

Fire Weather Operations Plan for Northern and Downeast Maine



2009

This operating plan will be a semi-permanent document, specifying Fire Weather services provided by National Weather Service in Caribou. The plan incorporates procedures detailed in the Interagency Agreement for Meteorological Services.

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Introduction

Purpose of the Operating Plan.

This Fire Weather Operating Plan 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 northern and eastern Maine.

Explanation of relationship between the Operating Plan 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
- USDA Forest Service
- USDI National Park Service
- USDI Fish and Wildlife Service
- Maine Forest Service

The National Mobilization Guide further defines 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 Services](#) .

Service Area and Organizational Directory

Service Area.

The service area covered by this Operating Plan is northern and eastern Maine, which is served by the National Weather Service Weather Forecast Office in Caribou, Maine.

Specifically, Maine counties that are covered by the Weather Forecast Office (WFO) in Caribou, ME include:

<u>County</u>	<u>Forecast Zone #</u>
Aroostook	MEZ001, MEZ002, MEZ006
Hancock	MEZ016, MEZ029
Penobscot	MEZ005, MEZ011, MEZ015
Piscataquis	MEZ004, MEZ010, MEZ031
Northern Somerset	MEZ003
Washington	MEZ017, MEZ030, MEZ032

National Weather Service Headquarters.

NWS Headquarters, located in Silver Spring, 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 Association of State Foresters 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 regions' fire weather programs and advise the Regional Directors on the operational and administrative aspects of the regions' programs.

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 Caribou](#)

810 Main Street
Caribou, Maine 04736

Meteorologists-in-Charge (MIC).

The Meteorologists-in-Charge is responsible for the provision of adequate weather services for the offices' assigned areas of program responsibility. The MIC will ensure that the focal points or program leaders are provided adequate time for user liaison and assistance activities. MICs can be reached via email or through contact with their respective office:

Meteorologist-in-Charge at WFO Caribou
Hendricus Lulofs

** For internal (unlisted) coordination phone numbers please call the public number above.

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 Weather Program Leaders can be reached via e-mail or through contact with their respective office:

Fire Weather Focal Point at WFO Caribou

Malcolm “Mal” Walker

** For internal (unlisted) coordination phone numbers please call the public number above.

Participating Agencies

The following agencies are participants of this operating plan:

NOAA National Weather Service

USDA Forest Service

USDI National Park Service

USDI Fish and Wildlife Service

Maine Forest Service

Services Provided by the National Weather Service

Fire Weather Season.

Wildfires can occur in the state of Maine any time during the seasons when the ground is free from snow cover, which is typically from early spring through late fall. However, there are two periods which are particularly prone to wild fires due to a combination of dry air and dry fuels.

The greatest peak is April into early May. During this period, the spring sun is gaining strength but the air can still be very dry. Many fine fuels freeze-dried from the winter season are available for burning. This peak period typically begins a week or two after the ground is snow-free, usually late March to early April, and then tapers off during green-up, which begins in earnest around mid May.

A second smaller peak occurs in October after the leaves have fallen and dried, and before the late fall storms appreciably dampen the ground.

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 land 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.

Product Overview and Issuance Criteria.

The FWF provides a detailed prediction of elements for three specific 12-hour periods, a general 3 to 7 day forecast, and an 8 to 14 day extended outlook. The FWF is issued during the morning (between 3:00 and 6:00 AM). The forecast, to be disseminated no later than 8:30 AM, consists of three periods: "Today" (valid from issuance through 6 PM local time), "Tonight" (6 PM to 6 AM), and "Tomorrow" (6 AM to 6 PM).

Dissemination.

The FWF is sent from our Advanced Weather Information and Processing System (AWIPS), and from there becomes available on our web page <http://www.weather.gov/car> under "Forecasts" in the category "Local Fire Weather".

Format/Content of the FWF.

- Format - The format of the Fire Weather Forecast is specified in National Weather Service Directive 10-401. Some elements are optional and are not included by all National Weather Service offices.
- 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 may be 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.
- Relative Humidity ("MAX/MIN RH") - Forecasted minimum relative humidity is provided during the daytime periods, while maximum RH is included at night. Relative humidity is highly variable from site to site, but for the purpose of the zone forecast will be the maximum or minimum relative humidity within the zone. In general, relative humidity values below 25 percent should deter a prescribed burn and cause a call to the National Weather Service to obtain a site specific forecast.

Note: The lowest average humidity typically occurs during the warmest part of the day. However, if it is expected to occur at a different time of the day, this will be noted in the "Remarks" portion of the forecast.

