Fire Weather Operating Plan

For

Tennessee

2021

NWS Morristown, TN

NWS Nashville, TN

NWS Memphis, TN

This operating plan will be a semi-permanent document valid January through December 2021, specifying Fire Weather services provided by the National Weather Service in Tennessee. The plan incorporates procedures detailed in the **Interagency Agreement for Meteorological and Other Technical Services** (found at https://www.weather.gov/media/fire/IA_NWS_Meterological_Tech%20Services_

Fire_FINAL.pdf).

Introduction

Purpose of the Operating Plan

This Operating Plan (OP) serves as the official document governing the interaction and relationships between the National Weather Service, and the federal, state and local natural resource and land management agencies or cooperators in Tennessee.

Explanation of relationship between OP and MOU

This Operating Plan is issued in lieu of a formal Memorandum of Understanding (MOU) between the National Weather Service, federal, state, and other agencies that rely on fire weather support. The plan will outline forecast operations and services available to users. This includes products and formats, dissemination and coordination, and the responsibilities of the partners.

This Operating Plan will be the governing document for fire weather procedures and cooperation among the following agencies:

NOAA National Weather Service
TDA Division of Forestry
USDI National Park Service
USDA Forest Service

The Southern Area Mobilization Guide and the National Mobilization Guide further define the relationship between the natural resource agencies and the NWS Incident Meteorologist.

This Operating Plan for Fire Weather Services conforms to the **Interagency Agreement for Meteorological and Other Technical Services** (found at

https://www.weather.gov/media/fire/IA_NWS_Meterological_Tech%20Services_Fire_FINAL.pdf).

Service Area and Organizational Directory

Service Area

The service area covered by this Operating Plan is the state of Tennessee, served by the National Weather Service Weather Forecast Offices at Morristown, TN (MRX), Nashville, TN (OHX), and Memphis, TN (MEG). Across the State of Tennessee, each county is its own fire weather zone. A map of the fire weather zone boundaries and corresponding zone numbers can be found here for reference. https://www.weather.gov/media/pimar/FireZone/tn_firezone.pdf

The **MRX forecast area** covers east Tennessee and includes:

TNZ012	Scott
TNZ013	Campbell
TNZ014	Claiborne
TNZ015	Hancock
TNZ016	Hawkins
TNZ017	Sullivan
TNZ018	Johnson
TNZ035	Morgan
TNZ036	Anderson
TNZ037	Union
TNZ038	Grainger
TNZ039	Hamblen
TNZ040	Northwest Cocke
TNZ041	Cocke-Smoky Mountains
TNZ042	Northwest Greene
TNZ043	Southeast Greene
TNZ044	Washington

TNZ045	Unicoi
TNZ046	Northwest Carter
TNZ047	Southeast Carter
TNZ067	Roane
TNZ068	Loudon
TNZ069	Knox
TNZ070	Jefferson
TNZ071	Northwest Blount
TNZ072	Blount-Smoky Mountains
TNZ073	North Sevier
TNZ074	Sevier-Smoky Mountains
TNZ081	Sequatchie
TNZ083	Rhea
TNZ084	Meigs
TNZ085	McMinn
TNZ087	Southeast Monroe
TNZ086	Northwest Monroe
TNZ098	Marion
TNZ099	Hamilton
TNZ100	Bradley
TNZ101	West Polk
TNZ102	East Polk

The **OHX forecast area** covers middle Tennessee and includes:

TNZ005	Stewart
TNZ006	Montgomery
TNZ007	Robertson
TNZ008	Sumner
TNZ009	Macon
TNZ010	Clay
TNZ011	Pickett

TNZ023	Houston
TNZ024	Humphreys
TNZ025	Dickson
TNZ026	Cheatham
TNZ027	Davidson
TNZ028	Wilson
TNZ029	Trousdale
TNZ030	Smith
TNZ031	Jackson
TNZ032	Putnam
TNZ033	Overton
TNZ034	Fentress
TNZ056	Perry
TNZ057	Hickman
TNZ058	Lewis
TNZ059	Williamson
TNZ060	Maury
TNZ061	Marshall
TNZ062	Rutherford
TNZ063	Cannon
TNZ064	De Kalb
TNZ065	White
TNZ066	Cumberland
TNZ075	Bedford
TNZ076	Moore
TNZ077	Coffee
TNZ078	Warren
TNZ079	Grundy
TNZ080	Van Buren
TNZ092	Hardin
TNZ093	Wayne

TNZ094	Lawrence
TNZ095	Giles
TNZ096	Lincoln
TNZ097	Franklin

The **MEG forecast area** covers much of west Tennessee and includes:

Fire weather zone name	Zone numbers
West Tennessee District (North)	1-4, 19-22, 51
West Tennessee District (South)	48-50, 52-55, 88-91

National Weather Service Headquarters

NWS Headquarters, located in Silver Springs, Maryland, establishes policies and coordinates the national fire weather program. The national program manager coordinates the program with the regional program managers. The national program manager also works with the national headquarters of the Federal forestry and other natural resource management agencies and the National Association of State Foresters (NASF) in determining overall requirements for meteorological support. The national program manager coordinates national training in forestry and fire weather for NWS forecasters.

National Weather Service Regional Headquarters

Regional Headquarters manage the technical operational aspects of the fire weather program within each region. They also provide guidance and assistance to meteorologists-in-charge (MIC) on program operations and developing issues through Supplements to the National Directives System (NDS) and conferences. Regional Headquarters advise National Headquarters on matters pertaining to technical planning and operations. The regional program managers

coordinate the region's fire weather programs and advise the Regional Directors on the operational and administrative aspects of the region's programs. The program manager for NWS Southern Region is Paul Witsaman.

Weather Forecast Offices (WFO)

Weather Forecast Offices prepare and disseminate forecast products for all sectors of the population, including those for the Fire Weather program. These offices are responsible for providing forecasts for user agencies within their County Warning Area (CWA). Most offices have a designated fire weather focal point or fire weather program leader.

The National Weather Service Weather Forecast Offices will provide 24-hour, 365 days-a-year service. The NWS WFO's can be reached at:

National Weather Service
5974 Commerce Blvd.
Morristown, TN 37814

National Weather Service
500 Weather Station Rd.
Old Hickory, TN 37138

National Weather Service
7777 Walnut Grove Rd. OM-1
Memphis, TN 38120

NOTE: Unlisted telephone numbers used for coordination cannot be listed here. All user agencies have been or will be provided voice and fax numbers to be used for official purposes only.

Meteorologists-in-Charge (MIC)

The Meteorologists-in-Charge are responsible for the provision of adequate weather

services for the offices' assigned areas of program responsibility. The MIC's will ensure that the focal points or program leaders are provided adequate time for user liaison and assistance activities.

George Mathews, Morristown, TN
Larry Vannozzi, Nashville, TN
Jim Belles, Memphis, TN

Program Leaders (or Focal Points)

Fire weather focal points and program leaders are the "customer service representatives" for the program. The focal points or program leaders, as representatives of the MIC's, are in regular contact with the partner agencies, helping them assess their meteorological needs, informing them of NWS products and services available to meet these needs, and educating them in the most effective use of the various NWS products and resources, including NOAA Weather Radio (NWR). Focal points and program leaders will work with users to utilize existing NWS products and services produced for other programs that could meet the requirements of natural resource management. The focal points and program leaders are also tasked with ensuring staff meteorologists are trained and remain proficient in preparing forecast products for support of the fire weather program. Fire Program Leaders can be reached via e-mail.

Sam Roberts, Morristown, TN (sam.roberts@noaa.gov)
John Cohen, Nashville, TN (john.cohen@noaa.gov)
Andrew Chiuppi, Memphis, TN (andrew.chiuppi@noaa.gov)

Participating Agencies

The following agencies are participants of this Operating Plan:

NOAA National Weather Service
TDA Division of Forestry

USDI National Park Service
USDA Forest Service

Services Provided by the National Weather Service

Basic Services

Fire Weather Planning Forecast (FWF)

The Fire Weather Planning Forecast (FWF) is a zone-type product used by natural resource management personnel primarily for input in decision-making related to pre-suppression and other planning or resource management activities, as well as for determining general weather trends that might impact burning condition and thereby fire behavior of wildfires and prescribed fires. The decisions impact firefighter safety, protection of the public, property, and the natural resource, and resource allocation.

i) Product Overview and Issuance Criteria

The FWF provides a detailed prediction of elements for three specific 12-hour periods (four 12-hour periods with the afternoon forecast) and a general 3 to 7 day forecast. The FWF is issued daily in the morning by 6:00 AM and in the afternoon by 4:00 PM. The Nashville office will issue a daily afternoon FWF only between October 15th and May 15th by 2:00 PM Central Time. The morning FWF contains three periods: "Today" (valid from issuance through 6 PM local time), "Tonight" (6 PM to 6 AM), and "Tomorrow" (6 AM to 6 PM). The afternoon FWF contains four periods: "Tonight" (6 PM to 6 AM), "Tomorrow" (6 AM to 6 PM), "Tomorrow Night" (6 PM to 6 AM), and the "Following Day" (6 AM to 6 PM).
Note: A sample Fire Weather Planning Forecast can be found in the Appendix.

ii) Format/Content of the FWF

Format - The format of the Fire Weather Forecast is specified in National Weather Service Directive 10-401.

