wind.

Geostrophic Wind: A horizontal wind resultant of the balance of the Coriolis acceleration and the horizontal pressure force.

Gradient Wind: A horizontal wind velocity tangent to the contour line or isobaric surface resulting in a balance of the coriolis, pressure and centrifugal force.

Gravity Wind: A wind directed down a slope caused by greater air density near the slope than at the same height at a distance from the slope. (Also called drainage or downslope wind).

Gust: A sudden brief increase in wind speed.

Haines Index: A lower atmospheric stability and dryness index that can be one predictor of large fire growth due to plume dominated fires.

Headline: A brief statement at the beginning of a forecast that highlights dangerous or changing weather conditions.

Heat: Internal energy. A form of energy transferred between systems by virtue of a difference in temperature.

Heat Lightning: The luminosity observed from ordinary lightning too far away for its thunder to be heard.

Heat Low: An area of low pressure due to high temperatures (thermal low).

Heavy: In reference to precipitation, more than a half inch in forecast period.

High Pressure: An anticyclone. An area of atmospheric pressure with closed isobars and relative high pressure at its center. Air flows clockwise around a high.

High Clouds: Cirrus type clouds composed of ice crystals, usually above 20,000 feet.

Homogenous: In reference to an airmass having similar horizontal properties or elements.

Humidity: A measure of the water vapor content of the air.

Hygrothermograph: An instrument that records temperature and relative humidity as a function of time.

IMET: Incident Meteorologist (IMET): A meteorologist trained and certified to provide on-site weather forecasting support to an incident management team at a fire or other incident.

Instability: A property of the steady state of a system such that certain disturbances introduced into the steady state will increase in magnitude.

Instability Line: A band of convective weather, i.e. squall line, a line of active thunderstorms.

Inversion: An increase in temperature with height, i.e. a departure from the usual decrease of temperature with increase of altitude.

Isobar: A line passing through points having equal atmospheric pressure.

Isopleth: A line passing through points having equal or constant values of a given gravity, with respect to either time or space.

Isolated: Affecting less than 20% percent of the area.

Jet Stream: Relatively strong winds concentrated within a narrow stream in the atmosphere.

Katabatic wind: A wind blowing down an incline. If warm, it is called a foehn or chinook. If cold, its called a gravity or mountain wind.

Key Station Forecast: A forecast that takes into account an observing station location and the microscale effects on weather parameters in presenting exact values of weather parameters rather than ranges.

Knot: The unit of speed in the nautical system; a nautical mile per hour. It is equal to 1.15 statute miles per hour.

Lapse Rate: The rate of change of temperature with height. The moist lapse rate is 3.5 degrees per 1000 feet and the dry lapse rate is 5.5 degrees per 1000 feet.

Lee Trough: A low pressure trough formed on the lee side of a mountain range across which the wind is blowing at nearly right angles.

Light Precipitation: Precipitation, ranging from .11 to .20 inches in a forecast period.

Lightning: All the various visible electrical discharges produced by thunderstorms. It can be cloud to cloud, cloud to ground, or cloud to air.

Lightning Activity Level (LAL): An objective rating system used in the NFDRS that indicates the amount of cloud to ground lightning observed or forecast in a given area.

Local Winds: Winds, which over a small area, differ from those appropriate to the general pressure distribution.

Long Range: An extended forecast for a period greater than 5 days.

Long Wave: A wave in the major belt of westerlies which is characterized by large length and significant amplitude.

Low: An area of low atmospheric pressure having closed isobars. Used interchangeably with cyclone.

Low Aloft: An upper level cyclone (low pressure system).

Major Trough: A long wave trough in the large scale pattern of the upper air.

Marine Layer: A shallow layer of air with relatively high humidity and cooler temperatures that moves from the ocean over land. It may be associated with diurnal land/sea breeze regimes or other features that increase on-shore pressure gradients.

Mesoscale: A scale that ranges in size from a few kilometers to about 100 kilometers.