- Surface Winds ("WND20FT2MIN/EARLY and WND20FT2MIN/LATE") - Surface wind speed and direction represent a two-minute average at 20 feet above the vegetative ground cover. Wind direction is the direction the wind blows from, to eight points of the compass. The "EARLY" designation refers to morning hours (before noon) during daytime periods, and also the evening hours (before midnight) during nighttime periods. "LATE" refers to the afternoon hours during the daytime periods, and also the pre-dawn hours (after midnight) during the nighttime periods. 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 highest probable 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. It provides the potential for the atmosphere to disperse smoke. Mixing height will vary from site to site, but for the purpose of the zone forecast will be the maximum height mixing is expected to occur within the zone. In general, a mixing height of 1650 feet or less should deter a prescribed burn and result in a call to the National Weather Service to obtain a site specific forecast. Routine upper air soundings are available after 0900 and may give a better indication of mixing heights than those in the forecast. Mixing height forecasts are given in feet above the ground ("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.
- Ventilation Rate ("VENT RATE") - Refers to a multiplication of the mixing height and transport wind., With units in ft MPH. Ventilation rates, forecasted during the daytime, are used to calculate the Burn Category for each day. The ventilation rate gives the potential for the atmosphere to disperse smoke. Refer

to the appendix for further details regarding the correlation of the Ventilation Rate and Burn Category.

- Dispersion ("DISPERSION") - Refers to the forecasted smoke dispersion category at night, based on the surface wind speed. The dispersion category gives a general indication of the state of the atmosphere with respect to its ability to disperse smoke. The dispersion forecast (nighttime) is analogous to the daytime Ventilation Rate, though only a forecast during the evening hours is provided as a large majority of controlled/prescribed fire operations are completed before midnight. A spot forecast is recommended for critical operations that might involve smoke drift towards a populated area. Refer to the appendix for further details on Dispersion categories.
- Lightning Activity Level ("LAL") - A numerical value, which is used to describe the expected lightning activity for that day, according to the following chart:

<u>LAL</u>	<u>Strikes per min</u>	<u>Strikes per 5 min.</u>	<u>Strikes per 15 min.</u>
1	0	0	0
2	1	1 to 5	1 to 8
3	1 to 2	6 to 10	9 to 15
4	2 to 3	11 to 15	16 to 25
5	>3	>15	>25
6	1 to 2	6 to 10	9 to 15

NOTE: LAL 6 has the same lightning activity as LAL 3 except thunderstorms with LAL 6 are dry with little or no precipitation.

- Haines Index ("HAINES INDEX or LASI")- The index infers the stability of the atmosphere. 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. 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 Haines Index of 4 or greater, there is an increased threat for large wind-driven fires.
- 3 through 7 Day Forecast - The outlook period is an extended forecast for the zone, or the entire forecast area, provided in narrative form (non-digital, non-tabular), and appended at the bottom of each zone grouping (for just that zone).
- Outlook 8 to 14 Days - This section will only include temperature and precipitation forecasts and will provide forecasts with respect to seasonal normal values for the specific time of year.

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.

National Fire Danger Rating System (NFDRS) Forecasts.

Issuance.

NFDRS forecasts will be issued for any predetermined site from which an NFDRS observation is received, provided the observation is received on time, is complete, and is deemed accurate. The natural resource agencies will determine which observation sites (normally RAWS sites) will be NFDRS sites. Initiation of NFDRS forecasts for a new site will be coordinated with the NWS, and the agency requesting new NFDRS service will provide the NWS with information about the site location. Forecasts will not be provided for sites with bad data. The NWS will notify the owner agency when bad data is received from a RAWS station. Eastern Maine has 1 NFDRS site:

Station ID | Name | County | Latitude | Longitude

- 170701 | Bar Harbor, Hancock county, 44.38N, 68.22W

Contents.

FCST,170701,YYMMDD,13,X,TT,RH,L1,L2,DD,SS,,TX,TN,RX,RN,P1,P2,F

Where: **YYMMDD** is the year, month, and day of the forecast.

13 local time (does not change).

X is a weather code: 0=clear, 1=scattered clouds(mostly (for next day) clear), 2=broken clouds(partly to Mostly cloudy), 3=overcast, 4=fog, 5=drizzle, 6=rain, 7=snow/sleet, 8=showers, and 9=thunderstorms.

TT is a 21 hour - 1300 LT temperature forecast.

RH is a 21 hour - 1300 LT relative humidity forecast.

L1 and **L2** are lightning activity levels (LALs)for 1300-0600 and 0600-1300 local time respectively.

code: 1=none, 2=1-8 strikes, 3=9-15 strikes
4=15-25 strikes, 5= >25 strikes, 6= scattered dry thunderstorms(very rare).

DD is wind direction using 8-point compass headings.

SS is 20 or 30 foot wind speed (10 minute average in mph).
TX is a forecast 24 hour maximum temperature.
TN is a forecast 24 hour minimum temperature.
RX is a forecast 24 hour maximum relative humidity.
RN is a forecast 24 hour minimum relative humidity.
P1 is precipitation duration (1300-0600 period) in hours.
P2 is precipitation duration (0600-1300 period) in hours.
F is a Y/N flag for wetting rains (0.25 + inches.)

Procedures.

The land management agencies are responsible for taking, quality controlling, transmitting and archiving the NFDRS observations. Observation must be received at the NWS in a timely manner. Forecasts will only be prepared for predetermined sites, and only from those sites for which an observation has been received. The deadline for the land management agency for transmitting the observation is 1900 GMT (2:00 PM EST or 3:00 PM EDT). The NWS will prepare and transmit the NFDRS forecasts no later than 1945 GMT (2:45 PM EST or 3:45 PM EDT). Although the data cutoff time for ingest into the NFDRS software is 7 PM, preliminary calculations based on the forecast are used by the land managers to make staffing decisions at shift briefing time (4 PM).