Headlines - A headline is **required** when Red Flag Warnings and/or Fire Weather Watches are in effect. The headline will include the warning type, location, reason for issuance (e.g., high winds and low humidity), and effective time period(s). The headline is also included in the body of the FWF, in each appropriate zone grouping. Other headlines are requested since the natural resource agencies are also considered "all risk agencies". When significant weather trends of locally-defined critical weather elements are forecast or observed during non-watch/warning periods, they will be identified in the headline.

Discussion - The discussion should be a brief, clear, non-technical description of the weather patterns that influence the weather in the forecast area.

Cloud Cover ("CLOUD COVER") - This is an indication of the expected sky condition. "Clear" or "Sunny" descriptors are designated when the forecast cloud cover is < 10%; "Mostly Clear" or "Mostly Sunny" are used when cloud cover is forecast to be >= 10% and < 30%; "Partly Cloudy" or "Partly Sunny" are used when cloud cover is forecast to be >= 30% and < 60%; "Mostly Cloudy" is used when cloud cover is >= 60% and < 80%; "Cloudy" is used when cloud cover is forecast to be >= 80%.

Precipitation Type ("PRECIP TYPE") - This refers to the predominant precipitation type during the forecast period, with an exception. When both "showers" and "thunderstorms" are included in the public forecast, "thunderstorms" will be designated as the precipitation type in the FWF.

Chance of Precipitation ("CHANCE PRECIP") - Refers to the probability of measurable precipitation (0.01 inches or more) during the forecast period. This will be rounded to the nearest 10%. Note: Drizzle and snow flurries are not considered measurable precipitation and thus will not be given a probability.

Temperature ("TEMP") - Refers to the forecasted maximum and minimum temperature for the zone, in degrees F, as measured at a standard 4.5 ft above the ground level. Also included is a 24 hour trend value, noting the difference from the previous day's maximum/minimum temperature.

Relative Humidity ("MAX/MIN RH") - Forecasted minimum relative humidity is provided during the daytime periods (and typically occurs during the warmest part of the day), while maximum RH is included only at night. Also, as with temperature, a 24-hour trend is provided.

Surface Winds ("20FT WND MPH (AM) and 20FT WND MPH (PM)") - Speed and direction of the two-minute averaged wind at 20 feet above the ground (or above the vegetative cover). Wind direction is the direction the wind blows from, to eight points of the compass. Wind gusts, which are rapid fluctuations in wind speed of usually less than 30 seconds in duration, are indicated in the forecast if gustiness is expected. Forecasts for the highest probable wind gust will be preceded by "G".

Precipitation Amount ("PRECIP AMOUNT") - Refers to the forecasted precipitation amount (in hundredths of an inch) whenever the chance of precipitation is 20% or greater.
Precipitation Duration ("PRECIP DURATION") - Refers to the duration of the measurable precipitation (in hours) when the probability of measurable precipitation is greater than or equal to 20%. A precipitation duration forecast of "1" is used for "1 hour or less" duration.

Precipitation Begin/End ("PRECIP BEGIN/END") - Refers to the time measurable precipitation begins or ends.

Mixing Height ("MIXING HGT") - Mixing height is defined as the atmospheric limit above which vigorous vertical mixing does not take place. Mixing height forecasts are given in feet above mean sea level ("FT-MSL") and in feet above ground level ("FT-AGL)".

Transport Wind ("TRANSPORT WND") - Defined as the average wind direction and speed from the surface to the top of the mixed layer. Direction of the transport wind (where the wind is blowing from) and speed will be given. The speed will be in mph, and Memphis will include

them in m/s as well.

Haines Index ("HAINES INDEX or LASI") - This index infers the stability of the atmosphere. It utilizes the atmospheric temperature at 950 mb and 850 mb as well as taking into account the moisture levels (dew point depression) at 850 mb. In the mountains, the "mid level" Haines Index is calculated using the temperatures at 850 mb and 700 mb, and the dew point depression at 850 mb. Haines Index values range from 2 through 6. Haines Index values of 5 or 6 serve as an alert that fires or prescribed burns can experience control challenges. Local regional studies have shown that a Haines Index of 4 represents the initiating threshold whereby the atmosphere can support large fire growth. In the absence of strong winds, fire growth will be primarily "plume dominated", with crowning and spotting on all sides. As wind speeds increase, coupled with a starting Haines Index of 4 or greater, there is an increased threat for large wind-driven fires.

Lightning Activity Level ("LAL") - A numerical value (1 through 6 based on the categories listed below), which is used to describe the expected lightning activity for that day.

1: No Thunderstorms.

2: Cumulus clouds are common, but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the rating area. The clouds mostly produce virga, but light rain will occasionally reach the ground.

3: Cumulus clouds are common. Swelling and towering cumulus cover less than 2/10ths of the sky. Thunderstorms are few, but two or three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.

4: Swelling cumulus and towering cumulus cover 2/10ths to 3/10ths of the sky. Thunderstorms are scattered, but more than three must occur within the observation area. Moderate rain is commonly produced, and lightning is frequent.

5: Towering cumulus and thunderstorms are numerous; they cover more than 3/10ths of the sky and occasionally obscure it. Rain is moderate to heavy, and lightning is frequent and

intense.

6: Same as #3, but dry (little or no rain reaching the ground).

Dispersion Index ("DISPERSION") - The dispersion index is computed from forecast variables that include the 20-foot wind speed, mixing height, transport wind, and cloud cover. The index is used by fire managers as a guide for smoke management, since it gives the potential for the atmosphere to disperse smoke. The following are guidelines for the dispersion index:

1-6 = Very Poor

7-12 = Poor

13-20 = Generally Poor

21-40 = Fair

41-60 = Generally Good

61-100 = Good

100+ = Very Good

Low Visibility Occurrence Risk Index ("LVORI") - derived from the dispersion index and the relative humidity, and gauges the probability of visibility restrictions in fog or smoke. There are 10 LVORI categories; ranging from 1 (indicating the lowest probability of visibility restrictions) to 10 (indicating the highest probability of visibility restrictions).

1: Lowest proportion of accidents with smoke and/or fog reported (130 of 127, 604 accidents, or just over 0.0010 accidents).

2: Physical or statistical reasons for not including in category 1, but proportion of accidents not significantly higher.

3: Higher proportion of accidents than category 1, by about 30 to 50 percent, marginal significance (between 1 and 5 percent).

4: Significantly higher than category 1, by a factor of 2.

5: Significantly higher than category 1, by a factor of 3 to 10.

6: Significantly higher than category 1, by a factor of 10 to 20.

7: Significantly higher than category 1, by a factor of 20 to 40.

8: Significantly higher than category 1, by a factor of 40 to 75.

9: Significantly higher than category 1, by a factor of 75 to 125.

10: Significantly higher than category 1, by a factor of 150.

Note: not included by WFO MEG.

Ventilation Index ("VENT INDEX") - Refers to a multiplication of the mixing height and transport wind, with units in m^2/s. The ventilation index gives the potential for the atmosphere to disperse smoke.

Note: not included by WFO OHX.

Category Day ("CATEGORY DAY") - Based on the ventilation rate. The categories are:

if vent rate is < 2000, then Category Day = 1

if vent rate is >= 2000 and < 4000, then Category Day = 2

if vent rate is >= 4000 and <8000, then Category Day = 3

if vent rate is >= 8000 and <16000, then Category Day = 4

if vent rate is >= 16000, then Category Day = 5

Note: not included by WFOs MRX and OHX.

500 Meter Mixing Height Temperature ("500M MIX HGT TEMP") - Refers to the surface temperature needed to create mixing up to 500 meters above the ground. This temperature usually occurs in the morning.

Note: not included by WFOs MRX and OHX.