Meteorology: The study of the phenomena of the atmosphere.

Microscale: A scale that covers phenomena smaller than those in the mesoscale range.

Middle Clouds: Clouds of the altocumulus or altostratus family, anywhere from 7,000 to 25,000 feet in elevation.

Minor Trough: A pressure trough in the upper air of smaller scale than a long wave trough. It usually moves rapidly, i.e. short wave.

Mixing Height: Maximum depth to which mixing will occur.

Model Output Statistics: A generation of point specific output from a numerical model.

Moderate Precipitation: Precipitation, ranging from .21 to .50 inches in a forecast period.

Mountain and Valley Winds: Diurnal winds along the axis of a valley, blowing uphill and valley during the day and downhill and down valley during the night.

National Fire Danger Rating System (NFDRS): A national system used by all land management agencies to assess fuels, weather and fire potential on a daily basis during fire season.

Neutral Stability: The state of a parcel of air, which if displaced vertically, will experience no buoyant acceleration.

Normal: The average value of a meteorological element over a period of years, usually 30 in the United States.

Occasional: Occurrence of a meteorological element at infrequent intervals and for short duration.

Orographic: Of, pertaining to, or caused by mountains.

Overcast: A cloud layer that covers most, or all of the sky.

Overrunning: Condition existing in which an air mass is in motion aloft above another air mass of greater density at the surface.

Persistence: The tendency for the occurrence of a specific event to be more probable, at a given time, if that same event has occurred immediately preceding the time period.

Polar Front: The semi-permanent, semi-continuous front separating air masses of polar and tropical origin.

Precipitation: Any or all the forms of water particles, liquid or solid, that falls from the atmosphere and reach the ground.

Prescribed Fire/Burn: A natural or human ignited fire burning under a strict set of predetermined conditions to fulfill specified land management objectives.

Pressure Center: The center of a high (anticyclone) or low (cyclone) pressure system.

Prevailing Wind Direction: The wind direction most frequently observed during a given period.

Probability: The chance that a prescribed event will occur.

Probability Forecast: A forecast of the probability of occurrence of one or more of a mutually exclusive set of weather contingencies, as distinguished from a series of categorical statements.

Prognostic (Prog) Chart: A chart depicting some meteorological parameter at a specified future time.

Pseudo-adiabatic (chart): A thermodynamic chart (process), same as adiabatic, but with saturation adiabats added.

Psychrometer: An instrument used for measuring the water vapor content of the air.

Quasi-Stationary Front: A front which is stationary, or nearly so.

Radiation: The process by which electromagnetic radiation is propagated through free space.

Radiational Cooling: The cooling of the earth's surface suffers a net loss of heat due to terrestrial cooling.

Radiosonde (RAOB): Balloon-borne instrument for the measurement and transmission of temperature, humidity and pressure. When tracked by radar, also provides wind direction and velocity (Rawin).

Red Flag Criteria: A locally determined set of criteria that expresses environmental and meteorological conditions that would provide for fire starts and rapid, dangerous fire spread.

Red Flag Warning: A warning issued by the forecasters when red flag criteria are met or expected to be met within 12 to 24 hours. The warning highlights weather of particular importance to fire behavior and potentially extreme burning conditions or many new fires. Red flag warnings should always be coordinated with the customer.

Relative Humidity: (Humidity) - The ratio of the actual amount of water vapor in the air to the possible amount at that temperature.

Retrograde: Usually used to denote the movement of a weather system in a direction opposite to that of the normal flow in which the system is embedded.

Ridge: An elongated area of relatively high atmospheric pressure.

Saturation: The condition in which the air contains all the water vapor possible at that temperature, i.e. 100% relative humidity.

Sea Level Pressure: The atmospheric pressure at mean sea level.

Severe: Used in reference to thunderstorm intensity. Indicates strong winds and large hail.

Short Wave: (Minor Wave) - A progressive wave in the pattern of upper air motion with dimensions of cyclonic scale, as distinguished from a long wave.