Site Specific Forecasts:

Spot Forecasts:

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. Spot forecast requests for wildfires and hazardous material emergencies are considered high priority, and can be obtained at any time. Spot forecasts may be obtained for prescribed burns; however, the response may be delayed due to higher priority responsibilities of the forecaster on duty.

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** if these products are issued concurrently. 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; stability indices (IE., 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).

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 is 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. This form, along with instructions on how to use it, is available on the local NWS fire weather web pages. The web based spot forecast request form should be filled out as completely as possible (required parameters are listed in red) by the user agency prior to submitting the request. Use Latitude/Longitude for your location, and this should be entered in either decimal degrees, or degrees/minutes/seconds. If you are using decimal degrees enter as standard (e.g. 37.52). If degrees/minutes/seconds, use a second decimal (e.g. 37.31.12), or leave a space between each number (e.g. 37 31 12).

Direct link to the spot monitor and request submission web page for NWS Caribou:

<http://spot.nws.noaa.gov/cgi-bin/spot/spotmon?site=car>

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 in the CWA 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 about 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. It will be helpful if the user provides an observation within an hour of the request. This observation should 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; 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 is 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 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.

Fire Weather Watch and Red Flag Programs:

Issuance.

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.

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

combinations of the following: strong, gusty winds; very low relative humidity; high to extreme fire danger (very low fuel moisture). Historically, the highest risk of significant fire starts and blow-ups occur when very dry air masses come down from Canada during our mid spring fire weather season. The spring sunshine will warm the air mass while the dew points in the air mass remain very low. This combination results in exceptionally low relative humidities which can quickly dry fine fuels and foster the ignition and spread of brushfires.

In an effort to simplify the Red Flag Warning process, forecasters at the NWS offices will be mainly concerned with the specific weather conditions and critical weather patterns necessary to produce Red Flag conditions. Tracking fuel moisture will be the responsibility of the fire product user agencies. **As a result, coordination will be necessary with the Maine State forest service when a NWS forecaster considers a Red Flag Warning or Fire Weather Watch.

Red Flag / Fire Weather Watch Criteria.

Red Flag criteria are considered met when both

- 1) The mean of 1 hour and 10 hour fuel moistures are less than 10% in combination with the following weather conditions

And

- 2) Certain relative humidity and wind conditions are met as defined by “W” in the following chart.

Relative Humidity	Wind Speeds			
	< 10 mph	10 to 19 mph	20 to 29 mph	> 30 mph
33 to 39%				W
27 to 32%			W	W
20 to 26%		W	W	W
< 20%	W	W	W	W

NOTE: It is also preferable to have a Haines Index of 5 or 6 as well. Although, it is not necessary this criterion be met.

During periods of extended drought or when wildland fires are occurring, modifications to these criteria may be required. Any change will be coordinated through the Eastern Area Coordination Center, or with the Fire Burn Analyst (FBAN) and Incident Commander (IC) on an existing large project burn. We recognize there are seasonal variability that may stress live fuels differently, in addition to other weather phenomena (such as, a frontal passage or thunderstorm downburst), that may result in extreme fire behavior and pose a hazard to wildland firefighters.

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 canceled. The format of the Red Flag Warning is specified in [National Weather Service Directive 10-401](#).

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 than 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](#).

The Caribou and Gray National Weather Service Offices and the Maine Forest Service have entered into a special agreement on the continuation/cancellation of Fire Weather Watches. Specifically, the agreement is as follows;

- Every attempt will be made by the NWS to coordinate with the Maine Forest Service prior to the midnight shift. Ideally, the day shift prior to the potential event will issue the Fire Weather Watch. Fuel conditions should be coordinated with the Forest Service at this time. The fuel conditions should be passed onto the midnight shift, ultimately allowing the midnight shift to determine whether to issue a Red Flag Warning.
- If the Maine Forest Service cannot be contacted the day prior (due to marginal conditions, or if expected weather conditions become worse on the midnight shift, etc.) then the NWS offices in Gray and Caribou will allow the Watch to continue until Maine Forest Service can be contacted. Watches should typically run from 16UTC to 01UTC, which would allow coordination with Maine Forest Service until 9 am local daylight time if need be.
- If a Watch is cancelled for all or part of the Watch area, the headline may be edited to read, "The Fire Weather Watch is no longer in effect" The text portion may address the marginal nature of fire weather conditions.

Fire Danger Statements and Blow-Up Alerts.

When fire danger or fire occurrence is high and is coupled with critical weather conditions, user agencies may request that the NWS issue a Fire Danger Statement or Blowup Alert. These statements will be issued in coordination with the requesting agency and will only be issued with their approval. The NWS will use the Special Weather Statement (SPS) for these issuances.

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 is 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 Services](#) .

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 Northeast coordination center in China Village, Maine. (207) 968-3782 www.nffpc.org

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. The nearest [ATMU cache](#) to the state of Maine is London, KY, where two are maintained. [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.