500 Meter Transport Wind ("500M TSPT WND") - Refers to the transport wind speed and direction at 500 meters above the ground. The speed will be in mph and also in m/s.

Note: not included by WFOs MRX and OHX.

Remarks - This section will include any specific information that the forecaster feels will aid the

overall forecast. Examples would be information about wind shifts, heavy rainfall, and severe thunderstorms.

3 through 7 Day Forecast - This period is an extended forecast for the zone provided in narrative form (non-digital, non-tabular), and appended at the bottom of each zone grouping (for just that zone).

iii) Update Criteria for the Fire Weather Planning Forecast

The Fire Weather Forecaster will maintain a weather watch to ensure that the forecast remains accurate. When unexpected changes occur or are forecast to occur which significantly deviate from the previous forecast, the forecast will be updated. The decision to update, to an extent, is at forecaster discretion. The update criteria for various elements are listed in the Appendix. It is a shared responsibility for the WFO's and the natural resource agencies to monitor the need to update a forecast. Respective agency personnel will also provide feedback as to the updating of an FWF, NFDRS Point, or Spot Forecast.

Site Specific Wildland Fire Forecasts (Spot Forecasts)

i) Criteria

Spot forecasts are special, non-routine forecasts prepared upon request of any federal agency, or state agency when there is some aspect of federal resources involved and/or interagency protection agreements currently exist, that needs site specific weather forecasts for: 1) controlling the spread of wildfire; 2) planning and managing prescribed fires; or 3) other specialized forest management activities. In the event of an emergency which threatens life and/or property, spot forecasts can also be provided to any federal, state, or local agency.

ii) Contents

Spot forecasts are highly detailed forecasts for a specific location within the forecast area. The format of the spot forecast is specified in National Weather Service Directive 10-401. The

forecasts will be **headlined** for a **Red Flag Warning** or **Fire Weather Watch**. The forecasts will begin with a discussion, and may contain any or all of the following weather elements: sky conditions; maximum and minimum temperatures, minimum and maximum relative humidity values, wind speed and direction; probability of precipitation; precipitation type, duration and amount; mixing heights; transport wind; inversion height; inversion onset and burn off times or temperatures; ventilation and smoke management levels; wind profiles and stability indices (i.e., Haines Index), and lightning activity levels (LAL). Since these are site specific and can be initiated because of critical circumstances, tailored products can be requested (e.g. temperature, relative humidity, and wind speed forecasts on a two hour incremental time period).
Note: A sample Spot Forecast can be found in the Appendix.

iii) Procedures for Requesting a Spot Forecast

Spot forecasts will be prepared when requested by a user agency. Federal, state and local agencies may request spot forecasts in support of wildfire suppression or other emergencies where lives and/or property may be threatened. Due to the detailed and specific nature of this forecast product, it's imperative that the user provide the forecaster with necessary and sufficient information so that a reliable forecast can be prepared.

Requests for spot forecasts should be made using the web-based spot forecast request form (http://www.weather.gov/spot/request/). The web-based spot forecast request form should be filled out as completely as possible by the user agency prior to submitting the request. In times when internet access is hindered or not possible, spot forecasts may be requested and disseminated via fax or phone. If faxing a request, users should use the Fire Weather Special Forecast Request Form, WS Form D-1. Section I of WS Form D-1 should be filled out as completely as possible by the user agency prior to submitting the request by the fax to the forecast office. If the request is made by phone, all information in Section I should be provided to the forecast office.

While there is no dedicated fire weather forecaster, the forecast office will give a high priority to spot forecasts in the absence of weather phenomena that pose a threat to life and property. To ensure that the request for a spot forecast is handled properly and appropriately, users should adhere to the following guidelines:

1) Allow adequate time for the forecaster to prepare the forecast. This will normally be between 20 and 30 minutes. On particularly busy fire weather days, spot forecasts will be handled on a first-come, first-serve basis, with wildfires or other life threatening events taking the highest priority.

2) Provide as much on-site or near-site weather information as possible. At a minimum, the user must provide at least one observation within an hour of the request. This observation must contain the following: location of the observation; elevation at the observation site; time of the observation; wind direction, speed, and level (eye or 20 foot); dry and wet bulb temperatures (or dry bulb temperature and relative humidity); any remarks about the state of the weather, particularly anything that may affect fire behavior. If possible, include some observations from the previous day that might give the forecaster an indication of daily trends.

3) As much as possible, specify the time period for which the forecast is needed.

4) As much as possible, specify the weather elements of most importance for which a forecast is needed, and/or critical values of these elements.

5) Provide a contact point name and phone number where the forecaster can call back, if necessary. (Also include a fax number for returning completed forecasts if the web based spot forecast form are not used).

6) In order to receive prompt attention for a fax request, please phone the office to let the forecaster know the request is on the way.

7) Natural resource agency personnel should contact the appropriate NWS forecast office for a spot update if the forecast conditions appear unrepresentative of the actual weather conditions. Whenever possible, users should provide feedback, positive or negative, to the NWS forecast office concerning the performance of the spot forecast during or shortly after an event. This will assist forecasters in subsequent forecasts for the same or similar conditions.

National Fire Danger Rating System (NFDRS) Forecasts

i) Issuance

NFDRS forecasts will be issued for all RAWS stations within the County Warning Area on a daily basis. As NFDRS 2016 is gradually implemented across the Geographic Area, the observations should automatically flow on the NWS Collective (FWO) product that is received from WIMS. It is not certain if the collective will even be necessary once NFDRS 2016 is fully implemented. The NWS will still need to notify the station owner if they deem the data received from a RAWS to be bad, especially if it is internally inconsistent with general meteorological practices. An example of internal inconsistency would include: a negative humidity, an abnormally high temperature, or an abnormally low temperature for the season. These things, when they occur, are normally an indication that sensors need to be replaced.

The information needed by the NWS to produce the NFDRS forecast can be supplied by either the GACC meteorologist or the agency representative within the state or local area. This data is readily available from the WIMS catalog.

WIMS access for NWS personnel is also available. The GACC meteorologist can assist with that as needed. WIMS access is through the National Application Portal (NAP) and a username and password is required for each individual that requires access. NAP does not allow for group accounts due to security concerns and regulations.

ii) Contents

The NFDRS forecast will be a forecast of the next day observation at 1300 local time. The format of the NFDRS forecast is specified in National Weather Service Directive 10-401. The forecast will include the following elements:

a. ZONE/FCST: Shows whether this forecast is for an NFDRS zone or individual station. Zone average trends are forecast when enough observations are available for the zone area. Individual site forecasts are done where only a few observations are available.

b. NO: NFDRS Zone Number (or individual NFDRS site number).

c. YYMMDD: Year, month and day of valid forecast time.

d. 13: Valid forecast time. Always 1300 LST.

e. WX: Weather valid at 1300 LST tomorrow. Valid entries are:

0 = clear
1 = scattered clouds (1/8 to 4/8)
2 = broken clouds (5/8 to 7/8)
3 = overcast clouds (more than 7/8)
4 = fog
5 = drizzle
6 = rain
7 = snow or sleet
8 = showers (in sight or at the station)
9 = thunderstorm
(Categories 5, 6 or 7 sets NFDRS index to 0)

f. TEMP: Temperature in degrees F valid at 1300 LST (or temperature trend + or - degrees F).

g. RH: Relative Humidity in percent valid at 1300 LST (or RH trend + or - percent).

h. LAL1: Lightning Activity Level 1400 LST to 2300 LST (refer to Appendix for LAL definitions).

i. LAL2: Lightning Activity Level 2300 LST to 2300 LST (refer to Appendix for LAL definitions).

j. WDIR: Wind Direction. Used only for point forecast (FCST) version. Enter direction using sixteen point compasses (N, NNE, NE, ENE, etc.) valid at 1300 LST (20 ft level, 10 minute average).
k. WSPD: Wind Speed. Enter wind speed in mph (or wind speed trend + or - mph) valid at 1300 LST (20 ft, 10 minute average).

l. 10HR: 10 hour time lag fuel moisture in percent valid at 1300 LST (or trend + or - percent).
m. Tx: Maximum temperature from 1300 LST to 1300 LST tomorrow.

n. Tn: Minimum temperature from 1300 LST to 1300 LST tomorrow.

o. RHx: Maximum relative humidity from 1300 LST to 1300 LST tomorrow.

p. RHn: Minimum relative humidity from 1300 LST to 1300 LST tomorrow.

q. PD1: Precipitation duration in hours 1300 LST to 0500 LST.

r. PD 2: Precipitation duration in hours 0500 LST to 1300 LST.

s. WETFLAG: Y or N. Indicates whether liquid water will be on the fuels at 1300 LST tomorrow. (Use with caution. A "Y" will set all the NFDRS indices to zero!).

iii) Format

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

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

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

iv) Procedures

The Land Management Agencies are responsible for taking, quality controlling, transmitting, and the archiving of NFDRS observations from RAWS sites. Forecasts will be prepared for all sites, unless obvious errors are transmitted or the observation is internally inconsistent for prolonged periods of time. The observation(s) should be received by the NWS in a timely manner.