Shower: Precipitation from a convective cloud, characterized by the suddenness with which they start, stop, and change intensity.

Smoke Management Parameters: The weather parameters used to forecast smoke dispersal (mixing height and transport winds).

Spot Weather Forecast: A specialized forecast issued by the National Weather Service for a localized area and time, at the request of the user.

Squall: A strong wind characterized by a sudden onset, of longer duration than gusts, and a rather sudden decrease in speed.

Stability Factor: This is determined by temperature differences between two atmospheric layers.

Stable: A property of the steady state of a system such that a disturbance introduced into the steady state will not increase in magnitude.

Storm: In meteorology, usually refers to cyclonic storms with considerable cloud and precipitation areas.

Stratiform: Descriptive of clouds of extensive horizontal development.

Subsidence: A descending motion of air in the atmosphere, of particular importance due to the heating and drying of the air as it contracts.

Surface Chart: An analyzed map showing the distribution of sea level pressure (isobars) and location of fronts and air masses.

Surface Pressure: The atmospheric pressure at a given location on the earth's surface.

Synopsis: A statement giving a brief general review or summary.

Temperature: The degree of hotness or coldness as measured on some definite temperature scale by means of various types of thermometers.

Thermal Belts: An area along the middle of a mountain slope that typically experiences the least diurnal variation in temperature and humidity, thus has the highest daily average temperature and the lowest relative humidity.

Thermal Low: (Heat Low) - An area of low atmospheric pressure due to high temperatures and intensive heating at earth's surface, usually stationary and have weak cyclonic circulation.

Thunderhead: Cumulonimbus or ice top cumulus.

Thunderstorm: A local storm produced by cumulonimbus clouds accompanied by lightning and thunder...often containing heavy rain...and sometimes strong winds and hail.

Topography: A detailed description of surface features including rivers, lakes, etc.

Tornado: A violently rotating column of air, pendant from a cumulonimbus cloud observed as a funnel cloud.

Towering Cumulus: The transitory stage of a cumulus into a cumulonimbus cloud.

Transport Winds: Winds in the lower mixed layer, used for smoke dispersal forecasts.

Tropical Cyclone: The general term for a cyclone that originates over the tropical oceans. The remnants of these storms occasionally recurve and move into the mid-latitude westerlies, bringing considerable moisture with them.

Tropopause: The boundary between the troposphere and the stratosphere, usually characterized by an abrupt change to a small lapse rate.

Trough: An elongated area of relatively low atmospheric pressure, the axis of which is called a trough line.

Turbulence: A state of fluid flow in which the instantaneous velocities exhibit irregular and apparently random fluctuations.

Upper Air: Generally applied to levels above 850 mb (5,000 feet).

Upslope Wind: A wind directed up a slope during the hot part of the day.

Valley Wind: A wind which ascends a mountain valley during the day.

Ventilation Index: This is the product of the mixing height and transport wind speed, and is an indicator of dispersion potential.

Veering Wind: A change in wind direction in a clockwise manner, i.e. south to southwest to west, the opposite of backing.

Virga: Water or ice particles falling out of a cloud but evaporating before reaching the ground.

Visibility: The greatest distance it is possible to see permanent objects with the unaided eye.

Warm Front: A front that moves in such a way that warmer air replaces colder air.

Wave: A disturbance propagated by virtue of periodic motions in the atmosphere.

Weather: The state of the atmosphere, usually short term, with respect to its effects upon life, property and human activities.

Wetting Rain: Precipitation of .10 inches or more over most of the area specified.

Westerlies: The dominant west to east motion of the atmosphere across the mid latitudes.

Wet Bulb Temperature: The temperature an air parcel would have if cooled to saturation. It lies between the dry bulb temperature and the dew point temperature.

Whirlwind: A small scale rotating column of air (dust devil).

Wind: Air in horizontal motion relative to the surface of the earth.

Wind Direction: The direction from which the wind is blowing.

Zonal Flow: The flow of air along a latitude circle.