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 specification shown is listed in the user agencies' National Mobilization Guide.

Requests for the ATMU, AMRS, and IMET should be made through the Northeast coordination center in China Village, Maine. (207) 968-3782.

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 the National Interagency Fire Center (NIFC) 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. 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 fireline maps. If possible, the IMET should be assigned a radio with the fireline 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 Eastern Area 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.

National Resource Agency Responsibility

Program Management.

The natural resource agencies will oversee the fire weather observation program, including the siting 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.

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.

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 that 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. 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 Responsibility

Conference Calls.

During times of very high or extreme fire danger, the agencies may initiate a conference call to discuss fire danger and weather. This call may include various partner agencies, and either some, or all of the NWS offices serving a particular area. When more than one NWS office is participating, one NWS office will lead the weather discussion, which may be followed by input from the other NWS offices for their area. At times when the entire state is the area of concern, the NWS State Liaison Office in Gray will normally lead the discussion, but this may vary if the area of concern is skewed toward another NWS office's area.

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 National Weather Service Office in Caribou, Maine, will be custodian of the plan.

Notification of NWS Changes in Operating Procedures.

From time to time, NWS headquarters, or NWS Eastern 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 State Liaison Office in Gray will forward a copy of draft directives to EACC when they are received. EACC will then forward draft NWS directives to the rest of the natural resource partner agencies for review. Comments and suggestions can be forwarded to the NWS State Liaison Office in Gray which will forward them to NWS Eastern Region Headquarters.

Agreements on Services Provided.

Agreements on services and standards are normally reached at statewide meetings, but may be achieved at 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.

Workplace Visits.

Natural resource agencies and the NWS collaborate on familiarization of personnel in each others 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.

Requests For Historical Weather Information

Agencies requiring historical weather information for specific locations should contact the appropriate NWS office listed in section 13.0. If the requested historical information is available, the NWS will disseminate the information via telephone, fax or mail, depending on the needs of the user agency. There will be no charge if the request is from a government agency (city/state/federal). Whenever possible, NWS offices will attempt to disseminate this information at the time of the request with little or no delay. However, because of staffing and/or operational priorities, NWS offices will often not be able to process such requests immediately. User agencies should anticipate such delays and request information as far in advance as possible.

Effective Dates on the AOP

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 web pages. A copy of this plan will be sent to NWS Eastern Region Headquarters by January 31 of the current year. Eastern Region Headquarters will forward a copy of the plan to NIFC and NWS Headquarters.

2007 Fire Season Customer Signature Page

Maine Forest Service _____ Date _____

Acadia National Park _____ Date _____

U.S. Fish and Wildlife _____ Date _____
Service

Appendix

A – Interagency Agreement

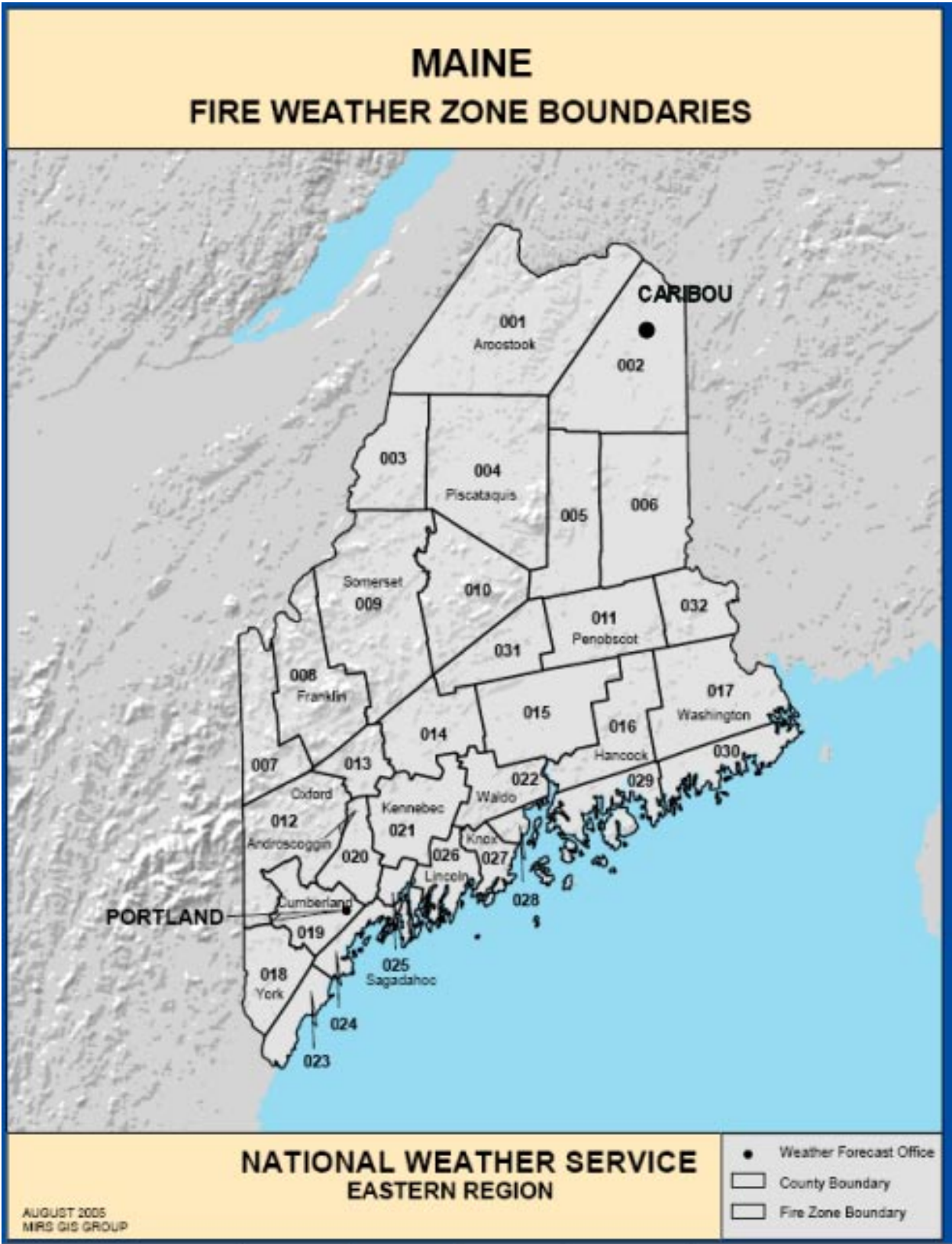
Interagency Agreement for the Meteorological Services in Support of Agencies with Land and Fire Management Responsibilities can be found at <http://www.nws.noaa.gov/directives/010/pd01004006a.pdf> .