Missing observations sometimes occur due to signal override, satellite outages, or other elements beyond the control of the station owner. In these types of situations, NFDRS forecasts should still be issued. Suspension of the NFDRS forecast should be coordinated with the GACC meteorologist, the Regional RAWS coordinator for that geographic area, and the station owner.

If the station owner, typically a Land Management employee, is unable to service the sensors on his station, the NFDRS forecast can be suspended until the station comes back into service. When regular maintenance is being performed on a timely basis, long term outages beyond five days should not occur, or at least occur very infrequently. The Land Management Agencies do not have a mandatory turn-around time on maintenance issues. An NFDRS forecast can be made based on conditions in the surrounding area, even though a particular RAWS site may be temporarily out of service.

NFDRS 2016 will require a continuum of observations spanning 24 hours every day. Short term outages of an hour or so will generally not pose too much of a problem in the computation of indices; however, long term outages of eight hours or more could lead to significant errors. This is due to the fact that every observation throughout the day is needed to accurately model fuel moisture values.

NFDRS 2016 is expected to reach full implementation in 2022 and the legacy fuel models from the 1978 and 1988 systems will be turned off. While there is some uncertainty regarding the exact date of this action, it will entail some fundamental changes to the way NFDRS is both computed and enacted. At this juncture, we suspect Fuel Model 16Y will be the replacement for fuel models 7G and 8G. Given that NFDRS 2016 is a much more automated system, the requirement of changing R to O will no longer be in place. This level of automation may render the WIMS collective (FWO) obsolete. Many of the changes in NFDRS will be largely transparent to the NWS, with the exception that the NFDRS forecast (FWM) will span seven days instead of the single day forecasts that have been issued over the past several years.

Fire Weather Watch and Red Flag Programs

During periods in which critical fire weather conditions are expected or imminent, the NWS will issue statements, watches and warnings to describe the level of urgency to the appropriate user agencies. These issuances will be coordinated with natural resource agencies.

i) Definition of a Red Flag Event

A Red Flag event occurs when critical weather conditions develop which could lead to extensive wildfire occurrence or to extreme fire behavior. Red Flag events represent a threat to life and property, and may adversely impact fire fighting personnel and resources. Critical weather conditions include the combination of strong winds, very low relative humidity, and high to extreme fire danger.

Note: Specific criteria can be found in the Appendix.

ii) Red Flag Warning

A Red Flag Warning will be issued, after coordination with the appropriate natural resource agencies, when a Red Flag event is occurring or is imminent. The warning will be issued for all or a portion of the forecast area. It will be issued immediately once the forecaster and the appropriate natural resource agency have determined that a Red Flag event is ongoing. Otherwise, it shall be issued for impending Red Flag conditions when there is a high degree of confidence that conditions will develop within 24 hours. The warning will continue until the conditions cease to exist or fail to develop as forecast. At such time, the warning will be cancelled. The format of the Red Flag Warning is specified in National Weather Service Directive 10-401.

Note: A sample Red Flag Warning can be found in the Appendix.

iii) Fire Weather Watch

A Fire Weather Watch will be issued, after coordination with the appropriate natural resource agencies, to advise of the possible development of a Red Flag event in the near future. It will be issued for all or part of the forecast area. A Fire Weather Watch is issued when the forecaster and appropriate natural resource agencies are reasonably confident that a Red Flag event will occur. A watch should be issued 12 to 48 hours in advance of, but not more 72 hours in advance of, the expected onset of the critical weather conditions. The watch will remain in effect until either it is determined the Red Flag event will not develop, or that the watch should be upgraded to a warning. If conditions are not expected to occur as forecast, the watch will be canceled. The format of the Fire Weather Watch is specified in National Weather Service Directive 10-401.

Fire Danger Statements (or Fire Weather Notification Messages)

When fire danger or fire occurrence is high and is coupled with critical weather conditions that don't quite meet Red Flag Warning criteria, user agencies may request that the NWS issue a Fire Danger Statement (or Fire Weather Notification Message in west TN). These statements will be issued in coordination with the requesting agency and will only be issued with their approval. WFO MRX and OHX will use the Special Weather Statement (SPS) product for these issuances, while WFO MEG will use the Fire Weather Notification (FWN) product.

Communications

The primary means of communication used by the NWS is the Advanced Weather Interactive Processing System (AWIPS). Products transmitted by this means include pre-suppression forecasts, Fire Weather Watches, Red Flag Warnings, and Fire Danger Statements. Spot Forecasts will be disseminated only to the requesting agency by means of the Internet, or as a backup, telefax (FAX). Therefore, anytime a request for a spot forecast is made, the requesting agency must include a FAX number. A voice number should also be included in case problems are encountered with the fax transmission. Other means of communication may be utilized upon mutual agreement with the user agencies.

Public products produced by the National Weather Service are available over NOAA Weather Radio (NWR). See the Appendix for a listing of NWS transmitters servicing Tennessee.

Participation in Interagency Groups

At a minimum, one NWS representative (usually the State Liaison WFO Fire Weather Program Leader or MIC) will attend the State Interagency meetings or working groups where fire weather or smoke management policy is discussed as an integral part of the meeting. However, it's strongly recommended that all NWS offices with fire weather responsibility attend the meetings to ensure uniform representation.

Special Services

Special fire weather services are those services that are uniquely required by natural resource agencies and go beyond the normal forecast operations of the NWS. Special services include Incident Meteorologist (IMET) deployment, station visits, training, and other pertinent meteorological services that are designated as non-routine.

Typically, special services require NWS personnel to be away from the Forecast Office and, in some instances, be in overtime status. User agencies are responsible for covering the cost of NWS overtime, travel and per diem expenses. Reimbursement of costs for special services will be as outlined in the **Interagency Agreement for Meteorological and Other Technical Services** (found at http://www.srh.noaa.gov/ridge2/fire/docs/2012_National_Agreement.pdf).

Incident Support

On-site forecast service support is available for wildfires and prescribed burns. This includes the deployment of an Incident Meteorologist (IMET) and related service equipment such as the Advanced Technology Meteorological Unit (ATMU), the All Hazards Meteorological Response System (AMRS), and the Fire Remote Automated Weather Station (Fire RAWS). The IMET, ATMU, AMRS, and the Fire RAWS are considered national fire fighting resources, and can be requested through the Tennessee Interagency Coordination Center.

The ATMU and AMRS are modularized and mobile systems of equipment used by an Incident Meteorologist (IMET) for data collection and forecast preparation. Only trained personnel will operate the ATMU and AMRS, and this service equipment will only be dispatched to an incident when a certified IMET is requested. The IMET is responsible for ordering and arranging shipment for the ATMU and AMRS.

There are 25 ATMUs cached across the country, mostly in the western states. AMRS workstations are also pre-positioned across the country, most of which are collocated with existing Weather Forecast Offices that contain certified IMETS. These AMRS workstations are maintained by the IMETS and are typically shipped with the IMET being mobilized. Previously, the nearest ATMU cache to the state of Tennessee was London, KY, where two were/are maintained. However, WFO Morristown, TN has recently acquired an ATMU and AMRS kit. Fire Weather Program Leader, Sam Roberts, is currently the onsite IMET trainee and is working toward IMET certification.

The ATMU is composed of one large shipping box consisting of a theodolite with tripod, a belt weather kit, PIBAL weather balloons, a nozzle and regulator for a helium tank, and office supplies and miscellaneous expendables. Its volume is 13.8 cubic feet and it weighs 122 pounds.

The AMRS is also composed of one large shipping box, and contains a laptop computer, a satellite dish for obtaining weather data, and a printer. The volume of the satellite dish is 13.8 cubic feet, and its weight is 122 pounds.

Total weight of the ATMU and AMRS is 244 lbs with a volume of 27.6 cubic feet. The cubic feet are necessary for shipment by air. The same specifications shown are listed in the user agencies' National Mobilization Guide.