Zone Weather Forecast: A portion of the general fire weather forecast issued on a regular basis during the normal fire season specifically to fit the requirements of fire management needs. These zones or areas are a combination of administrative and climatological areas, usually nearly the size of an individual forest or district.

NWS Burlington Internet and other links

NWS Burlington Internet

The National Weather Service (NWS) in Burlington will continue to provide important information to the fire weather user community via a fire weather resource page. This page will reside on the NWS Burlington web site, which can be accessed through the following address:

<http://www.erh.noaa.gov/btv/> (then select Fire Weather from the menu)

The information can also be accessed through the following address:

<http://www.weather.gov> (then click the appropriate state)

A wide range of elements are available on the fire weather resource page, which can assist the fire weather user with any decision making process. Topics include, but are not restricted to:

- Local, Regional, and National Fire Weather Forecasts
- Spot Forecast Information and Online Reporting Capabilities
- Extended Weather Forecasts
- Current Weather
- Fire and Drought Indices
- BTV Fire Weather Program
- Precipitation/Drought Information
- National Fire Information
- Training Material

In addition, the Annual Operating Plan (AOP) will continue to reside on our web site. This will provide you with access to other administrative, technical, or operational information you may be seeking.

If you have any suggestions as to ways in which we can enhance our fire weather resource page, please do not hesitate to contact us. Our Internet contact point is Eric Evenson, and he may be reached via e-mail at Eric.Evenson@noaa.gov or by phone at 802-862-8711.

A few other sources/internet links of Fire Weather information include:

Local and Regional links:

<http://www.erh.noaa.gov/btv> : NWS, Burlington, VT Home Page

<http://www.erh.noaa.gov/aly> : NWS, Albany, NY Home Page

<http://www.erh.noaa.gov/box> : NWS, Taunton, MA Home Page

<http://www.erh.noaa.gov/gyx> : NWS, Gray, ME Home Page

National Centers

<http://www.weather.gov/fire>: National Weather Service (NWS) National Fire Weather Page

http://www.spc.noaa.gov/products/fire_wx: Storm Prediction Center, Norman, Ok (National Guidance).

<http://www.nifc.gov>: US National Interagency Fire Center

<http://www.fs.fed.us/eacc>: Eastern Area Coordination Center

International Centers

<http://www.cifc.ca>: Canadian Interagency Fire Center

Appendix - D

Instructions On How To Use Internet Spot Forecast Request Form

From the Fire Weather Main Page on the National Weather Service Burlington (NWS BTV) web site, click on Internet Request Spot Form. The BURLINGTON, VERMONT SPOT FORECASTS page will appear. This page auto_updates every minute, so as new spot forecasts are requested or their status changes, you immediately see the changes on the page! We call this the monitoring page. Some of the features on this page include...

A) The current date with arrow keys allowing you to step back or forward to a particular date. A calendar is also available, which will allow you to see how many spot forecasts were issued on a certain date. You can also move ahead or back on the calendar as well as clicking on a particular date to view information from that day. (This can help if you want to go back and provide feedback on a past spot forecast).

B) A map of the NWS BTV fire weather area of responsibility. A small box will appear indicating the location of the spot request. The box is colored coded to indicate if the spot forecast is pending (green), which means you have submitted the request and the NWS is working on the forecast. A purple box indicates the NWS has sent you a question with respect to the spot forecast. A red box on the map means the spot forecast is complete and you can either click on the red box or in the Name/Ignition Time/Status Box to see the forecast.

C) A link at the top of the monitoring page exists to take you back to the Burlington Fire Weather Page. So to submit a spot request online, simply click on SUBMIT A NEW SPOT REQUEST. You will now be taken to the BURLINGTON VERMONT SPOT FORECAST REQUEST page.

Information Page You Will Be Filling In

*** It is important to note that the elements colored in red are required fields! ***

Let's look at the information fields on this page...