B - Points of Contact

Points of contact have been removed

For contact Information please e-mail the Caribou National Weather Service web master.

C – Map of Fire Weather Zones



D - Example of NWS Products

Fire Weather Forecast

FNUS51 KCAR 110935
FWFCAR

FIRE WEATHER PLANNING FORECAST FOR EASTERN AND NORTHERN MAINE
NATIONAL WEATHER SERVICE CARIBOU ME
435 AM EST THU JAN 11 2007

...SCATTERED SNOW SHOWERS NORTH AND DRY DOWNEAST TODAY...
...SNOW AND RAIN SHOWERS FRIDAY...

.DISCUSSION...

HIGH PRESSURE OVER THE REGION EARLY THIS MORNING...WILL SLIDE
SOUTHEAST OF THE REGION THIS AFTERNOON. A COLD FRONT WILL APPROACH TONIGHT
AND SLOWLY PRESS ACROSS THE REGION FRIDAY INTO FRIDAY NIGHT.

MEZ001-003-004-112145-
NORTHWEST AROOSTOOK-NORTHERN SOMERSET-NORTHERN PISCATAQUIS-
INCLUDING THE CITIES OF...ALLAGASH...CLAYTON LAKE...MADAWASKA...
FORT KENT...FRENCHVILLE...BAKER LAKE...BILLY-JACK DEPOT...
BAXTER ST PARK...CHAMBERLAIN LAKE...CHURCHILL DAM...
MOUNT KATAHDIN
435 AM EST THU JAN 11 2007

	TODAY	TONIGHT	FRI
CLOUD COVER	PCLDY	MCLDY	MCLDY
PRECIP TYPE	SNOW SHOWERS	SNOW SHOWERS	SNOW SHOWERS
PRECIP CHC (%)	30	50	80
MAX/MIN TEMP	17	14	32
MIN/MAX RH %	49	86	57
20FTWND/AM(MPH)	W 7		SW 8
20FTWND/PM(MPH)	SW 7	S 7	SW 8
PRECIP AMOUNT	0.02	0.05	0.09
PRECIP DURATION	1	2	9
PRECIP BEGIN	2 PM	CONTINUING	CONTINUING
PRECIP END	CONTINUING	CONTINUING	CONTINUING
MIXING HGT(FT-AGL)	1500		2340
TRANSPORT WND (KTS)	W 15		W 27
VENT RATE (KT-FT)	12460		59720
DISPERSION	POOR		GOOD
LAL	1	1	1
HAINES INDEX	3	3	2

REMARKS...NONE.

\$\$

Rest of Fire weather zones omitted for brevity. They would
follow in a similar format as the grouping above.

\$\$

Red Flag Warning

RED FLAG WARNING
NATIONAL WEATHER SERVICE CARIBOU ME
700 AM EDT WED OCT 8 2000

...A RED FLAG WARNING IS IN EFFECT FOR NORTHERN MAINE THROUGH THURSDAY...

HUMIDITY LEVELS WILL BE 25% OR LOWER THIS AFTERNOON AND AGAIN THURSDAY AFTERNOON AND THE WINDS WILL BE FROM THE SOUTH AT 20 TO 30 MPH. THE THREAT OF WILDFIRES WILL BE EXTREMELY HIGH.

AS A RESULT A RED FLAG WARNING HAS BEEN ISSUED FOR NORTHWEST AROOSTOOK...NORTHEAST AROOSTOOK...NORTHERN SOMERSET...NORTHERN PISCATAQUIS...NORTHERN PENOBSCOT AND SOUTHEAST AROOSTOOK COUNTIES.