Requests for the ATMU, AMRS, and IMET should be made through the Tennessee Interagency Coordination Center. Typically, the IMET nearest the incident will be deployed. However, during times of limited resources, IMETs from other areas of the country may be called. The decision will be made by the Special Meteorologist to NIFC (SMC) in conjunction with the MIC and IMET from the affected offices. It is the responsibility of the IMET to arrange shipment of the AMRS workstation.

The success of the operation depends in part on the user agency providing shelter and logistical support. Prior to the use of this equipment, the IMET is expected to have coordinated with the local user agency to ensure proper field support. If an IMET determines that an ATMU

and/or Fire RAWS is desirable, it is the IMET's responsibility to ensure the ATMU and Fire RAWS have also been ordered for the incident.

The requesting agency is responsible for any storage of service equipment while in transit, and shelter for the IMET and service equipment at the site. A sheltered work area, of at least 50 square feet with a table and chair, must be protected from excessive dust, free of standing water or condensation, and must be heated and/or cooled sufficiently to allow efficient operation of equipment. Power (120V AC) must be provided for the AMRS's electrical equipment, and priority telephone access during certain short periods each day must be made available.

The procedure for requesting IMETs will follow the guidelines outlined in the national MOA, the National Mobilization Guide, and the Southern Area Interagency Mobilization Guide. The following information will be provided to the requested IMET:

1. Name of fire.
2. Location of fire.
3. Directions to location where the IMET is to report and the location of ICP.
4. Name of Incident Commander, Plans Chief, and FBAN, if available.
5. Request and Resource Order number for IMET.

Upon arrival at the incident and after going through the appropriate check-in procedures, the IMET will:

1. Brief the Fire Behavior Analyst (FBAN), Planning Section Chief (PSC), and the Incident Commander (IC) on current and expected weather as it affects the fire.

2. Establish a schedule with the IC and the FBAN for written forecasts and formal briefings.

3. Request a briefing of the fire situation and potential behavior problems from the FBAN. As time and resources permit, incident management should arrange for an aerial inspection trip for the meteorologist and should provide the forecaster with current fire line maps. If possible, the IMET should be assigned a radio with the fire line frequency.

4. Arrange for a schedule of observations from key points around the fire and from nearby

lookouts and fire danger stations, in cooperation with the FBAN and PSC. On large fires, some personnel (at least two) should be permanently assigned to this duty. On smaller fires, this information can be provided by Division Supervisors equipped with belt weather kits.

IMET duties will vary with incident management team requirements, but the IMET is expected to provide daily weather forecasts for the incident, participate in shift briefings, planning and strategy meeting, and coordinate daily with the local Weather Forecast Office (WFO) and /or other IMETs at nearby incidents.

Demobilization is initiated at the incident, and will be coordinated through the Tennessee Interagency Coordination Center. Upon release, the user agency will transport the ATMU and Fire RAWS back to its cache location or to the controlling fire weather office. Travel arrangements will be made for the IMET back to his or her home office. The IMET is responsible for transporting the AMRS workstation back to the home office. If the AMRS unit resides at a different location than the IMET, the IMET must make arrangements to ship the equipment to the proper office, and charge any shipping cost to the fire.

Other Special Services

Other special services may include weather station visits by partner agency personnel, RAWS site surveys and inspections, weather observer training, and course development work or related program work. These activities would typically be at the full expense of the requesting agency unless other arrangements have been made.

NWS meteorologists may also be asked to assist in other non-routine services (e.g. briefings or coordination calls) during periods of high fire danger or fire occurrence. MICs and Fire Program Leaders are to ensure the natural resource agency needs are met with little expense to either agency.

Fire Weather Training

NWS meteorologists will be available to assist in user-oriented training. This includes

fire behavior courses, such as S-190 and S-290, where the meteorologist will serve as part of the cadre for that course. Requests for training assistance should be made through the NWS office's Fire Weather Program Leader or Meteorologist-in-Charge (MIC). Sufficient advance notice should be given to allow for scheduling and proper preparation. Costs incurred by the NWS in providing training assistance will be borne by the requesting agency.

Natural Resource Agency Responsibilities

Operational Support and Predictive Services

Program Management

The natural resource agencies will oversee the fire weather observation program, including the site selection and maintenance of the observing equipment, fire weather training of their personnel, and the proficiency of their personnel in the use of the NWS Spot software.

Monitoring, Feedback and Improvement

Natural resource agencies will monitor the quality and timeliness of NWS fire weather products, and provide feedback to the NWS in order to improve services to the agencies.

Technology Transfer

The natural resource agencies may, from time to time, advise the NWS of new technologies being implemented to monitor meteorological or fuel parameters, or to improve communication, coordination, training or reference. Natural resource agency personnel may, with prior arrangement, visit an NWS office to acquire knowledge of NWS technologies used in the monitoring of weather, or the preparation of products.

Agency Computer Resources

Internet will be the primary method of obtaining the Fire Weather Forecast, Red Flag Warning, Fire Weather Watch, and for both requesting and receiving a Spot Forecast. As a backup method, a request can be made to the NWS for a product to be faxed to the customer agency. NFDRS observations will be entered into WIMS, and forecasts and calculations based on these observations will be received by WIMS, or by internet via a WIMS website (found at http://fam.nwcg.gov/famweb/wims/jsp/default.htm).

Fire Weather Observations

Fire weather observation stations provide the specialized weather observations for fire weather forecasts, wildfire control and suppression, and various other land management operations. These stations were selected very carefully in each state and federal district. Sites were chosen to represent homogeneous weather conditions across a district. Stations may either be manned sites operated by land management agencies, or unmanned Remote Automatic Weather Stations (RAWS) maintained by any of the federal or state land management agencies in the area.

All observation stations are assigned a 6-digit identification/location number. The first two digits indicate the state, the second two digits indicated the county, and the last two digits indicated the consecutively-assigned station number for that county. Land managers who wish to have a number assigned to a station should contact the GACC meteorologist at SACC in Atlanta. RAWS stations are also assigned an 8 character alphanumeric identifier based on satellite transmission time. The NESDIS ID, transmit channel and time are assigned by the US Forest Service National RAWS program. The NESDIS ID is a hexadecimal representation of the transmit time window and the channel of the satellite that is used during transmission.

Observations from a satellite telemetered RAWS will automatically flow into WIMS via the NESDIS ID. If a station is not satellite telemetered, the data must be manually entered into WIMS. As NFDRS 2016 is implemented, the previous requirement of changing R to O will no longer be present. All 24 observations will be needed to accurately compute fire danger indices. State of the Weather will no longer be needed as that part of the computation is handled by an algorithm that utilizes Solar Radiation data. NFDRS 2016 will feature a much higher degree of automation than the previous system. For those stations that do not embrace NFDRS 2016, the manual change from R to O will still be required. However, the state of the weather is computed by the Nelson Model. The station owner has an opportunity to edit that value if he deems it inappropriate or erroneous on a given day. Non-NFDRS stations are exempt for these procedures.

Even with automated observations, the responsibility still rests with the RAWS owner to

ensure that observations are being transmitted, recorded, and archived properly in WIMS. Automation greatly simplifies the daily process, however there will still be the need for observations to be checked for integrity and consistency. Managing the NFDRS model parameters will still be a manual process in WIMS prior to the implementation of NFDRS 2016. Once the station owner opts to implement NFDRS 2016, the manual model management will be greatly reduced or possibly eliminated altogether.

Automation helps streamline the WIMS collective that is distributed to the NWS via AWIPS. NFDRS forecasts are based on RAWS observations that appear on the daily collective and it is important these observations are accurate.

Sensor failure will often result in erroneous or (at best) suspicious values. If the NWS becomes aware of such a situation, it is prudent to contact the station owner. Similarly, if a station owner becomes aware of a sensor failure, he should relay that information to the appropriate NWS office. It is the station owner's responsibility to make sure that their station is and remains in good working order and repairs are made in a timely manner. Owners of NFDRS stations can still (and should) correct any errors in their respective observations.

It is important to note, observations are the most important single effort the control agencies put into the Fire Weather Program. Potential fire danger is derived from these observations. The Fire Danger Rating System is the guidance tool that, together with the weather forecast, is used to make a variety of management decisions at various levels of fire management. It is important that observers be well trained and informed of the necessity for accurate, timely, and representative observations.

On - Site Support

The user agencies are also responsible for maintaining observation site equipment. NWS personnel may accompany the user on maintenance trips or for annual inspection visits, which could also serve as liaison with the users.