1 _ Project Name: typically fires in the Western United States have names with respect to the river drainage basin they are in. If your fire has a name, go ahead and put it in. Otherwise, let's say the fire is 2 miles west of Essex, Vermont, go ahead and enter in 2W of Essex, VT. Or if the fire is on a mountain, you could put in the name of the mountain. Essentially put in something that you will be able to reference on the Spot Request Page because this is a required field.

* select the type of project (either a wildfire or a prescribed burn. Do not worry about what WFU is). If it is a prescribed burn, please enter in the Ignition Time (using the 24 hour clock) and Date. The form defaults to an ignition time about ½ hour into the future. If it is a wildfire, remove the default ignition time.

2 _ Requesting Agency: The Requesting Agency name and phone number are required. Fax number and contact person are optional, but we consider those very important if we have any

questions or a breakdown in dissemination capabilities. You will only need to enter your agency name, phone/fax numbers, and your name the first time you request a spot forecast. After that, it will be filled in with the same information as your last request, assuming you use the same computer. Please note that no other people other than you and the NWS will see this information!

3 _ Location: You have a couple of options on this one, but they are important with respect to having the location appear on the map. Proper location data will give us detailed map information on the location of the fire and the terrain in the area.

* Enter the Latitude and Longitude of the fire (you can either specify degrees like 45.1486 or degrees/minutes/seconds like 45 13 34). For supplemental information you can reference the 7.5' USGS Quadmap, but you still need to provide the Lat/Lon. As of 4/8/02, the Legal Township/Range (T/R) section is mainly for locations in the Western Region of the National Weather Service, so inputting Lat/Lon information is the required method. The National Weather Service will be looking into this function for all areas in the country.

4 _ Elevation: The top and bottom elevations of the fire are required. You can just enter the numbers and do not need to mention the word feet. If the burn or fire is on flat ground, you can enter a value in only one of the boxes, preferably the one labeled Top.

* Drainage is optional and once again references the river drainage basin the fire is in. If you know it, you can enter it. For example if the fire is near East Mountain (near Rutland, Vermont), you could enter North Branch, for the North Branch River just south of East Mountain. Note that you will be flagged when submitting the request that if possible, we would like the drainage information. If you do not know it, go ahead and just submit the request anyway.

5 _ Aspect: This field is required and important to know which side of a mountain the fire may be on. Use direction references such as N, NE, E, SE, S, SW, W, NW. If the fire or burn is in flat terrain, you can type in FLAT.

6 _ Size: Enter the acreage if known, but it is an optional field.

7 _ Fuel: Please indicate the type of fuel, either using fuel model numbers, or better yet a description of the fuel such as grass, ponderosa pine, etc. Also, if you can indicate the amount of fuel sheltering, it helps us tremendously in providing accurate wind forecasts.

8 _ Observations: Although it is considered optional in the program, it is required to get a spot forecast from the NWS in Burlington. Please enter in the information with respect to the observation. For each observation we need to know where it is in relation to the burn, the elevation in feet, and the time (preferably using a 24 hour clock). The wind (in mph) can be specified as N12 Gust 25 or North at 10 for example. The temperature and wetbulb values (in degrees F) should be entered and the RH (in percent) and Dewpoint (in degrees F) can also be entered if known. If you enter a temperature and wetbulb, the RH and dewpoint will be calculated for you on the next page. Finally, any remarks about clouds, weather, or other important information should be entered in the final box.

9 _ Primary Forecast Elements: Not all spot forecasts are created equal, so we are asking you to tell us what are the forecast elements you need, or are particularly important. There are six parameters listed for you. Select which ones you want a forecast for, and for the time period(s) you would like as well (available times are Today, Tonight, and Tomorrow).

10 _ Remarks: If a meteorological parameter is not listed and you would like to have Haines Index for example, enter that information in the Remarks section. You can also enter in information with respect to when you might want the forecast or any other information/input you can give to us with respect to the spot forecast request.