\$\$

VJN

Fire Weather Watch

FIRE WEATHER WATCH
NATIONAL WEATHER SERVICE CARIBOU ME
700 AM EDT WED OCT 8 2000

...A FIRE WEATHER WATCH IS IN EFFECT FOR ALL OF NORTHERN AND DOWNEAST MAINE THURSDAY...

HUMIDITY LEVELS ARE EXPECTED TO FALL TO 25% OR LOWER AND WINDS ARE EXPECTED TO EXCEED 15 MPH THURSDAY. THESE CONDITIONS WILL CAUSE THE THREAT OF WILDFIRES TO BE VERY HIGH.

\$\$

VJN

NFDRS Forecast

FNUS81 KCAR 101952
FWMCAR

FCST,170701,070111,13,1,24,45,1,1,W,04,,33,13,67,42,0,0,N

Spot Forecast

SPOT FORECAST FOR MOOSEHORN...NWS CARIBOU
NATIONAL WEATHER SERVICE CARIBOU ME
101 PM EST WED MAR 21 2007

FORECAST IS BASED ON IGNITION TIME OF 1320 EST ON FEBRUARY 21.
IF CONDITIONS BECOME UNREPRESENTATIVE, CONTACT THE NATIONAL WEATHER
SERVICE.

.DISCUSSION...
DRY CONDITIONS WITH LIGHT WINDS WILL PREVAIL TODAY WITH A
MOSTLY CLOUDY SKY.

.TODAY...

SKY/WEATHER.....MOSTLY SUNNY (45-55 PERCENT). CHANCE OF SNOW
SHOWERS EARLY IN THE MORNING.
MAX TEMPERATURE.....AROUND 30.
MIN HUMIDITY.....59 PERCENT.
EYE LEVEL WINDS.....LIGHT WINDS BECOMING NORTHWEST 5 TO 11 MPH IN
THE LATE MORNING AND AFTERNOON.
CHANCE OF PCPN.....10 PERCENT.
MIXING HEIGHT.....2000-3800 FT AGL INCREASING TO 4000-4400 FT AGL
IN THE AFTERNOON.
TRANSPORT WINDS.....NORTHWEST 12 TO 18 MPH.

TIME (EST)	1 PM	3 PM	5 PM
SKY (%).....	61	61	62
WEATHER COV.....			
WEATHER TYPE....	NONE	NONE	NONE
TEMP.....	48	48	45
RH.....	49	51	57
EYE LEVEL WIND..	NW 9	NW 9	NW 9
EYE LEVEL WIND..	15	15	15
CHC OF PCPN (%)..	10	10	10

C- Surface Observations

The Automated Surface Observing System (ASOS) is located at 6 sites across Northern and Downeast Maine. A complete weather observation is available 24 hours a day by calling the site. The observation locations and telephone numbers are listed below:

<u>ID</u>	<u>LOCATION</u>	<u>TELEPHONE</u>
FVE	Frenchville	207-543-7456
CAR	Caribou	207-496-3153
HUL	Houlton	207-532-1584
GNR	Greenville	207-695-0732
MLT	Millinocket	207-723-8396
BGR	Bangor	207-947-5293

In addition to the ASOS observation, Automated Weather Observations (AWOS) are available from the following sites:

<u>ID</u>	<u>LOCATION</u>	<u>TELEPHONE</u>
PQI	Presque Isle	207-764-7248
BHB	Bar Harbor	207-667-7364

RAWS and MESONET SITES (w/Lat and Lon)

RAWS

McFarland Hill RAWS	44.37	-68.26
Sunkhaze	44.90	-68.64
Turner Brook	46.29	-69.84
Moosehorn	45.11	-67.28
Rachel Carson	43.27	-70.59

MCOOP sites

Dixmont	44.68	-69.16
Knowles Corner	46.20	-68.31
Ripogenous Dam	45.87	-69.17
Kokadjo	45.67	-69.44
Eagle Lake	47.04	-68.59
Eastport	44.90	-67.00
Jonesboro	44.63	-67.64
Patten	46.02	-68.50
Bald Mtn.	45.34	-68.09
Oxbow Ck Pnt.	46.42	-68.55
Princeton	45.19	-67.55
Danforth	45.66	-67.87
Fox Brook	46.80	-68.83
Clayton Lake	46.60	-69.52

Rainwise

Stonington	44.15	-68.65
Bass Harbor	44.22	-68.33
Prospect Harbor	44.40	-68.00
Jonesport	44.52	-67.62
Cutler	44.64	-67.28
West Quoddy Head	44.80	-66.95
Fort Kent	47.25	-68.58
Van Buren 2	47.16	-67.93

Other Automated Stations

Bangor ASOS	44.80	-68.77
Bar Harbor AMOS	44.44	-68.35
Caribou ASOS	46.85	-68.00
Clayton Lake RAMOS	46.60	-69.52
Eastport Synop	44.90	-66.98
Fox Brook HANDAR	46.80	-68.83
Frenchville ASOS	47.28	-68.30
Greenville ASOS	45.45	-69.55
Houlton ASOS	46.12	-67.83
Millinocket ASOS	45.65	-68.70
Presque Isle AMOS	46.65	-68.00
St. Aurelie HANDAR	46.20	-70.27
Smith Brook HANDAR	46.45	-68.95