Training

The responsibility of training natural resource agency employees will be that of the agencies themselves. However, the NWS will be available to assist when requested to do so. Any

expenses incurred by the NWS will normally be charged to the user agency, unless other arrangements have been made.

Joint Responsibilities

Meetings between the NWS offices and the natural resource agencies

The U.S.F.S. Cherokee National Forest fire section facilitates the Tennessee Fire Co-operators meeting held at least twice per year (in late spring and late fall) with all natural resource agencies and NWS offices serving Tennessee invited to attend. These meetings typically will be held in east Tennessee, to minimize travel distance. Although the agenda includes many internal division matters they are of interagency consequence. Therefore, the NWS is a Strategic Partner and is invited to these meetings since topics often include NWS operations.

Maintenance and Revision of the Annual Operating Plan

The AOP should be revised each year by the end of January, with cooperation and participation from each NWS office and each natural resource agency. The state liaison office (Morristown - MRX) will be custodian of the plan.

Notification of NWS Changes in Operating Procedures

From time to time, NWS headquarters, or NWS Southern Region Headquarters, will send draft versions of future directives to their forecast offices for review and comment. To ensure that the natural resource partner agencies have an opportunity to review and comment on proposed changes, the NWS office in Morristown will forward a copy of draft directives to the land management agencies in Tennessee when they are received. Comments and suggestions can be forwarded to the NWS office in Morristown, which will forward them to NWS Southern

Region Headquarters.

Agreements on Services Provided

Agreements on services and standards are normally reached at statewide meetings, but may be achieved by a series of local meetings or by other means such as telephone or e-mail. NWS offices and land managers should be aware of the ripple effect an agreement might have on other NWS offices and their customers, particularly when service areas cross state lines.

Fire Weather/Fire Prevention Awareness Week

Annually during the National Fire Prevention Week (the first Sunday in October through the following Saturday), the NWS and cooperating fire agencies will provide fire safety and prevention information to the public, as well as information concerning how weather affects fire behavior. The NWS will send daily "Public Information Statements" over their communications systems during this week. The Tennessee Division of Forestry, U.S. Forest Service, and National Park Service will provide guidance and additional information that is appropriate for the season for these statements. The intent is to raise public awareness of how weather affects fire behavior, the need for using safe burning techniques, and how to prevent wildfires from occurring in Tennessee.

Workplace Visits

Natural resource agencies and the NWS collaborate on familiarization of personnel in each other’s fields of expertise, operations, and equipment. Visits to offices and work centers, as well as field job sites, can meet part of these requirements.

Service Evaluation

Services provided by the NWS, and delivery of observations and information from the

natural resource agencies to the NWS in support of these services, shall be under constant evaluation by both parties.

Effective Dates of the Operating Plan

The effective dates of this Annual Operating Plan will be from January 1 through December 31 of the current calendar year. This plan will be subject to review and revision by all signatory parties each year, or more frequently as operations warrant.

This plan will be available on the WFO fire weather webpages. A copy of this plan will be sent to NWS Southern Region Headquarters by January 31 of the current year. Southern Region Headquarters will forward a copy of the plan to NIFC and NWS Headquarters.

Signatory Page

The following signatories have agreed to the terms and conditions of this Annual Operating Plan, which is subject to revision on a least an annual basis, or more frequently as operations necessitate. Actual signatures are maintained on file.

_____/signed/_____ 3/19/21

Wade Waters
Fire Unit Leader
Tennessee Division of Forestry

_____/signed/_____ 3/19/21

Shane Paxton
Fire Management Officer
Appalachian-Piedmont-Coastal Zone
USDI National Park Service

_____/signed/_____ 3/19/21

Trenton Girard
Fire Management Officer
Cherokee National Forest
USDA Forest Service

_____/signed/_____ 3/19/21

James Sprouse
Fire Management Officer
Mississippi River Zone
National Park Service

_____/signed/_____ 3/19/21

Anthony Garner
Chief Ranger
Big South Fork National River and Recreation Area
USDI National Park Service

_____/signed/_____ 3/19/21

Denver Ingram
Predictive Services Program Manager
Southern Area Coordination Center

_____/signed/_____ 3/19/21

Sam Roberts
Fire Weather Program Leader
NWS Morristown, TN

_____/signed/_____ 3/19/21

John Cohen
Fire Weather Program Leader
NWS Nashville, TN

_____/signed/_____ 3/19/21

Andrew Chiuppi
Fire Weather Program Leader
NWS Memphis, TN

Appendices

Fire Weather Zone Maps

Fire weather zones consist of groups of counties, or single counties, selected based on homogeneous climatology and expected weather. These groupings may change from forecast issuance to forecast issuance, and may contain counties from adjacent states served by the same NWS office. For a map of the TN fire weather forecast zones, go to https://www.weather.gov/media/pimar/FireZone/tn_firezone.pdf

Observation Stations

RAWS = Remote Automatic Weather Station (forestry maintenance)
ASOS = Automated Surface Observation Station (NWS maintenance)
AWOS = Automated Weather Observation Station (FAA maintenance)

Station Name; County; Type; ID or Number; Latitude; Longitude; Elevation

Cherokee National Forest

Mountain City - Johnson County Airport; Johnson; AWOS; 6A4; 36^0 25' N; 81^0 51' W; 2241'
Nolichucky - Greene; RAWS; 403602; 35.982 N; 82.843 W; 2300'
Tellico - Monroe; RAWS; 407502; 35.2800 N; 84.2750 W; 1700'
Watauga - Unicoi/Washington; RAWS; 403604; 36.201 N; 82.389 W; 2880’

Great Smoky Mountains National Park

Indian Grave - Blount; RAWS; 407603; 35.6236 N; 83.8083 W; 2700'

East Tennessee District (East)

Elizabethton - Municipal Airport; Carter; AWOS; 0A9; 36^0 22' N; 82^0 10' W; 1584'

Greeneville - Greene County Municipal Arpt; Greene; AWOS; GCY; 36^0 12' N; 82^0 49' W; 1608'

Hamblen County Headquarters - Hamblen; RAWS; 403301; 36.2572 N; 83.2772 W; 1163'

Morristown - Moore-Murrell Airport - Hamblen; AWOS; MOR; 36^0 11' N; 83^0 23' W; 1313'

Tri-Cities Regional Airport - Sullivan; ASOS; TRI; 36^0 28' N; 82^0 24' W; 1500'

East Tennessee District (West)

Big South Fork National Recreation Area - Scott; RAWS; 400902; 36.4750 N; 84.6542 W; 1445'

Chuck Swan State Forest - Union; RAWS; 403101; 36.3689 N; 83.8986 W; 1657'

Jacksboro - Campbell County Airport; Campbell; AWOS; JAU; 36^0 20' N; 84^0 10' W; 1180'

Knoxville - Downtown Island Airport; Knox; AWOS; DKX; 35^0 58' N; 83^0 52' W; 833'

Knoxville McGhee Tyson Airport; Blount; ASOS; TYS; 35^0 49' N; 83^0 59' W; 962'

Lenoir City; Loudon; RAWS; 405101; 35.8442 N; 84.3317 W; 1240'

Oak Ridge; Anderson; ASOS; OQT; 36^0 01' N; 84^0 14' W; 910'

Oneida - Scott County Municipal Airport; Scott; AWOS; SCX; 36^0 27' N; 84^0 35' W; 1542'

Sevierville - Gatlinburg-Pigeon Forge Airport; Sevier; AWOS; GKT; 35^0 52' N; 83^0 32' W; 1020'

Cumberland District (South)

Athens - McMinn County Airport; McMinn; AWOS; MMI; 35^0 24' N; 84^0 34' W; 858'

Bledsoe State Forest - Bledsoe; RAWS; 407102; 35.6819 N; 85.2733 W; 1780'

Chattanooga Lovell Field Airport - Hamilton; ASOS; CHA; 35^0 02' N; 85^0 12' W; 689'

Dayton - Mark Anton Airport; Rhea; AWOS; 2A0; 35^0 29' N; 84^0 56' W; 715'

Delano - Polk; RAWS; 407301; 35.2477 N; 84.5813 W; 695’

Prentice Cooper State Forest - Marion; RAWS; 409201; 35.1303 N; 85.4278 W; 1920'

Tullahoma - Tullahoma Regional Airport; Coffee; AWOS; THA; 35^0 23' N; 86^0 15' W; 1082'

Winchester - Municipal Airport; Franklin; AWOS; BGF; 35^0 11' N; 86^0 04' W; 979'

Cumberland District (North)