11 _ Action: You now have three options. You can Submit Request, Cancel Request, or Clear Form. When you hit Submit Request, various checks are performed on the data you have entered. Some problems make it impossible for your request to be accepted (for example, if you forget to enter a name for the burn), while others will produce warnings and messages for your information. For example, even though drainage name is not required, it will still ask you if you know what it is. You do not have to answer this question. If an error is found, you will be taken to a page that describes the errors or minor problems. You can click on Go Back and Fix and have the opportunity to make the necessary changes. You can click on Submit Request Anyway, but more than likely we will probably be sending back a question or calling. You do have one more option and that is to Cancel Request.

Other Important Information

* After you have submitted a spot forecast request, an individualized spot forecast web page becomes available for that burn. The page automatically updates every minute so that as new information becomes available for the burn, you see it immediately. Detailed maps of the area around the burn are generated and displayed when they become available.

* Once the forecast is COMPLETED and made available to you, the page will not update anymore. Thus if we have to update the forecast, we would be calling you to inform you of the upcoming change, since the page no longer updates or has a way to inform you that a change has been sent. When you go back into the forecast, the only way you might pick up on the changed forecast is at the top of the page it shows the time that the spot was requested and the time it was issued. The issue time will have changed. Keep in mind that "sensitive" information like your name, phone number, and the exact location of the burn are NOT visible to others _ only to you and the NWS.

* If we have questions about your request, we may send you back a question about it. If this happens, the Status Box will show the word QUESTION and the box on the map will turn purple. Click on this and you will see a big red box in the forecast page with our question. Usually there is some problem with the request that you can probably fix (use the CHANGE

REQUEST link to do this, make your changes if necessary, then submit the request once again. The purple box will return to green and the word QUESTION will change back to PENDING) or you can call us.

* When your forecast is complete, it will show up in the spot forecast web page (clicking on the red box in the map or COMPLETED in the Status Box can access the spot). On the forecast page a Feedback box will appear where you can provide us information with respect to how the forecast worked out, perhaps later in the day or several days down the road. This feedback helps us to improve. Simply type in your feedback into the box and click on Send Feedback.

* At the bottom of the forecast page are links for actions that you can take. For example, you can go "Back to Spot List" to return to the monitor page. If you are on the same computer where you made the original request, you can click on "Change Request" to change the details of your request and then send the request again. This is what you would do if we send you a question and you need to change some information. If you need to delete a request, simply click on "Delete Request".

* You can also click on "Copy Info to New Spot Request". This is helpful for burns that last over several days. Rather than having to reenter the data in the form to get a new forecast, you can view the previous spot request and then copy all the location parameters to a new request using this link. This will save you some time when filling out the request form.

* Invariably, something will go wrong at some point, and you might not be able to request or receive spot requests via the web page. In such cases, you can call in or fax us the spot forecast.

Appendix – E

Primary State of Vermont POC's for SPOT's

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Appendix – E (cont'd)

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Appendix - F

Introduction to the National Digital Forecast Database

What is the NDFD?

The NWS continues to make available a number of forecast grids of sensible weather elements (e.g., cloud cover, maximum temperature, etc). This database is called the National Digital Forecast Database or NDFD. National forecast graphics, such as temperature and probability of precipitation, produced from these grids, are made available with each forecast cycle. Additional parameters have been added in experimental stages, such as relative humidity. Additional fire weather parameters will be added in stages. Refer to the following URL:

http://www.nws.noaa.gov/ndfd/resources/oper_status_table.pdf

The NDFD contains a seamless mosaic of NWS digital forecasts produced by NWS field offices working in collaboration to produce these timely forecasts. The database will be available to *all* customers and partners, allowing them to create a wide range of text, graphic, and image products of their own from the database. For additional information on the NDFD, check out the following URL's:

<http://weather.gov/ndfd>

<http://weather.gov/forecasts/graphical>

Below is an example of the Relative Humidity Graphical Forecast produced by NWS Burlington VT Forecast Office. Note the higher relative humidity in the mountains due to upslope flow and precipitation, with drier air in the St Lawrence and Champlain valleys (downslope flow).