D – NOAA Weather Radio

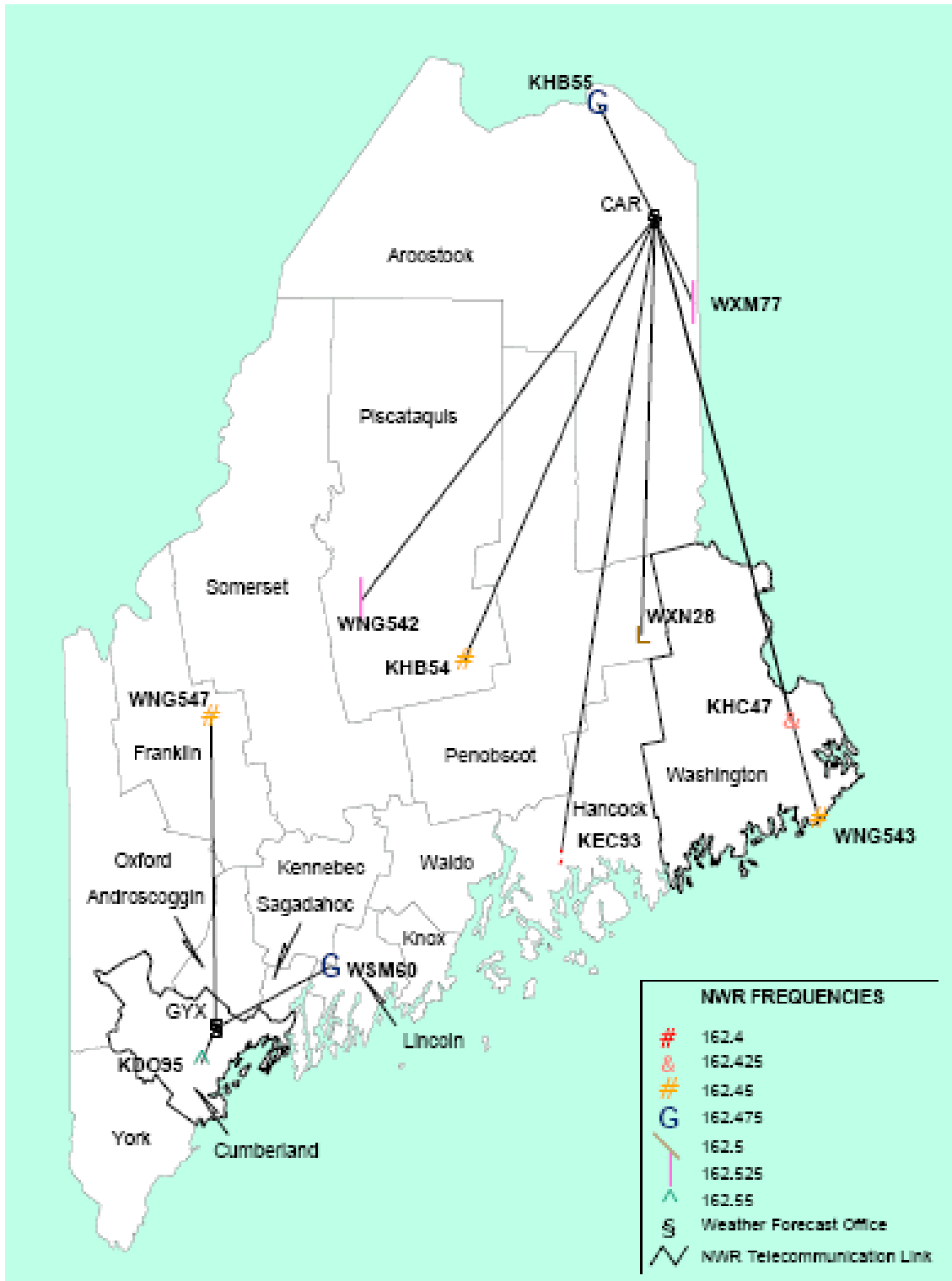
Portions of Northern and Downeast Maine are covered by a NOAA Weather Radio network. These 24-hour broadcasts provide continuous up-to-date weather information directly from the NWS. Automated or taped weather messages are repeated every 5 to 10 minutes, and are routinely revised as needed. The broadcasts are tailored to the weather needs of the people within the receiving area. These broadcasts can usually be heard as far as 40 miles or more from the antenna site depending on terrain, receiver quality, and other factors.