Crossville Area Office - Cumberland; RAWS; 405001; 35.9178 N; 84.9972 W; 1770'

Crossville Memorial Airport - Cumberland; ASOS; CSV; 35^0 57' N; 85^0 05' W; 1867'

Lafayette Work Center - Macon; RAWS; 400501; 36.5411 N; 86.0028 W; 970'

Livingston - Municipal Airport; Overton; AWOS; 8A3; 36^0 25' N; 85^0 19' W; 1370'

McMinnville - Warren Co. Municipal Arpt; Warren; AWOS; RNC; 35^0 42' N; 85^0 51' W; 1032'

Sparta - Upper Cumberland Regional Airport; White; AWOS; SRB; 36^0 03' N; 85^0 32' W; 1025'

Highland Rim District

Burns - Dickson; RAWS; 402102; 36.0650 N; 87.2831 W; 706'

Clarksville Outlaw Airport - Montgomery; ASOS; CKV; 36^0 37' N; 87^0 25' W; 560'

Columbia - Maury Co. Regional Airport; Maury; AWOS; MRC; 35^0 33' N; 87^0 11' W; 681'

Dickson - Municipal Airport; Dickson; AWOS; M02; 36^0 08' N; 87^0 26' W; 891'

Fayetteville - Municipal Airport; Lincoln; AWOS; FYM; 35^0 04' N; 86^0 34' W; 983'

Fort Campbell - Montgomery; RAWS; 400201; 36.6256 N; 87.5369 W; 545'

Gallatin - Sumner Co. Regional Airport; Sumner; AWOS; M33; 36^0 23' N; 86^0 25' W; 584'

Lawrenceburg - Lawrence Co. Airport; Lawrence; AWOS; 2M2; 35^0 14' N; 87^0 15' W; 936'

Lebanon - Municipal Airport; Wilson; AWOS; M54; 36^0 12' N; 86^0 19' W; 571'

Lewisburg Tower - Marshall; RAWS; 406601; 35.3817 N; 86.7658 W; 1150'

Lewisburg - Ellington Airport; Marshall; AWOS; LUG; 35^0 30' N; 86^0 48' W; 707'

Meriwether Lewis - Lewis; RAWS; 406401; 35.5025 N; 87.4581 W; 920'

Murfreesboro - Municipal Airport; Rutherford; AWOS; MBT; 35^0 53' N; 86^0 23' W; 615'

Nashville International Airport; Davidson; ASOS; BNA; 36^0 08' N; 86^0 41' W; 600'

Nashville - John Tune Airport; Davidson; AWOS; JWN; 36^0 11' N; 86^0 53' W; 494'

Portland - Municipal Airport; Sumner; AWOS; 1M5; 36^0 36' N; 86^0 29' W; 818'

Pulaski - Abernathy Field; Giles; AWOS; GZS; 35^0 09' N; 87^0 04' W; 689'

Savannah - Hardin County Airport; Hardin; AWOS; SNH; 35^0 10' N; 88^0 13' W; 473'

Shelbyville - Bomar Field; Bedford; AWOS; SYI; 35^0 34' N; 86^0 27' W; 802'

Shiloh National Military Park - Hardin; RAWS; 408302; 35.1550 N; 88.3217 W; 420'

Springfield - Robertson Co. Airport; Robertson; AWOS; M91; 36^0 32' N; 86^0 55' W; 708'

West Tennessee District

Beech River Regional Arpt - Henderson; AWOS; PVE; 35^0 39.551' N; 88^0 11.581' W; 488'

Bolivar - William Whitehurst Field; Hardeman; AWOS; M08; 35^0 13' N; 89^0 03' W; 499'

Camden Tower - Benton; RAWS; 404001; 36.0661 N; 88.1686 W; 512'

Chickasaw State Forest - Hardeman; RAWS; 408001; 35.3725 N; 88.8292 W; 496'

Covington - Municipal Airport; Tipton; AWOS; M04; 35^0 35' N; 89^0 35' W; 280'

Covington - Municipal Airport: Tipton: RAWS; TT531; 35^0 35' N; 89^0 35' W; 280'

Dyersburg Regional Airport - Dyer; AWOS; DYR; 36^0 00' N; 89^0 24' W; 338'

Dyersburg - Dyer; RAWS; 403801; 35^0 59.717' N; 89^0 24.350' W; 208'

Greenfield - Weakley; RAWS; 401302; 36^0 09.648' N; 88^0 48.000' W; 499'

Huntingdon - Carroll County Airport; Carroll; AWOS; HZD; 36^0 05' N; 88^0 28' W; 497'

Jackson McKellar - Sipes Regional Airport; Madison; ASOS; MKL; 35^0 36' N; 88^0 55' W; 433'

Memphis International Airport - Shelby; ASOS; MEM; 35^0 03' N; 89^0 59' W; 254'

Millington Regional Jetport - Shelby; AWOS; NQA; 35^0 21' N; 89^0 52' W; 320'

Paris - Henry County Airport; Henry; AWOS; PHT; 36^0 20' N; 88^0 23' W; 580'

Selmer - Robert Sibley Airport; McNairy; AWOS; SZY; 35^0 12' N; 88^0 30' W; 610'

Somerville - Fayette County Airport; Fayette; AWOS; FYE; 35^0 12' N; 89^0 24' W; 436'

Union City - Everett-Stewart Regional Airport; Obion; AWOS; UCY; 36^0 23' N; 88^0 59' W; 342'

NOAA Weather Radio Transmitters Serving Tennessee Counties

For a map of each transmitter reception area, go to
https://www.weather.gov/nwr/tennessee

Location; NWS Office; Call Sign; Frequency; TN Counties Served

Beechgrove, TN; Nashville, TN (OHX); WXK-63; 162.475 MHz; Bedford, Cannon, Coffee, Franklin, Grundy, Marshall, Moore, Rutherford, Warren, Williamson and Wilson

Blue Ridge, GA; Atlanta, GA (FFC); KXI-75; 162.475 MHz; Polk

Booneville, MS; Memphis, TN (MEG); KIH-53; 162.400 MHz; Hardeman, Hardin, and McNairy

Bristol, TN; Morristown, TN (MRX); WXK-47; 162.550 MHz; Carter, Greene, Hancock,

Hawkins, Johnson, Sullivan, Unicoi, and Washington

Centerville, TN; Nashville, TN (OHX); KWN-53; 162.450 MHz; Hickman, Lewis, and Maury

Chattanooga, TN; Morristown, TN (MRX); WXK-48; 162.550 MHz; Bledsoe, Bradley, Hamilton, McMinn, Marion, Meigs, Monroe, Polk, Rhea, Roane, and Sequatchie

Clarksville, TN; Nashville, TN (OHX); WWH-37; 162.500 MHz; Dickson, Montgomery, Robertson, and Stewart

Clifton, TN; Nashville, TN (OHX); WZ-2506; 162.500 MHz; Decatur, Hardin, McNairy, Perry, and Wayne

Cookeville, TN; Nashville, TN (OHX); WXK-61; 162.400 MHz; Clay, Cumberland, Dekalb, Fentress, Jackson, Overton, Pickett, Putnam, Smith, Trousdale, Van Buren, and White

Dyersburg, TN; Memphis, TN (MEG); WWH-30; 162.500 MHz; Crockett, Dyer, Gibson, Haywood, Lake, Lauderdale, Obion, and Weakley

Hickman, TN; Nashville, TN (OHX); WXN-74; 162.500 MHz; Cannon, DeKalb, Jackson, Putnam, Smith, Trousdale, and Wilson

Huntsville, AL; Huntsville, AL (HUN); KIH-20; 162.400 MHz; Lincoln

Jackson, TN; Memphis, TN (MEG); WXK-60; 162.550 MHz; Carroll, Chester, Crockett, Dyer, Gibson, Hardeman, Hardin, Haywood, Henderson, Madison, McNairy, and Weakley

Knoxville, TN; Morristown, TN (MRX); WXK-46; 162.475 MHz; Anderson, Blount, Campbell, Claiborne, Cocke, Grainger, Hamblen, Jefferson, Knox, Loudon, Monroe, Morgan, Roane, Scott, Sevier, and Union

Lafayette, TN; Nashville, TN (OHX); WNG-631; 162.525 MHz; Clay, Jackson, Macon,

Smith, Sumner, Trousdale, and Wilson

Lawrenceburg, TN; Nashville, TN (OHX); WWF-84; 162.425 MHz; Giles, Lawrence, Lewis, Lincoln, Marshall, Maury, Wayne, and Williamson

Lobelville, TN; Nashville, TN (OHX); KWN-52; 162.525 MHz; Benton, Decatur, Henderson, Hickman, Humphreys, Lewis, Perry, and Wayne

Mayfield, KY; Paducah, KY (PAH); KIH-46; 162.475 MHz; Henry and Weakley

Memphis, TN; Memphis, TN (MEG); WXK-49; 162.475 MHz; Fayette, Hardeman, Haywood, Lauderdale, Shelby, and Tipton

Nashville, TN; Nashville, TN (OHX); KIG-79; 162.550 MHz; Cheatham, Davidson, Dickson, Maury, Montgomery, Robertson, Rutherford, Smith, Sumner, Trousdale, Williamson, and Wilson

Spencer, TN; Nashville, TN (OHX); WNG-629; 162.450 MHz; Bledsoe, Cumberland, DeKalb, Grundy, Marion, Putnam, Sequatchie, Van Buren, Warren, and White

Vale, TN; Memphis, TN (MEG); KHA-46; 162.450 MHz; Benton, Carroll, Henry, and Weakley

Waverly, TN; Nashville, TN (OHX); WXK-62; 162.400 MHz; Benton, Dickson, Hickman, Houston, Humphreys, Lewis, Montgomery, Perry, and Stewart

Winchester, TN; Huntsville, AL (HUN); WNG-554; 162.525 MHz; Bedford, Coffee, Franklin, Grundy, Lincoln, and Moore

Red Flag Criteria

A Red Flag Warning is issued when forecast conditions (high winds and low humidity), together with existing environmental conditions (extended dry periods), could result in extreme fire behavior within 24 hours. A Fire Weather Watch will be issued if Red Flag Warning conditions are possible in the next 24 to 48 hours. NWS forecasters will first coordinate the issuance of a Red Flag Warning or Fire Weather Watch with the associated land management agency after determining that fuels are dry enough for fire danger concerns. A highlight of the Red Flag Warning or Fire Weather Watch should be included within the routine fire weather forecast.

Meteorological conditions which warrant the issuance of a Red Flag Warning or Fire Weather Watch in Tennessee are the following:

1. Strong winds with low humidity, generally 18 mph or higher sustained wind speeds with less than 25 percent relative humidity.
2. Rainfall of less than 0.25 inch during the past two days.

Fire Weather Product Examples

Morristown, TN (MRX):

Red Flag Warning (found at
http://forecast.weather.gov/product.php?site=NWS&product=RFW&issuedby=MRX

Fire Weather Forecast (found at
http://forecast.weather.gov/product.php?site=MRX&product=FWF&issuedby=MRX

Spot Forecast (found at
http://forecast.weather.gov/product.php?site=NWS&product=FWS&issuedby=MRX

Nashville, TN (OHX):

Red Flag Warning (found at
http://forecast.weather.gov/product.php?site=NWS&product=RFW&issuedby=OHX

Fire Weather Forecast (found at

http://forecast.weather.gov/product.php?site=NWS&product=FWF&issuedby=OHX

Spot Forecast (found at

http://forecast.weather.gov/product.php?site=NWS&product=FWS&issuedby=OHX

Memphis, TN (MEG):

Red Flag Warning (found at

http://forecast.weather.gov/product.php?site=NWS&product=RFW&issuedby=MEG

Fire Weather Forecast (found at

http://forecast.weather.gov/product.php?site=NWS&product=FWF&issuedby=MEG

Spot Forecast (found at

http://forecast.weather.gov/product.php?site=NWS&product=FWS&issuedby=MEG

FWF Update Criteria

The Fire Weather Planning Forecast (FWF) will be updated when the expected weather changes significantly from what was predicted in the routine forecast. The decision to issue a fire weather update will be based on the effect the weather change has on the fire behavior and the level of fire danger in the state. An update may be issued at any time of day and using the following guidelines:

1. If precipitation was not mentioned in the previous forecast and looks likely, or if it was forecast as being predominant and now looks as if it will not occur or remain isolated, an update should be issued.

2. An update should be considered when a front and its associated wind shift is much delayed or arrives sooner than expected.

3. An update should be considered whenever the wind speed is much stronger or lighter than previously expected. Differences of 10 to 15 mph in most cases are significant and may also apply to gustiness. If the wind direction differs by two or more compass points (more than 45 degrees), an update may be needed if the prevailing wind speed is 15 mph or more.

4. When relative humidity drops to a very low level (30 percent or less) and differs by more than 15 percent from the morning forecast, an update should be considered. Also, if the relative humidity remains high and low levels had been previously forecast, an updated forecast should be considered.

Record of Changes to the AOP

March 2018:

Under “Program Leaders or (Focal Points)” Sam Roberts was added as program leader for MRX, who replaces the previous program leader, Timothy Doyle. Timothy Doyle is now the assistant program leader.

Under “Fire Weather Planning Forecast (FWF)” subsection “ii) Format/Content of the FWF”, where it mentions Mixing Height ("MIXING HGT"), MRX now provides AGL mixing heights in addition to MSL.

Under “Fire Weather Planning Forecast (FWF)” subsection “ii) Format/Content of the FWF”, where it mentions Low Visibility Occurrence Risk Index (“LVORI”), MRX now provides LVORI for all of their fire weather zones.

Under “Fire Weather Planning Forecast (FWF)” subsection “ii) Format/Content of the FWF”, where it mentions Ventilation Index ("VENT INDEX"), MRX now provides Vent Index for all of their fire weather zones.

Under “National Fire Danger Rating System (NFDRS) Forecasts” and under “Fire Weather Observations”, updated verbiage to be consistent with NFDRS 2016 per Denver Ingram at SACC.

Under "Signatory Page", Trenton Girard was listed as the Acting Fire Management Officer and signatory for Cherokee National Forest.

February 2019:

Under “Service Area and Organizational Directory” and under “Service Area”, the new 2019 zone names, numbers, and boundaries were inserted and show the changes from the 2018

service area. This section states the new policy will be implemented April 2, 2019.

Under “Service Area and Organizational Directory” and under “Program Leaders or (Focal Points)”, Andrew Chiuppi was added as program leader for MEG, who replaces the previous program leader John Sirmon.

Under "Signatory Page", Wade Waters was listed as the Acting Fire Unit Leader and signatory for the State of Tennessee, replacing Robin Bible.

Under "Signatory Page", Anthony Garner was listed as the Chief Ranger for the Big South Fork National Park, replacing Tommy Barnes.

Under “Appendices” and under “Fire Weather Zone Maps”, new wording in place describing the new one county-one zone format.

Under “Appendices” and under “Observational Stations”, new RAWS station added in the West Tennessee District at Covington Municipal Airport.

January 2020

Under “Service Area and Organizational Dictionary” and under “Service Area”, the fire weather zone map hyperlink was updated. The previous link did not work.

Under “Service Area and Organizational Dictionary”and under “Service Area”, any reference to the old TN zone numbers, names, and boundaries, 2018 and prior, were removed. What remains is the current, 2019 - current, zone numbers, names, and boundaries.

Under “Service Area and Organizational Dictionary” and under “Program Leaders or (Focal Points)”, contact emails were listed for program leaders at WFO Memphis, Nashville, and Morristown.

Under “Services Provided by the National Weather Service " and under “Incident Support ", the following was added, “ However, WFO Morristown, TN has recently acquired an ATMU and AMRS kit. Fire Weather Program Leader, Sam Roberts, is currently the onsite IMET trainee and is working toward IMET certification.

Under “Appendices” and under “Observation Stations”, the previously listed
Meigs EOC - Meigs; RAWS; 407301; 35.5208 N; 84.7931 W; 760' was changed to
Delano - Polk; RAWS; 407301; 35.2477 N; 84.5813 W; 695’. The Meigs site was moved to Delano but kept the same WIMS ID.

Under “NOAA Weather Radio Transmitters Serving Tennessee Counties”, the coverage map hyperlink was updated. The old one did not work.

January 2021:

Under “Signatory Page”, Shane Paxton. was listed as the Fire Management Officer and signatory for the Appalachian Piedmont Zone

Under “Signatory Page”, changed the “Appalachian Piedmont Zone to Appalachian-Piedmont-Coastal Zone.

Under “Signatory Page”, added Doug Sprouse as Acting FMO for the Mississippi River Fire Management Zone.

On page 21 of the “procedures” section of the National Fire Danger Rating System (NFDRS) Forecasts, added the information about implementation of NFDRS 2016 as requested by Denver Ingram.