NOAA Weather Radio transmitter sites serving Maine and their assigned frequency are listed below:

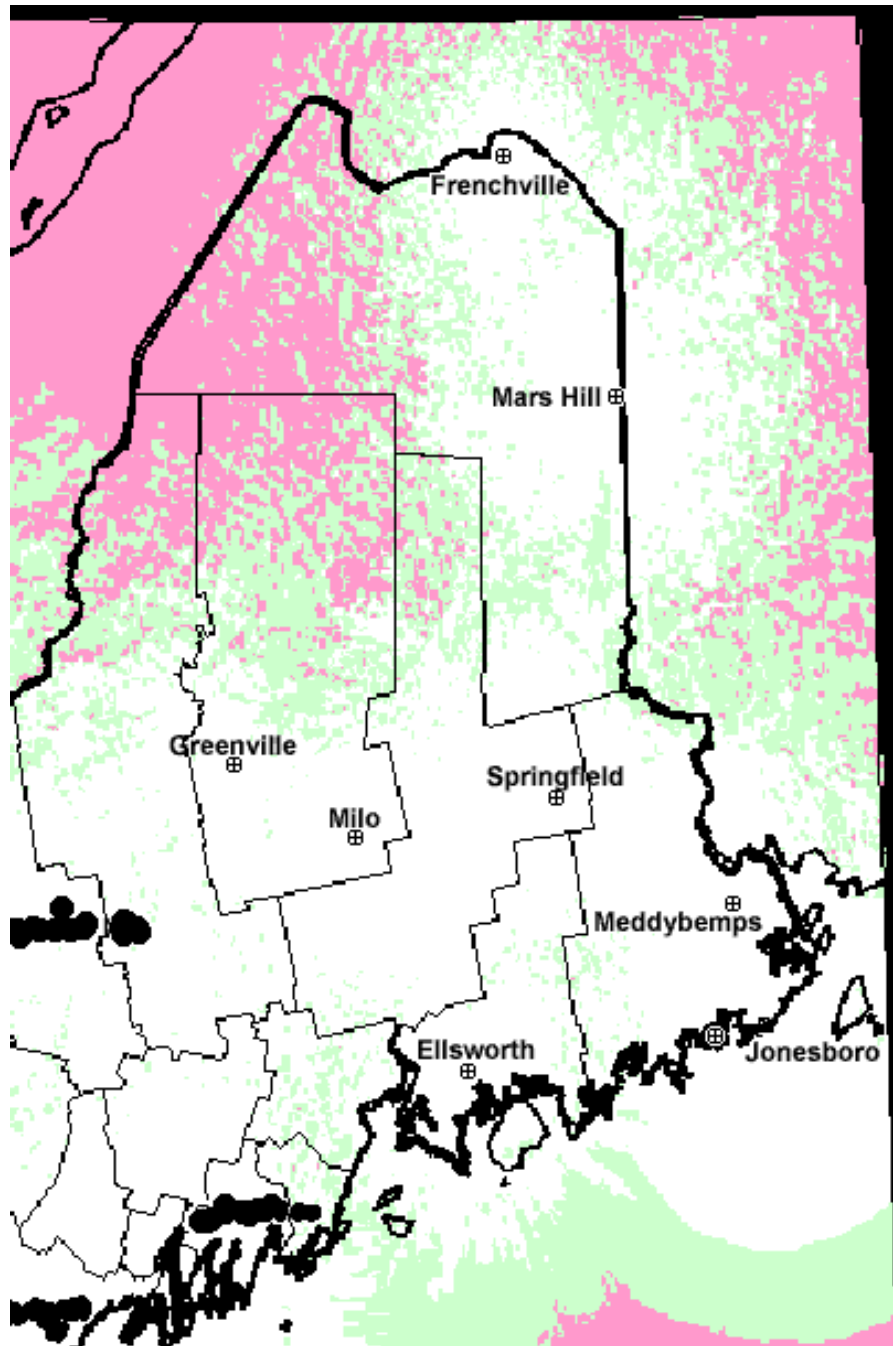
The Caribou Weather Forecast Office operates 8 NOAA Weather Radio transmitters across northern and Downeast Maine. Here's a list:

Location	Frequency	Call Sign	Power
Ellsworth, Hancock Co.	162.400 MHz	KEC-93	1000 watts
Frenchville, Aroostook Co.	162.475 MHz	KHB-55	300 watts
Greenville, Piscataquis Co.	162.425 MHz	WNG-542	300 watts
Jonesboro, Washington Co. (marine specific)	162.450 MHz	WNG-543	300 watts
Mars Hill, Aroostook Co.	162.525 MHz	WXM-77	100 watts
Meddybemps, Washington Co.	162.425 MHz	WHC-47	300 watts
Milo, Piscataquis Co.	162.450 MHz	KHB-54	1000 watts
Springfield, Penobscot Co.	162.500 MHz	WXN-28	1000 watts

Jonesboro's primary programming is dedicated to marine forecasts, observations, and warnings for the intended use of both commercial and recreational mariners. In addition, severe weather warnings for Washington and Hancock counties will be aired on this station.



Here is a map showing NOAA Weather Radio sires and associated frequencies.



Here is a map showing NOAA Weather Radio coverage in our area. Find your location then check the color.

- **White** - Signal level of greater than 18dBd: reliable coverage, including SAME alerts.
- **Green** - 0dBd to 18dBd: picking up an audio signal is possible but unreliable. No SAME alerts.
- **Pink** - Less than 0dBd: unlikely to receive any signal.

E – Record of Changes to the Operating Plan